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Screening and Information Asymmetry in Early-Stage Venture Capital Markets

A Dissertation in Support of the Degree of
Doctor of Philosophy

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27 Feb 07

PhD.

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Date of submission: 5 Oct 2006
Date of award: 12 April 2007

Dedicated to Julia Stollery,

the high-school music teacher who pushed me to aim higher than I thought reasonable or possible, who with a single phrase of encouragement set me on this twenty-five year journey of discovery.

Abstract

This is an examination of early-stage capital markets among venture capital investors and entrepreneurs, and the role information asymmetry plays in influencing the strategies that market participants adopt. It explores the thesis that venture capital investors who operate in early-stage capital markets do so to attract desirable entrepreneurs, and thereby improve the quality of investment opportunities they are presented with. A combination of theoretical arguments and empirical research on venture capital investors frames the types of investors and the reasons they use to justify their operation in early-stage capital markets. An empirical study of entrepreneurs and their capital-sourcing decisions then elucidates the effect of various investor strategies on the decisions of entrepreneurs.

This research suggests that venture capitalists are not homogeneous in their approach to this market, and these variations are due to differences in their ability to “screen” investment opportunities. Moreover, investors with particularly high skill will operate in this market to attempt to signal this quality to entrepreneurs, as successful operation in this market does convey private information about the investor’s skill. Yet, entrepreneurs do not value this signal. When selecting their capital providers, they pay little practical attention to the information this signal conveys.

This research contributes to the extension of previous theoretical models of investor screening, by allowing heterogeneity in screening skill, and by developing a range of strategic alternatives that skilled investors can pursue, which are not evident in previous models.

This research also contributes to an enhanced understanding of the role of signalling in financial markets with high information asymmetries, by developing a theoretical justification for the emergence of such signals, by demonstrating their formation in early-stage capital markets, and by examining their poor efficacy with respect to one of the target audiences (i.e., entrepreneurs).

Finally, this research contributes a novel perspective to our understanding of how early-stage entrepreneurs evaluate potential venture capital investors, and the degree to which their own understanding of this is marred by poor introspection.

Through these contributions, this research provides an improved understanding of key elements of the entrepreneurial process in relation to high-growth firms.

An earlier version of chapter 7 has been published in *Silicon Valley Review of Global Entrepreneurship Research*, 2(1): 25-45.

Keywords: venture capital, adverse selection, information asymmetry, screening, signalling, entrepreneurial finance, conjoint analysis.

66,000 words.



Acknowledgements

I am profoundly grateful for the wise counsel and guidance I have received from my supervisors, Colin Gray at Open University, and Rein Peterson at York University. They have given my close enough support to keep me from discovering anew the manifold traps into which PhD students often fall, yet have given me enough freedom to pursue a line of research uniquely my own and to take full responsibility for the approach and the results obtained. To the extent that I am prepared to join the Academy, I owe them my thanks.

I am also indebted to those who tried to teach me something about the philosophical foundations of research, good research design, sound research methodologies, and the effective use of tools to manage and analyze research data. Thank-you, Willow Sheremata, Eileen Fischer, Ashwin Joshi, Mark Kamstra, and Marshall Rice, for equipping me to launch a research career, and for generously sharing your tips and tricks of the trade. Thanks especially to Marshall for his detailed support in the design and analysis of the conjoint study reported in chapter 7.

Thank-you also to my more experienced peers and colleagues, Neil Wolff, Yuval Deutsch, and Steve Gedeon, for all their support and advice along the way. Thanks especially to Steve for being the “practitioner” sounding board in the design of the study reported in chapter 7 and for providing so much assistance and guidance towards enlisting participants in that same study, and to Neil for being a sparkling colleague with a delightfully sharp mind that seems often to run orthogonal to my own.

I benefited immensely from the industry experience and practical advice of many experts in the early-stage private equity markets. In particular, I am grateful for the time and wisdom shared by Kevin Talbot, Kathy Jeramaz-Larson, Sunil Selby, and Dominic Tallala, each of whom is an enormously talented and insightful investor, and a warm and generous friend. I would also like to recognize and thank David Woolford, Rolf Eichfuss, and Scott Anderson for their support and assistance in

refining the approach and the research instruments for the studies reported in chapters 4 and 5. Thanks, Richard Rémillard, Cindy Gordon, and Helix Commerce for your assistance in contacting entrepreneur research participants.

I am grateful also to the senior administrators at the Faculty of Business, Ryerson University, for creating the supportive and encouraging environment, and especially for granting me the time and resources necessary to focus on this endeavour. Thank-you, Director Peter Luk, Associate Dean Wendy Cukier, former Dean Tom Knowlton, and current Dean Ken Jones. I hope that your faith has been well-placed. Thanks also to Geoff Mallory of Open University for a careful reading of earlier drafts, which led to many insightful and helpful suggestions for improvement of this dissertation. And many thanks to Richard Harrison, Devendra Kodwani and Janette Rutterford for careful critique and many helpful suggestions for improvement of the final version.

Finally, I owe greatest thanks to my family, my wife Nalini Valliere, and my daughters Nisha and Yashoda. It has been a long journey, and I have had to make sacrifices along the way. But none compare to the sacrifices you have made and the support you have given me.

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1. Introduction

This research is an investigation into early-stage private equity markets among venture capital (VC) investors and entrepreneurs. The effective operation of these financial markets is an essential precursor to the development of many successful new firms and the various social benefits associated with their launch and growth: economic growth, job creation, regional development, efficient deployment of resources, exploitation of technological innovation, provision of new products and services, and funding of research. When early-stage markets operate effectively, capital is directed to firms with the greatest potential for growth and the creation of these benefits. Consequently, it is important to understand the unique challenges in these markets, and to gain insight into how market effectiveness can be enhanced.

Towards this goal, this research specifically examines the effects of information asymmetries among the actors in early-stage markets, by investigating how it shapes their various strategies and influences their objectives. Early-stage private equity markets are characterized by uniquely high information asymmetries, where investors have few mechanisms for obtaining information to help them determine whether a particular entrepreneur and firm represent an attractive investment opportunity. These markets lack the institutionalized information transfer mechanisms of the public capital markets, and the early-stage firms themselves face uniquely high uncertainties regarding their own future prospects. Yet the effective functioning of early-stage capital markets is a critical antecedent to the economically more significant later-stage public capital markets – the public markets cannot sustain and evolve without the periodic injection of new firms through initial public offerings (IPOs). And these new IPOs depend on the earlier-stage private capital markets for the infant feeding, selection, and development of IPO-ready candidate firms. Therefore, the effective resolution of information asymmetries and associated risks in early-stage markets is an important precursor to all later-stage capital markets. Yet, despite this importance, the extant

research into the methods by which information asymmetries are resolved in early-stage markets remains underdeveloped.

This research adopts a positivist paradigm to attempt to objectively describe how the market actors respond to the challenges of information asymmetry, and how these responses interact to shape the process of matching investors with entrepreneurs that is needed for successful investment transactions to occur. In particular, this research examines the role of screening processes on the part of VC investors, the way in which these processes mitigate information asymmetries about entrepreneurial firms, and how they also signal hidden qualities of the VC investor to other stakeholders. Although current models assume a homogeneity of VC abilities and behaviour, the wide differences in screening abilities and procedures suggest heterogeneity, and that any differences between types of VC need to be taken into account. This research is conducted using a combination of theoretical and empirical arguments, supported by data obtained from VC investors. This is followed by an examination of the effects these processes have on entrepreneurs, through an exploratory empirical examination of how entrepreneurs choose their venture capital investors, using data obtained from entrepreneurs.

Investing in private companies is fraught with risk, largely due to the high information asymmetries between the company and the investor. These asymmetries are particularly high in markets comprising young start-up companies, where little may be generally known about the firm, and where relatively few institutionalized information dissemination mechanisms exist. Information asymmetries can exist prior to an investment being made, and can lead VC investors to fund poor companies or to not fund good companies, leading to poor investment returns. And the efforts that investors might make to mitigate this risk may have the effect of driving to good companies out of the market – a condition of adverse selection. Information asymmetries also exist after an investment being made, and can lead VC investors to continue to support poorly managed companies or to cut off support to well-managed companies – a condition of moral hazard. Of these two challenges, the problem of

adverse selection is particularly significant because it occurs *ex ante*, when uncertainty is highest and the costs of a misjudgement are also highest.

Venture capital investors operating in early-stage markets often attempt to mitigate information asymmetry and adverse selection risks by requiring entrepreneurs from such firms to disclose private information about themselves prior to any agreement for investment; they “screen” entrepreneur through an information gathering and evaluation process. The screening process creates the potential for an adverse selection problem, whereby the more vigorously the investors attempt to gather private information from the entrepreneurs, the more likely they are to drive away desirable entrepreneurs – these entrepreneurs can obtain financing from other investors who impose less onerous screening processes. The investor challenge therefore is to mitigate the information asymmetries without creating adverse selection. An inability to do this can effectively bar some investors from the market.

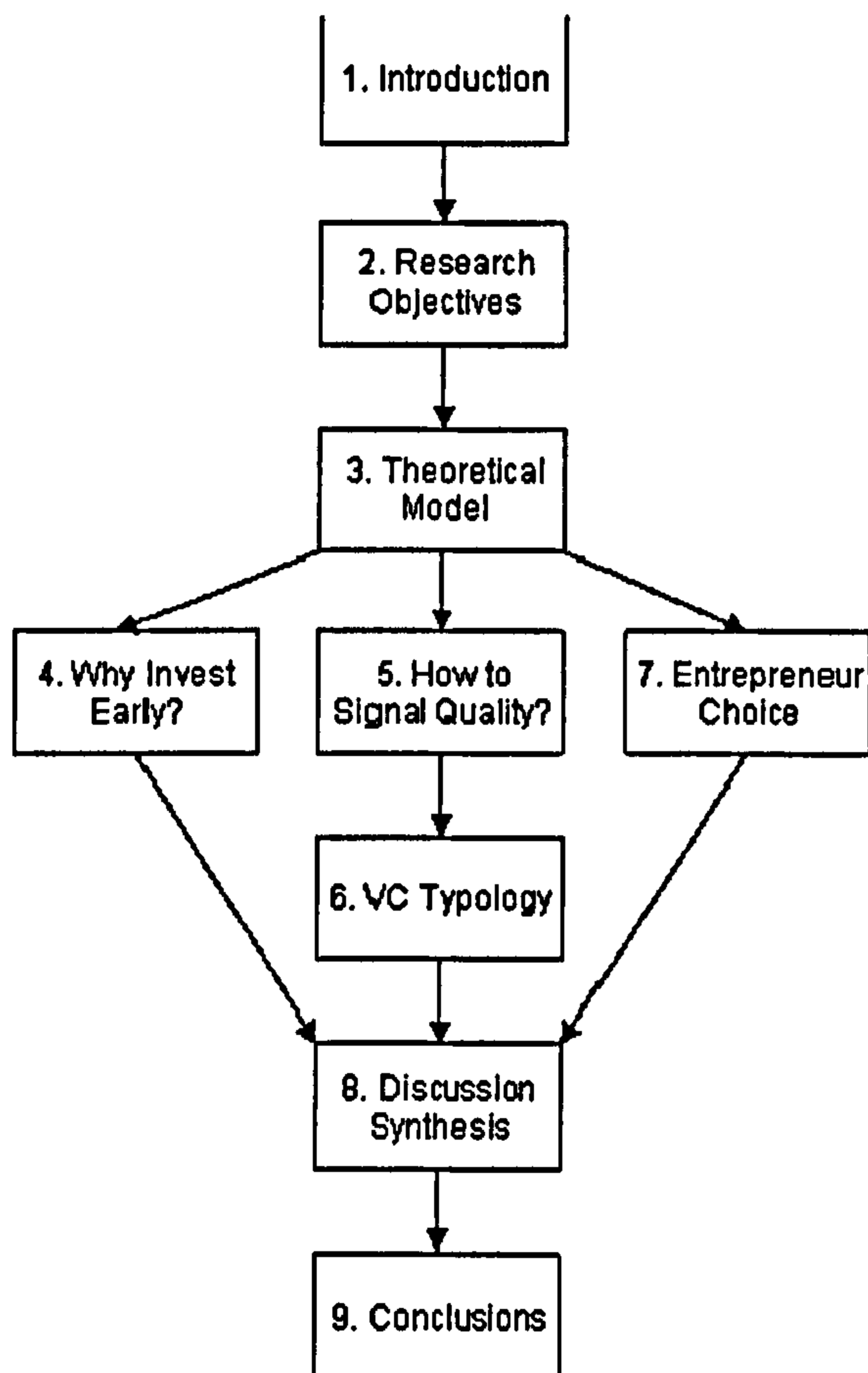
Accordingly, it is the VC investors with extraordinarily high screening skill who are especially willing to participate in early-stage investment markets, despite the high risks they face due to information asymmetries. One reason they do so is to signal to observers that they possess this high degree of screening skill and the ability to reduce information asymmetries. By signalling this level of skill they hope to attract desirable stakeholders in general and entrepreneurs with desirable firms in particular. These entrepreneurs are attracted by this potential to reduce asymmetries, since it would result in more favourable financing terms for them. Entrepreneurs with less-desirable firms are not attracted by this potential, since it would result in less-favourable financing terms for them. As a result, making investments in companies in early-stage markets can act to mitigate the potential for adverse selection.

It is this logic that motivates the fundamental thesis of this present research. In a single and greatly simplified form, this thesis can be given in a single statement:

Venture capital investors invest in early-stage capital markets partly to appear more attractive to desirable entrepreneurs.
--

Figure 1-1 outlines the approach taken to exploring this thesis and arguing for specific conclusions.

Figure 1-1: Structure of the Argument



The research exploration begins in chapter 2, where several related research objectives are stated, and where specific research questions are put forth. These research questions form the context for the specific research studies reported in the subsequent chapters. Chapter 3 then presents a comprehensive literature review to position these research questions into streams of interrelated research about venture capitalist screening behaviours, information asymmetry and adverse selection in various financial markets, and the consumer choice process by which entrepreneurs choose their VC investors. This broad literature review is complemented in the chapters that follow by more narrowly targeted and deeper reviews of the literature relevant to each specific research study.

The next four chapters comprise the various research studies that have been conducted to test this thesis. Chapter 4 is a theoretical and quantitatively empirical


investigation into the nature of VC screening skill and its relationship to the degree to which VC investors participate in markets with high information asymmetries, such as early-stage private investment markets. This investigation attempts to explore the question of why a VC investor would choose to operate in early-stage markets with high information asymmetries.

Chapter 5 theoretically and empirically examines the possibility that this early-stage investment behaviour may be more than a simple pursuit of economic gain, and that it may have an additional information-signalling value. In particular, it explores the possibility that early-stage market behaviour on the part of VC investors may act as a signal of quality to other market participants, and by so doing, create value for the VC investor.

Chapter 6 further expands on the topics of the previous chapter by triangulating with qualitative interview data from practicing VC investors. This triangulation from an interpretivist research stance provides some validation of the interpretations drawn from the preceding positivist investigations. These data are used to develop a typology of VC investors that supports the interpretations of chapters 4 and 5. The adoption of a multi-method approach to the thesis, by incorporating this interpretivist perspective in complement to the positivist perspectives of the other empirical chapters, provides a broader and more complete exploration of the constructs and relationships being suggested in this research. The alternative research approach used in this chapter also highlights some future research topics, pertaining to non-rational goals of VC investors, which are beyond the scope of the present thesis.

Finally, to reflect the potential adverse selection risk that screening may create, chapter 7 provides an empirical exploratory investigation into how entrepreneurs evaluate potential VC investors for their firms. It investigates the criteria by which VC investors are chosen by entrepreneurs and the role (if any) that signals of screening quality may play in this choice.

The final two chapters integrate the findings of these research studies and use these results to address the specific research questions outlined in chapter 2. Chapter 8 provides discussion and synthesis of the results from the various studies, drawing out common themes and observations that emerge upon comparison across studies. Chapter 9 directly addresses the specific and detailed research questions, positing equally specific and detailed answers that are proposed as a result of the research. It also summarizes the limitations of the aggregate research effort, highlights the new or related research questions that remain unanswered, and provides some practical recommendations for both VC investors and entrepreneurs seeking capital.



2. Objectives

Purpose

This research contributes to the extension and integration of three streams of literature. First, it extends the economic literature of information asymmetry and its effects in capital markets by investigating how the presence of very high asymmetries in early-stage markets influences the strategies of participants. Secondly, it extends the literature of venture capitalist operations in two ways: by relaxing the assumed homogeneity of investor skill levels and demonstrating a resulting range of strategic possibilities afforded to different types of investors, and by considering the possibility that early-stage investments constitute a signal to stakeholders regarding these different skill levels and strategies. And finally, it makes novel application of ideas developed in the consumer behaviour literature, to better understand the process by which entrepreneurs select their capital providers and to identify ways in which differences among investors may influence this selection process. By integrating these three perspectives, this research provides a more comprehensive understanding of how investors and entrepreneurs in early-stage markets find and evaluate each other, and how they adopt strategies to mitigate information asymmetries and maximize their expected values.

This research is focused on financing provided by professional venture capital investors, rather than substitute investments from informal “angel” investors because the VC investors seek purely financial gains, while angels may also seek additional non-financial goals (such as meeting a perceived social responsibility, or for pure enjoyment) that may confound the effects of information asymmetries on their investment decisions. There is an argument that angel investors are not subject to the information asymmetry problem as they are investing in principal-principal situations rather than principal-agent ones. Moreover, angels typically employ different screening criteria and different due diligence approaches than do professional VC investors. The research is also focused on financing of early-stage firms because it is with such firms that uncertainties are likely to be greatest and information asymmetries highest, yet

formal mechanisms for information exchange are least developed. As a result, this research focus should offer unique insight into how the challenges of information asymmetries are handled.

Early-stage capital markets are critical enablers of entrepreneurial activity and development of new sources of economic gain, a role which motivates the present attempt to better understand the strategies and interactions of market participants and to develop more complete theories to explain these behaviours. This research should therefore advance the understanding of market dynamics between entrepreneurs and venture capital (VC) investors, and elucidate the balance between the competing risks that the utilization of screening criteria entails. Of specific practical value should be the emergence of guidelines by which investors may establish screening criteria that adequately compensate for information asymmetries, yet do not result in unacceptable levels of adverse selection.

It is therefore expected that the results of this research may have practical value to investment practitioners in designing and evaluating due diligence processes and screening criteria, first by providing insights into the relationship between due diligence and adverse selection risk for a class of investors with a poor history of introspection and internal process improvement, and secondly by providing these same investors with practical guidance on how best to improve their due diligence processes to mitigate this risk. This research may thereby make some initial steps towards responding to the call of Sheppard and Zacharakis for better understanding of decision aids and cognitive feedback for VC investors (Shepherd and Zacharakis 2002).

Additionally, it is expected that this research will benefit entrepreneurs and SME managers by providing an improved understanding of which aspects of a VC screening process are essential to mitigating information asymmetry (and must therefore be accepted as prerequisite to obtaining any VC financing), and which are merely incidental (and can therefore be challenged by an entrepreneur who feels averse to them).

Finally, this research may lead to insights into the entrepreneurial cognitive processes that generate aversion to VC screening, and thereby enhance understanding of the role of social psychology in the financing of SMEs, particularly from the perspective of entrepreneurs and those types who are drawn especially to VC financing.

Research Questions

A contribution towards this overall objective will be attempted by addressing a small set of interrelated research questions.

- 1) What role does screening play in mitigating information asymmetry in early-stage markets? This question is additional to the immediate role that the screening process plays in causing entrepreneurs to reveal some degree of private information to potential VC investors.**
 - Are VC investors homogeneous in how they use screening to mitigate information asymmetries? If not, what factors underlie the heterogeneity and how are these manifested?
 - What asymmetry-mitigation strategies do VC investors adopt? Is the adoption of different strategies dependent on the screening skill of the particular VC investor?
 - Does screening ability correlate with willingness to invest in markets with high asymmetries, such as potential investments with unknown entrepreneurs, business startups, expansions of established firms into new areas of business, firms with unproven business models, investments in foreign jurisdictions, unsyndicated investments, and investments into firms that have been rejected by other VC investors?
- 2) Do VC investors use screening ability as a signal of quality for their stakeholders? Does differential screening skill meet the requirements of an effective signal? What information value would such a signal convey?**

- Do VC investors signal their screening skill in order to improve the quality of their dealflow (i.e., the firms and entrepreneurs that present themselves as seeking investment capital)? How else do they attempt to improve the quality of dealflow?
 - What value would such signals have? How much should the market participants be willing to pay to cause the effective transmission of the information carried by these signals?
 - In practice, do VC investors signal their screening skill by investing in early-stage markets? By what other methods do VC investors think that their screening skill can be signalled to observers? And what other reasons do VC investors have for investing in early-stage markets?
- 3) Do entrepreneurs pay attention to the signal value of differential screening skill when seeking and evaluating potential VC investors? How important is this potential signal, relative to other selection criteria used by entrepreneurs?**
- How do entrepreneurs believe they choose their VC investors? What criteria do they espouse to value? Do they intend to look for signals of screening skill? In practice, how and why do entrepreneurs actually choose their VC investors? How well does their actual choice behaviour correspond to their espoused beliefs? Are entrepreneurs homogeneous with respect to these choice criteria, or does the relative importance of criteria depend on industry, firm or individual entrepreneurial attributes?

To provide an improved context for these questions, the investigation begins by developing a theoretically based model of the early-stage capital market and the information exchanges among participants in this market. This model development is the focus of the next chapter.

3. Theoretical Model

Markets with Imperfect Information

This research is an investigation into the early-stage market among venture capital (VC) investors and entrepreneurs. By VC investors is meant professional investors, acting as agents for some institutional source of capital, and investing in equity-like instruments of privately-held firms founded by entrepreneurs. These VC investors are thereby differentiated from angel investors (who may not be professional investors, and who are typically investing their own money as principal sources of capital), from sources of large later-stage private equity investments (e.g., merchant banks), and from sources of non-equity finance (e.g., banks and trade creditors). And “early-stage” refers to the market for investments in young firms with significant uncertainties with respect to the completion of commercialized products, the acceptance of these products by customers, operational capabilities of the firm, the skill of the management team, or the financial viability of the firm’s business model. This market is thereby differentiated from investments in later-stage private firms (where most of these uncertainties have been resolved or significantly reduced) and from public stock markets (which have well-established mechanisms such as disclosure rules for addressing imperfect information among market participants, which are not available in early-stage markets).

To approach an understanding of the interrelated behaviours of entrepreneurs and VC investors, theorizing starts from the assumption of a classical marketplace of transactions among many entrepreneurs and investors, in which the entrepreneurs exchange bundles of potential cashflow and control rights (typically in the form of debt or equity contracts) for bundles of capital and intangible benefits (such as expert knowledge, access to personal networks, or certification value) provided by VC investors.

The operation of the market (such as price formation and the determination of the strategies that the actors follow to make their buy/sell decisions) depends on the

information available to the actors. Much of this information is “common knowledge” (meaning that it is known to all the actors, who in turn know that all others also know it, and so on in recursive fashion) (Aumann 1976). Examples of this common knowledge include market and general economic conditions, the overall levels of venture capital available, and the publicly disclosed terms of recent deals (typically comprising high-level descriptors such as the sector in which the company operates, and the total amount of the investment made). But some of the information is private to entrepreneurs (such as the true state of their firms, their intentions regarding future expenditure of effort, and the potential investment terms they would be willing to accept). And some of the information is private to investors (such as their assessment and level of desire for each entrepreneur’s investment opportunity, the performance of their current investment portfolio compared to the performance targets established for it, and their assessment of competitive pressures).

As a result of the existence of this private information, the actors in the market necessarily have imperfect information. They may have prior assumptions about the information unknown to them, but these assumptions are probabilistic at best. Choosing and implementing a strategy in the face of this imperfect information is therefore a decision taken under risk.

How people make decisions under risk is a topic with rich history. Several of the theoretical lenses that may be applied to managerial decision-making under risk owe their origins to the theory of the firm and associated agency risks (Jensen and Meckling 1976) or to various permutations of generalized expected utility theory (Machina 1982) that are obtained by successively relaxing individual axioms of subjective utility theory (Savage 1954).

Generalized expected utility theory is an extension of the von Neumann-Morgenstern classical utility theory (von Neumann and Morgenstern 1944). This theory posits that actors make choices from among alternatives based on the *utility* of these alternatives, and that the utility of an alternative is somehow related to the expectation value of the economic payoff of that alternative. The generalization is that this relationship, while

monotonic, is not necessarily linear. The preferences implied by this relationship must only satisfy four axioms:

- **Completeness** – Any pair of alternatives can be ranked or compared, and actors will have a preference between them.
- **Transitivity** – If alternative A is preferred to alternative B, and alternative B is preferred to alternative C, then alternative A will be preferred to alternative C.
- **Continuity** – In any gamble for an $X\%$ chance to win \$1000, there exists a value of X where the gamble is equally desired as an absolutely certain of win \$100 (but X might be different than 10%). There is a fixed-value equivalent to any gamble.
- **Independence** – Two alternatives that have the same expected utility can be substituted for each other in any gamble, and it will not affect the preferences of the actors evaluating the gamble.

Subjective expected utility theory extends this thinking to account for a number of observed paradoxes where the expressed preferences of actors appear to violate one or more of these axioms. In particular, subjective expected utility replaces the classical probabilities used in generalized expected utility with “subjectively estimated” probabilities. In this way, the theory can account for decisions made in the face of uncertainty (where the risks cannot be quantified). For example, it may describe how an entrepreneur evaluates her chances of success in a business venture that has never been tried before.

Each extension to these theories adds an additional perspective to the question of decision-making under risk. For example, whereas this traditional economics with strong rationality models address the utility maximization behaviour of investors under point-in-time and path-independent conditions, prospect theory (Kahneman and Tversky 1979; Tversky and Kahneman 1992) adds a dimension of historical context to their cognitions, whereby the utility of a future alternative is partly dependent on the path that has led to it. Career concerns and reputation theory (Holstrom 1982;

Kanodia, Bushman et al. 1989) further adds a dimension of individual actor utility maximization and agency risk, whereby utility is determined with reference to an individual actor. Regret theory (Bell 1982; Loomes and Sugden 1982) adds a dimension of multivariate utility and opportunity cost, whereby utility is not simply a function of wealth but also of emotional components. And signalling theory (Spence 1973; Stuart, Hoang et al. 1999; Bhattacharya and Dittmar 2000) adds a dimension pertaining to access and information economics among actors, and how they communicate information about utility.

Information asymmetry and adverse selection

In the entrepreneur-investor market, a significant component of the decision risk and uncertainty is attributable the asymmetry of private information between the two parties. *Ex ante*, the entrepreneur alone possesses information about her firm¹, her future projects and the effort she is willing to expend towards those projects under various ownership and control scenarios. This leads to two problems. First, if the entrepreneur believes her opportunity to be better than average, she may be reluctant to fully disclose it to others, through fear that either others may copy her ideas and expropriate the opportunity (what Arrow refers to as the “paradox of disclosure”) (Arrow 1962), or that resource providers may raise their prices to attempt to capture more of the economic gains available through the opportunity (Shane and Cable 2002). Secondly, if the entrepreneur believes her opportunity to be worse than average, she faces an incentive to misrepresent the opportunity to thereby entice resource providers to contribute to it, partly to enjoy private benefit of their resources (Jensen and Meckling 1976; Cable and Shane 1997), and partly to trade on their good reputations (Sahlman 1990). In response to this, the challenge for the VC investor is to reduce this asymmetry through the discovery of additional information, and to mitigate the impact of any remaining asymmetry through the design of investment contracts that minimize agency risks.

¹ In the interests of greater clarity of writing, I have adopted the convention of a masculine pronoun for the VC investor and a feminine pronoun for the entrepreneur. Of course, both roles are open to members of both sexes. Nothing gender-specific is being implied in this convention of convenience.

Asymmetry mitigation is typically effected through successive phases of due diligence investigation by the investor, starting with some form of screening criteria (Fried and Hisrich 1994). This includes the creation of bonding costs for the entrepreneur, and the creation of monitoring mechanisms and costs for the investor (Jensen and Meckling 1976). *Ex ante* bonding costs in VC investment contracts may take the form of due diligence fees and break fees that the investor imposes upon the entrepreneur, which thereby create incentives for the entrepreneur to disclose her private information truthfully. *Ex post* bonding costs may take the form of performance-based compensation for the firm management and the sharing of equity risks between the investor and the entrepreneur. Monitoring may take the form of ongoing reporting obligations, active involvement of the VC investor in the management or strategic governance of the firm, and the staging of the investment into multiple tranches (Gompers 1995; Lerner 1995; Berlin 1998; Kaplan and Stromberg 2001).

Without these treatments, markets characterized by such information asymmetries can suffer from two defects:

- 1) Where the asymmetry arises prior to making transactions, adverse selection may occur.
- 2) Where it arises after the transaction is completed, moral hazard may become an issue.

The general adverse selection problem was first discussed in the literature in Akerlof's seminar paper on "lemons" and the potential for market collapse in the markets for used cars, insurance, and others (Akerlof 1970). This model was subsequently enhanced by Wilson, who showed that markets with adverse selection may be characterized by multiple equilibria (Wilson 1979). Rose subsequently provided a framework by which markets with adverse selection may be shown to exhibit either no equilibrium per Akerlof, multiple equilibria per Wilson (with the highest priced equilibrium being preferred by all), or a unique equilibrium under the most likely distribution of quality (Rose 1993). This result that suggests that in adverse selection

markets, provided collapse can be prevented through some mitigating mechanisms, a unique equilibrium typically will emerge (Rose 1993). Yet, this unique equilibrium might not be the expected Walrasian market-clearing price, as some participants may be using price as a signalling mechanism to overcome information asymmetries, as will be discussed below (Wilson 1979).

Yet, despite continuing work on the problem of markets with information asymmetries, there currently exists no single paradigm for competitive markets with incomplete information (Gale 1999); a category that includes the capital markets between VC investors and entrepreneurs.

As a consequence of the competitive pressures among VC investors, the most desirable entrepreneurs are also the ones least likely to acquiesce in demands that they perceive as unjustifiable by the VC investors. Should a VC investor demand an unfavourable valuation or investment terms, or indeed make onerous demands of the entrepreneur during screening and due diligence investigations, a highly desirable entrepreneur may simply walk away into the arms of another investor. In this way, the careful screening processes that VC investors use to mitigate risks due to information asymmetry can be seen also to perversely exacerbate risks of adverse selection (Cumming 2002).

A number of studies, for example, have looked at how the structure of the financing offered by the investor can lead to adverse selection (Stiglitz and Weiss 1981; Myers and Majluf 1984; De Meza and Webb 1987). The practical implications of these studies has been the realisation that offers of equity attract firms with low expected returns, offers of debt attracts firms with higher expected returns but with high expected volatility, and convertible instruments attract firms with low expected volatility (Brennan and Kraus 1987; Hellmann and Stiglitz 2000). These results demonstrate that it is possible to influence the type of entrepreneur attracted to a specific type of investor, and thereby to influence the volume and quality of dealflow that a specific investor will see.

The problem of adverse selection is wide-ranging and significant if left unchecked, and has been proposed as a potential cause of capital markets failure (De Meza and Webb 1990). Since Akerlof's pioneering work (Akerlof 1970), the phenomenon of adverse selection has been found to occur in a wide range of financial markets. In the debt financing world of the banking industry, Stiglitz and Weiss found that information asymmetry leads to a form of credit rationing, whereby banks would be unable to increase interest rates in the face of excess credit demand, because doing so would result in adverse selection and a decline in the credit-worthiness of their customers (Stiglitz and Weiss 1981; Stiglitz and Weiss 1992). In public equity capital markets with high-quality IPO firms, the adverse selection risk in the new issues market can lead to underpricing and staged financing (Jain 1997). In M&A activities, adverse selection can materially impact the choice and form of consideration when structuring acquisition transactions (Datar, Frankel et al. 2001). Adverse selection has also been found to contribute to the creation of barriers to entry in the banking industry, and the fostering of resultant market inefficiencies due to constraints on competition (Dell'Ariccia, Friedman et al. 1999). In aggregate, adverse selection in financial markets can lead to over-investment at a socially inefficient level, wherein more attractive projects subsidize less attractive ones (De Meza and Webb 1987).

Yet despite the presence of the adverse selection problem, the market collapse foreseen by Akerlof and by De Meza and Webb typically does not occur. Mechanisms and market conventions have developed to reduce the information asymmetry in the market and mitigate the risk of market collapse. Akerlof suggested that mechanisms such as seller liability, guarantees, brand reputation, and third-party certifications could arise to reduce information asymmetry in the market. Other mechanisms that have been proposed include contract terms and conditions designed to enforce information transfer (such as investment structure, monitoring and information rights, and staging of investment tranches) (Gompers 1995; Neher 1999; Bascha and Walz 2001), the ability of VC investors to obtain information about the entrepreneur and her opportunity through external social networks (Shane and Cable 2002), and the incentive value for

entrepreneurs to include VC investors as a risk-sharing strategy (Amit, Glosten et al. 1990a).

Capital structure within the entrepreneurial firm can also serve as an information transfer mechanism. Darrough and Stroughton examined the impact of adverse selection in markets where entrepreneurs offer securities to uninformed investors, and found the risk can be somewhat mitigated through the combined use of debt and equity instruments (Darrough and Stoughton 1986). Notably, several studies have reported on the widespread use of combined debt/equity structures or the use of instruments with hybrid characteristics by VC investors (Bascha and Walz 2001; Bratton 2002). But the extent to which these structures are designed to mitigate the potential adverse selection problem, or have had practical impact upon adverse selection, appears to have not been researched.

Venture Capital Seeking Entrepreneurs

The fundamental investing operations of formal VC firms has been extensively described in the literature (Hunstman and Hoban 1980; Tyebjee and Bruno 1984; Sahlman 1990; Gompers 1993; Fried and Hisrich 1995; Berlin 1998). Typically, VC firms are structured as limited liability partnerships in which general partners, acting as agents for the limited partner investors, source investment opportunities, evaluate or screen them according to investment criteria for the specific VC fund, structure and execute investment contracts with the investee companies, monitor the performance of the investees, and eventually liquidate their investment, usually through initial public offering or trade sale.

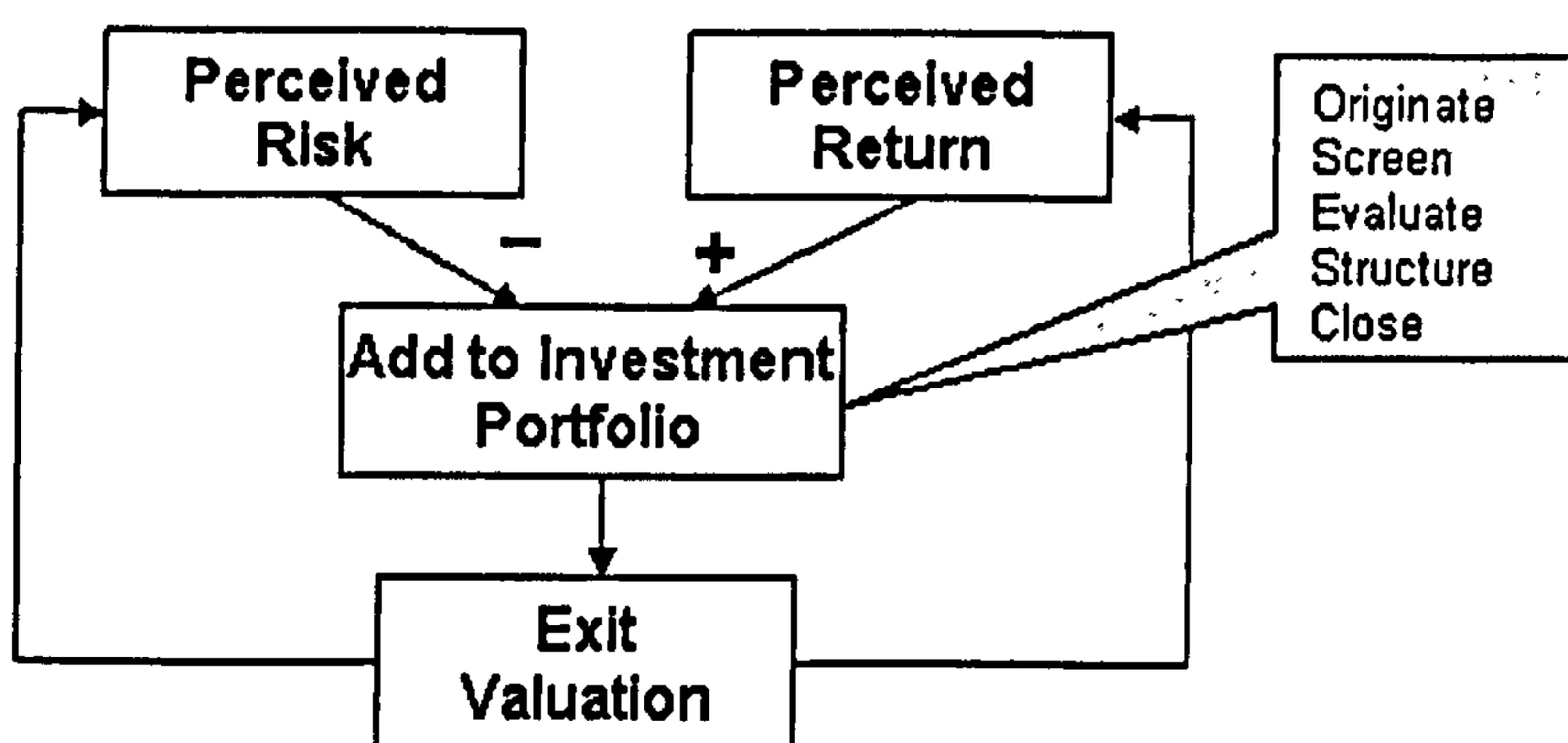
Venture capital firms seek investments that have the potential for high-growth and high returns and, in order to gain the opportunity to secure these high returns, accept high risks and uncertainties in the performance of the investments. Their perception of these growth expectations, and the attendant levels of risk, is conditioned partly by the success or failure of similar investments made by themselves or their peers and partly by factors unique to the individual investment opportunity. For example, Roure and Keeley found, in examining the entire portfolio for a specific VC firm specializing in

technology-based firms, that the performance expectations held by VC investors were primarily driven by their perceptions of the completeness of the founding team, the technical superiority of the product, the expected time required to complete product development, and the degree of buyer concentration. They also found that most of the variance in investee performance could be explained by these factors alone (Roure and Keeley 1990). Stuart and Abetti looked more closely into the qualifications of the founding team, and found that the number of previous new venture involvements and the level of managerial responsibility of the founding team members was by far the most significant factor (Stuart and Abetti 1990). Ruhnka and Young contributed a study into the expectations of VC firms regarding the level of risk of a new company, and found strong correlations between the growth stage of the company and the level/type of risks expected (Ruhnka and Young 1991). Subsequently, researchers explored other potential predictors of investee performance, for which the degree of inclusion into VC expectation models is still not well understood. These include the self-assessed competence of the founders (Chandler and Jansen 1992), a range of general measures of the human capital of the firm (Cooper, Javier Gimeno-Gascon et al. 1994; Smart 1998), and operational and investment governance factors of the contract structure (Jain 2001).

The high degree of uncertainty in the performance of VC investments results in a wide range of performance outcomes, with some investee companies performing spectacularly, while others fail and die before the VC firm can exit. Indeed, an industry heuristic frequently cited by VC investors is that, of ten investments, two or three will die and result in complete investment loss, six will survive but under-perform target return rates or provide no easy liquidity path for the VC firm (so called “walking wounded” or “living dead”), and one or two will perform so spectacularly well as to result in acceptable overall portfolio returns (so called “home runs”). Some empirical studies have obtained results that confirm this practitioner viewpoint (Hunstman and Hoban 1980; Chiampou and Kallett 1989; Ruhnka, Feldman et al. 1992).

Figure 3-1 shows a model of VC investment within a competitive context, by which VC investors observe the successes and failures of competitor investments in a marketplace and use this information to adjust their perceptions of potential risks and returns of future similar investments (Valliere and Peterson 2004). Within this competitive environment, VC firms must strive to become known, differentiate themselves from their competitors, and successfully attract the most desirable entrepreneurs and investment opportunities.

Figure 3-1: Context for Investment Screening



(Valliere and Peterson 2004)

Competition among VC firms

Venture capital firms do not operate in isolation. They compete with other firms for access to attractive investment opportunities and for relationships with the sources of this access; such as universities, research institutions, and professionals (lawyers, accountants, etc.) serving entrepreneurs (referred to as “deal flow”); in particular, they face competition from other sources of capital such as “angel” investors (Sohl 2003), foreign VC firms expanding their reach (Sapienza, Manigart et al. 1996), and local VC firms who chose not to cooperate in syndicated investments (Gompers and Lerner 2001). They also exist in an environment of mutual co-operation in sharing or syndicating individual investment opportunities, as a strategy for marshalling sufficient resources, for amortizing the fixed costs of investment due diligence, or for mitigating agency risks (Lerner 1994; Lockett and Wright 2001). The syndication network environment often forms stable and persistent subgroups (Campo-Rembado 2005).

The existing agency risk between VC firm as agents for their respective capital-provider principals can result in VC firms making investment decisions that are designed to create a favourable impression on their peers, on current or prospective principal sources of capital, or on potential investee companies – a phenomenon referred to as grandstanding (Gompers 1996; Gompers and Lerner 1998). In extreme cases, this can result in a form of herd behaviour sometimes referred to as capital markets myopia (Sahlman and Stevenson 1985; Scharfstein and Stein 1990; Bygrave and Timmons 1992).

Venture capital firms can compete to attract entrepreneurs through a variety of strategies, including the industry/stage/geographic scope of their fund (Elango, Fried et al. 1995), the price of their capital (i.e., the valuation of the entrepreneur's company upon which the VC firms is willing to invest for equity, or the interest rate at which it is willing to invest as debt) (Biglaiser and Ching-to 2003), the nature and extent of the other terms and conditions of the proposed investment contract (such as capital structure, tranches, anti-dilution provisions, vetoes over management, and information reporting obligations) (Neher 1999; Bascha and Walz 2001; Bratton 2002; Wang and Zhou 2002), the degree of expertise the VC firm can make available to assist the entrepreneurial management (Schultz, Murray et al. 2002), the nature and extent of business networks the VC firm can make available (Stuart, Hoang et al. 1999; Schultz, Murray et al. 2002), the VC firm's reputation and any associated referrals from sources trusted by entrepreneurs (such as word-of-mouth recommendations by the management of existing investee companies), and the perceived certification and affiliation value that entrepreneur expects to receive through association with the VC firm (Megginson and Weiss 1991; Stuart, Hoang et al. 1999; Lange, Bygrave et al. 2001; Hsu 2002).

The net impact of this competitive VC environment is that those entrepreneurs with attractive opportunities (being ones that pass the various screening criteria), can become objects of competitive demand among VC firms. The better an entrepreneur's opportunity appears on the screening results, the more that VC firms will wish to add

her firm to their own investment portfolios. The relative scarcity of high-quality entrepreneurial investment opportunities among the total deal flow seen by VC investors only serves to amplify this competitive pressure. As several studies have shown, good investment opportunities are relatively rare among the deal flow most VC investors see (Hunstman and Hoban 1980; Ruhnka, Feldman et al. 1992; Fried and Hisrich 1994). As a result, an entrepreneur with an attractive firm and with the ability to pass the various screening criteria of VC investors will be in a strong position to negotiate favourable investment terms with interested VC investors. This is in stark contrast to an average or low-quality entrepreneur who, if she can attract venture capital at all, is forced into a position of a simple price-taker.

VC investors screening entrepreneurs

In dealing with entrepreneurs, VC investors are at an intrinsic information disadvantage, in that the entrepreneurs possess private information about the nature and prospects of their businesses, and about the level of effort they are willing to expend towards making their businesses successful. This information asymmetry has the effect of creating risk, uncertainty and inefficiency in early-stage capital markets (De Meza and Webb 1987; Cumming and MacIntosh 2001).

If the VC investor chooses to invest in an entrepreneurial company, it creates an agency relationship by which the entrepreneur acts as an agent of the investors, charged with effectively utilizing their capital to cause the firm to grow. As a result of this relationship, an agency risk exists between VC investor principals and entrepreneur agents (Darrough and Stoughton 1986; Ruhnka and Young 1991; Kaplan and Stromberg 2001; Cumming 2002).

So, VC firms face the challenge of evaluating potential investee companies in an uncertain environment where moral hazard and adverse selection may exist (Sahlman 1990). Some of the strategies used to mitigate these risks include use of formal screening criteria (Wells 1974; Tyebjee and Bruno 1984; MacMillan, Seigel et al. 1985; MacMillan, Zeman et al. 1985; Silver 1985; MacMillan and Subba Narasimha 1987; Sandberg, Schweiger et al. 1988; Hall 1989; Hall and Hofer 1993; Fried and

Hisrich 1994; Shepherd 1997; Shepherd 1999; Shepherd, Ettenson et al. 2000; Kaplan and Stromberg 2001), reliance on syndicate partners (Lerner 1994; Lockett and Wright 2001; Wright and Lockett 2003), imposition of high hurdle rates (Gompers 1995; Mason and Harrison 1999), use of convertible or preferred securities (Bascha and Walz 2001; Bratton 2002), staging of investments into separate tranches (Neher 1999; Wang and Zhou 2002), and close monitoring of investee companies and mentoring of their management (Sapienza and Gupta 1994; Gompers 1995; Lerner 1995; Kaplan and Stromberg 2001).

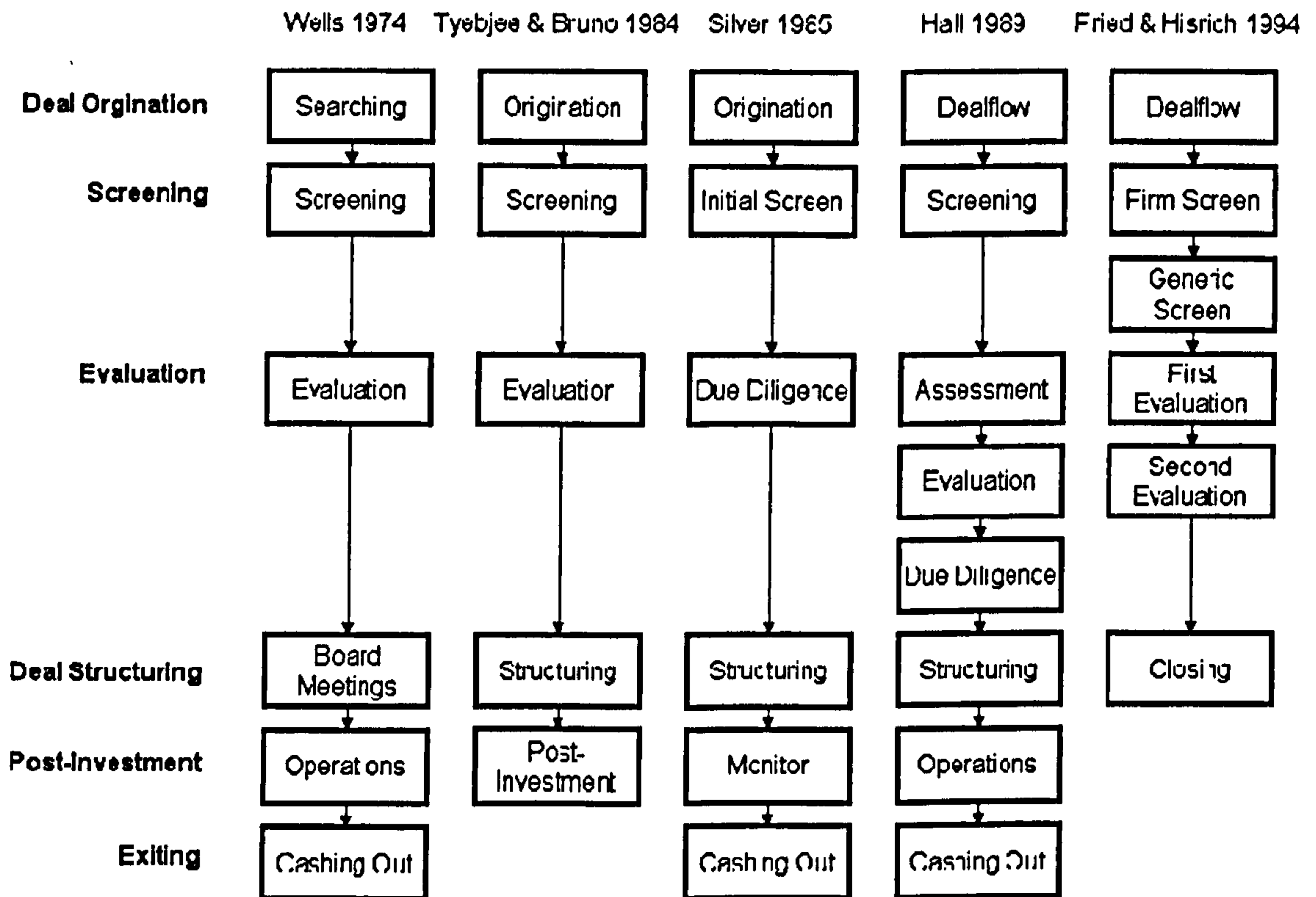
Over time, a range of mechanisms have developed in capital markets to mitigate information asymmetries between company managers and their investors. These have included: information disclosure regulations (Forsythe, Lundholm et al. 1999), capital structures that provide incentives for truthful disclosure (Leland and Pyle 1977; Darrough and Stoughton 1986), voluntary disclosures by managers (Lang and Lundholm 2000), the increasing use of convertible shares to force the sharing of “monitoring” information (Houben 2002), and the use of staged financing to mitigate moral hazard (Neher 1999).

The primary method employed *ex ante* by VC investors for reducing information asymmetry has been the use of screening criteria (i.e., a set of evaluative criteria by which investment opportunities may be ranked and scored against some acceptable benchmarks). The application of these screening criteria typically occurs over several successive phases or stages, wherein only the entrepreneurs who meet or exceed the criteria of one evaluation stage are considered for evaluation at the next stage. Whereas early research into VC screening largely dealt with its application as a single-stage event (Hall and Hofer 1993); Fried and Hisrich have identified a model that more accurately reflects the successive nature of staged screening (Fried and Hisrich 1994).

The VC activities related to the addition of a new company to the investment portfolio (origination, screening, evaluation, structuring, and closing) are therefore done within an overall context that conditions perceptions and expectations of risk and return. The

nature of these activities has been investigated by many previous researchers. Figure 3-2 summarizes a range of alternative conceptualisations for these activities.

Figure 3-2: Alternative Views of Screening



The alternative models shown in figure 3-2 differ only in details as to the steps and depth of particular screening stages. But broadly they reflect a consensus view of the activities that VC investors undertake to determine whether to make a new investment and add a new company to the investment portfolio.

From the perspective of the VC investor, the ideal set of screening criteria would effectively separate entrepreneurial investment opportunities based on their likely future success: minimize Type I errors (erroneous elimination of “good” opportunities), minimize Type II errors (erroneous acceptance of “bad” opportunities), and do so in an efficient manner (e.g., quickly, at low cost, reliably, robustly, and deterministically) (Zacharakis and Meyer 2000).

Research into screening has evolved into two streams:

- 1) Espoused (“do what I say”).**
- 2) Attribute-based (“do what ought to work”).**

The majority of research has been directed at the espoused stream (MacMillan, Seigel et al. 1985; MacMillan, Zeman et al. 1985; Sandberg, Schweiger et al. 1988; Hall and Hofer 1993; Fried and Hisrich 1994; Elango, Fried et al. 1995; Shepherd 1999; Kaplan and Stromberg 2001). This stream of research attempts to capture the screening criteria used by VC investors by asking the investors to introspect and identify the criteria they employed, either during or after the evaluation process. But as social judgement theorists have demonstrated (Priem and Harrison 1994), espoused criteria are not always reflective of what is actually happening – here exacerbated by the observation that VC investors are notoriously poor at introspection into their own decision-making processes (Zacharakis and Meyer 1998; Shepherd 1999). Moreover, despite poor introspection, VC investors are overconfident in their selection abilities (Zacharakis 1997; Zacharakis and Shepherd 2001). This overconfidence encumbers their already poor introspection, and inhibits learning and ongoing improvement.

The methodology employed in several such studies has also been criticized on several points (Sandberg, Schweiger et al. 1988). The use of actuarial “bootstrap” models using espoused criteria (Zacharakis and Meyer 2000) was an improvement, but was still based on potentially flawed espousals by VC investors. Some areas of methodological weakness in some of these early studies include:

- Assuming that screening is a single-pass operation, rather than a successive application of different, more refined filters. This presupposes that if a criterion is found to have low significance then it must be unimportant, overlooking the possibility that it may have simply been already applied in a pre-screening step.
- Assuming that screening criteria or weightings are not endogenously impacted by the nature of heterogeneous company datasets. This presupposes that the criteria reported by one investor are comparable to those reported by another even though they were reporting on the criteria used to evaluate different companies,

overlooking the possibility that investors may apply different criteria to different classes of firm.

- Limiting data collection to very few company evaluations per respondent. This presupposes that the criteria used for one or two study companies are accurate measures of general criteria, and are not biased by the choice of study companies.
- Lack of normalization of reported data based on number of evaluations per respondent, thereby not correcting for the fact that criteria used by an investor reporting on three study companies will be over weighted relative to an investor reporting on only a single company.
- Potential for *post-hoc* rationalizing by respondents and self-reporting of criteria that make the respondent look good, whereby respondents may claim that the reported criteria were all in fact used, and no unreported criteria were used. This potentially undermines the validity of the measures of which criteria are actually used.
- Potential for overweighting minor criteria and underweighting major criteria, whereby respondents may claim that screening decisions are based on a broad set of criteria, and not driven primarily by a small dominant set). This potentially undermines the validity of the measures of the weights used for the criteria that are actually used.
- Assuming that VC investors act uniformly and do not exhibit subsectors with very different criteria or weightings. This presupposes there are no differences among investors, in terms of strategies, stage or style – or that these differences are immaterial to the screening process.

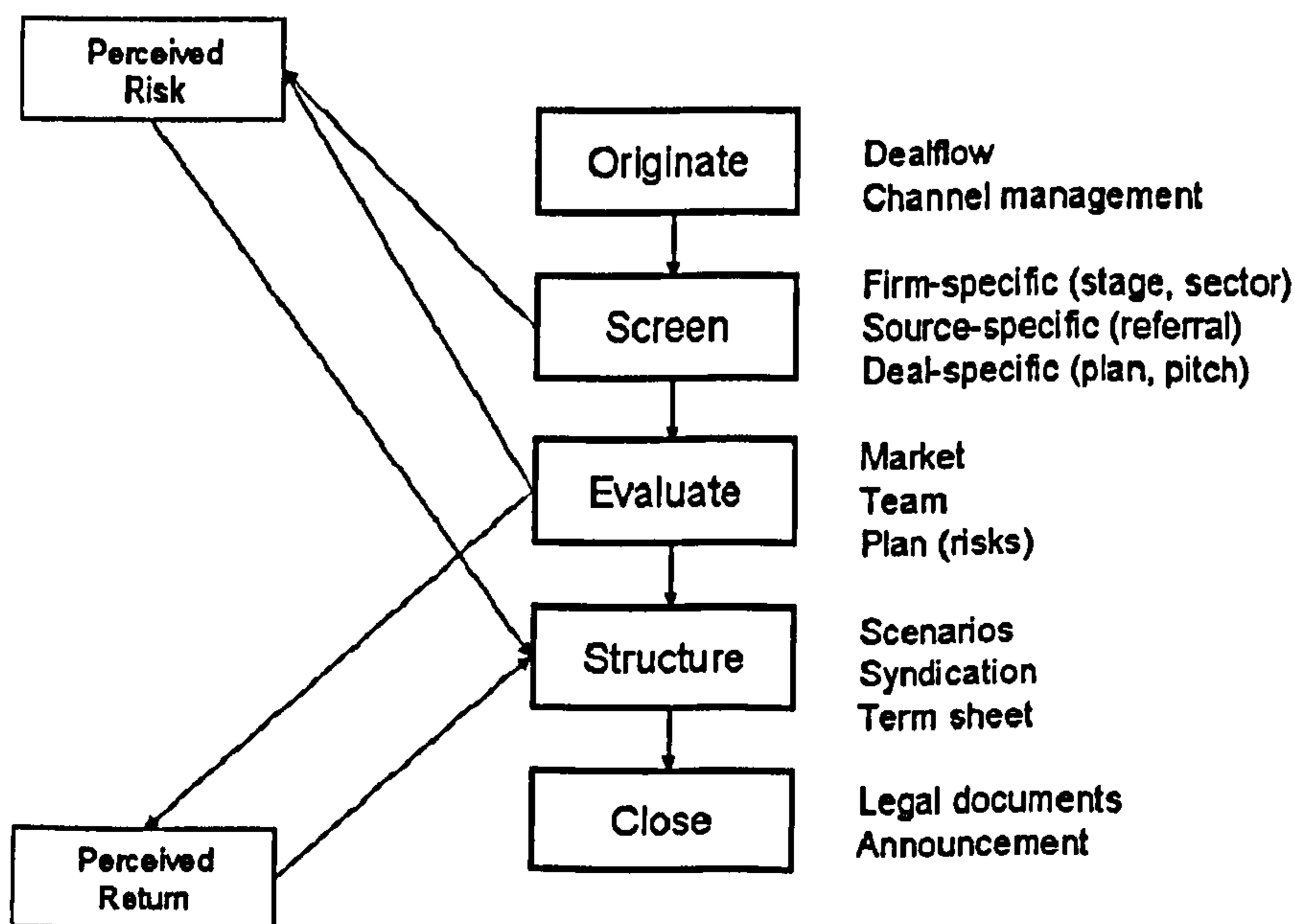
Despite these methodological shortcomings, there has been a good degree of high-level agreement on the espoused criteria of VC investors, leading to the general recognition of market characteristics, product characteristics, entrepreneur/team

attributes, strategy and financial characteristics as the predominant factors in VC screening decisions.

The alternative approach to the research into VC screening criteria has been attribute-based. This stream has evolved from the venture performance area of business strategy research. Under this approach, an attempt has been made to identify theoretically justified attributes of successful new ventures, without reference to the criteria espoused by investors through their own introspection (MacMillan and Subba Narasimha 1987; Rea 1989; Roure and Keeley 1990; Shepherd 1997). The results of these studies appear mixed, with no common set of theoretically anchored attributes clearly emerging as the optimal predictors of venture prospects and outcomes. Nevertheless, despite the uncertainty around the choice of attribute-predictors, the attribute-based screening approach appears to hold some promise of providing a higher level of predictive capability; in one study, an actuarial model based on attributes identified by Mitchell (Mitchell 1998) was found to be superior both to unaided VC investor intuition and to the use of espoused criteria in predicting venture performance (Mainprize, Hindle et al. 2002).

Figure 3-3 integrates these screening perspectives into a single high-level model, and illustrates points at which the contextual influences of figure 3-1 may be felt.

Figure 3-3: Contextual Influences on Screening



Information obtained from screening may cause increases or decreases in perceived risks due to degree of fit with the VC fund area of specialisation. Evaluation may also uncover information that leads to changed perceptions of potential risk and return. These changed perceptions are in turn reflected by changes in the structuring of terms and conditions of the investment. For example, if evaluation uncovers a key dependency on a single employee or founder, then structuring may be adjusted to include a stock vesting schedule or earn-out provisions to encourage that key employee to remain with the firm for many years (Datar, Frankel et al. 2001).

Entrepreneurs Seeking Venture Capital

Entrepreneurs can have many motivations for launching and growing their firms. Some aim to achieve particularly high growth in order to capture high-value market opportunities or to otherwise achieve personal objectives. Among these entrepreneurs, those who lack sufficient financial resources to fund the growth of their companies are forced to seek outside investors (Bank of England 2001). Amit *et al* show that some entrepreneurs will seek outside investors, in the form of VC investors, even when the entrepreneurs have adequate alternative sources of funds, in order to obtain additional non-financial benefits of association with these investors (Amit, Glosten et al. 1990; Amit, Glosten et al. 1990a).

Several studies have reported on the sources of capital that entrepreneurs seek and access, and the importance that venture capital plays as a source of entrepreneurial capital (Bruno and Tyebjee 1983; Bruno and Tyebjee 1985; NVCA 2002). In particular, the studies of Bruno and Tyebjee, summarized in table 3-1, have found general consistency in the major role the VC investment plays in the financial sourcing strategies of entrepreneurs. The range of sources cited, and their relative preference shows that venture capital and private equity remain very important sources of financing for entrepreneurs.

Table 3-1: Sources of entrepreneurial capital

	1983 preferred	1985 Anticipated	preferred
Venture capital	28%	38%	28%
Bank debt	19%	34%	19%
Private equity	20%	13%	20%
Public equity	8%	8%	8%
Corporations	4%	0%	4%
Others*	1%	26%	1%
None	20%	0%	20%

* Includes SBA, retained earnings and unclassified

Percentage of mentions. Totals greater than 100% reflect choice of more than one source.
(Bruno and Tyebjee 1983; Bruno and Tyebjee 1985)

These studies show that VC investment is an important factor for many entrepreneurs. Yet they also show that many entrepreneurs anticipate and obtain capital from alternative sources. This raises numerous questions about when entrepreneurs access venture capital and when they do not, and why they make these choices. However, there have been few research efforts into understanding the reasons for these choices – such as determining whether, when VC funding is not successfully obtained, it was a decision of the VC investor or a decision of the entrepreneur. Indeed, the one study into proposed VC deals that were not consummated (Bruno and Tyebjee 1983) failed to make this important distinction, treating both cases as a rejection of the entrepreneur by the VC investor.

Subsequent studies by Amit *et al* have developed a theoretical basis for predicting these financing choices (Amit, Glosten et al. 1990; Amit, Glosten et al. 1990a). They first show that where all entrepreneurs and VC investors have access to the same information (i.e., where there is no information asymmetry), all entrepreneurs will choose to access VC investors in order to enjoy the risk-sharing benefits. However, when entrepreneurs have private information (such as their expected level of personal effort), only some entrepreneurs will seek VC investment, while many will reject it – often out of fear or resentment of the appropriation of benefits by a prospective VC investor. Moreover, they show that in such circumstances, it will be the weakest entrepreneurs (those with projects with low prospect, and who therefore are in a weak negotiating position with VC investors) who seek VC investment, while the stronger

entrepreneurs will exercise their rights to consumer choice – a situation of classic adverse selection.

Entrepreneurs as consumers

Consumer marketing textbooks typically describe the consumer choice process as a series of steps in which a number of brand alternatives are identified and then winnowed down to a final selection. The original set of alternatives is drawn from the set of brands of which the consumer is aware (the “awareness set”). The marketing challenge at this step is to raise awareness of a brand with the potential consumer, so that it comes to mind when a purchase decision is required. The awareness set is subsequently divided by the consumer into those alternatives that she may consider buying (the “consideration set” or “evoked set”) and those that are rejected out of hand as unsuitable (the “inept set”). Finally, some decision rule or decision process is applied so that the members of the consideration set can be examined and evaluated, and a decision made.

The concepts of these search sets originates from Stigler’s economics work, in which he shows that, in the presence of search costs, rational consumers will not search all the brands available in the market (Stigler 1961). The concept of search cost was then further developed to reflect information processing requirements, such as the cost and energy required to think through the evaluation and decision (Shugan 1980; Alba and Hutchinson 1987), which is a function of the number of decision criteria, the range and variability of the values of these criteria, and the number of brands to be evaluated (Belonax and Mittelstaedt 1978).

The consumer purchase process begins with the search for information and alternatives. The buyer seeks information about the range of alternatives available and the attributes of each alternative. Naturally, to the extent that the buyer has some of this information available through prior knowledge, this search will be more efficient – an outcome that was confirmed by Brucks (1985). To further enhance the efficiency of the search, the buyer may prioritize the information sought according to the nature of the task at hand. Simonson *et al* found that the prioritization of these searches for

brand attribute information depends on the consumer's prior beliefs about the brand, and on the level of uncertainty she has about prior brand attribute knowledge – high priority is given to searching for information about brand attributes when the attribute values are uncertain, when prior evaluations of the brand attribute were negative, or when the task is a choice among brands with positive prior experience (Simonson, Huber et al. 1988). In the early-stage capital markets this may correspond to investor reputation.

This prioritization of information search, combined with the existence of search costs, creates an advantage for first-mover suppliers, which is particularly strong for experience-based goods that are high-risk and low-frequency purchases (such as obtaining venture capital) (Schmalensee 1982). First-movers have the opportunity to define the reference standard and to influence the choice of attributes by which all followers will be evaluated, towards attributes on which they rank well, or for which the search costs for competitor information is especially high.

From the information garnered, the consumer then forms an "evaluation set" or "consideration set" of those alternatives that will be evaluated to reach the purchase decision. In the early-stage capital markets this set may correspond to the set of VC investors who are targeted to receive the entrepreneur's business plan in order to initiate a conversation that may lead to a financing transaction. For certain major purchase items, Punj has found that consumers make evaluations of some selected attributes *prior* to their need to purchase (Punj 1987). If a brand alternative is known to be poor on a materially important attribute, this prior pre-search information may be sufficient to cause the brand to be excluded from the consideration set. Otherwise, the decision of whether to include the brand into the consideration set is based on a balance of opposing factors. Adding a brand to the set increases the cost and complexity of the decision process; but it also may incrementally increase the utility of the outcome and may provide valuable data for future decisions. The result is that additional brands are likely to be considered when they are easy to research and

evaluate, and when they promise the potential of incremental benefit relative to the existing alternatives in the consideration set (Hauser and Wernerfelt 1990).

Having formed a consideration set of brand alternatives, the consumer next chooses and applies some decision process, consisting either of a simple application of a decision rule, or the successive application of several decision rules, to evaluate the alternatives. The choice of decision rule is a trade-off between “simplifying” rules (which emphasize the efficiency of the decision process) and “optimizing” rules (which emphasize the effectiveness or utility of the decision reached). As the complexity of the decision increases (more attributes to be considered, and a wider range of values within each attribute), the balance shifts towards simplifying rules (Wright 1975).

The behavioural psychology influences discussed above in the context of VC investor decision making can also influence the decision process of entrepreneur consumers. For example, the skewing of probability weighting functions, as described in prospect theory, can similarly affect the evaluation and decision processes of consumers. How a consumer will evaluate a given attribute and brand may be influenced by the path taken to reach this decision point – making it part of the seller’s marketing challenge to attempt to influence either the path taken by the consumer or to otherwise influence the “reference point” she uses to evaluate the incremental benefits of the proposed brand alternative (Puto 1987).

Finally, as Cote and Gardner both illustrate, for some purchase decisions, situational factors can override the results of the formal decision process, and yield a different final purchase outcome (Cote, McCullough et al. 1985; Gardner 1985). These situational factors can include affective aspects of the purchase event, or the last-minute occurrence of contextual events. The determination of which situational factors can affect a specific purchase choice apparently depends on the nature of the item being purchased. In the early-stage capital markets, these situational factors may correspond to investment transaction attributes, such as the speed, cost, and difficulty of completing the screening process.

Entrepreneurs and the capital buying decision

The early-stage capital marketplace (like all markets) is a two-sided exchange of value. High-quality entrepreneurs can therefore be viewed not simply as marketers of their equity, but also conversely as *consumers* searching for and evaluating offers from investors wishing to sell capital in exchange for equity or other rights in their new ventures. So, when financial negotiations between an entrepreneur and a VC investor break down without a deal being made, these failures cannot simply be ascribed to the investor discovering unfavourable information during the screening process – some of the failed deals may be due to entrepreneurs breaking off discussions with a VC firm that they perceived as being uncompetitive or too intrusive. One investigation made into unconsummated VC deals examined a number of potential reasons for failure, some of which would support an interpretation that it was the entrepreneur (not the investor) who broke off talks (Bruno and Tyebjee 1983). However, the analysis accompanying this study did not entertain this possibility, and ascribed all failed deals to a presumed termination decision by the investor – so the opportunity to make a first examination of this potential scenario was not realized. However, this study did shed some initial light on some of the irritants for entrepreneurs in the negotiation process. In particular, the researchers found that entrepreneurs were often dissatisfied with five aspects of the negotiation process:

- Valuation of their firm
- Operating restrictions or covenants in the proposed deal
- Lack of speed in the negotiation process
- Poor understanding of the business by the VC investor
- Low risk appetite by the VC investor.

The final two of these aspects were found to be especially irritating for entrepreneurs who subsequently abandoned the search for venture capital financing – perhaps suggesting that some VCs are inadvertently signalling their own poor quality. Alternatively, these entrepreneurs may have been ones with businesses that were wholly unsuitable for VC financing, and so their expressed frustration was simply a

reflection of them learning this unhappy reality. But, as the study was not designed to investigate further into the reasons for their subsequent departure from the market, this was unconfirmed. This study at least suggests that the suitability of a given entrepreneurial firm for VC financing can be independently assessed from the perspectives of both the VC investor and the entrepreneur.

In a later study, Rea found further confirmation that valuation and the terms and conditions of a proposed deal can influence an entrepreneur's decision of whether to break off negotiations (Rea 1989). In this study, VC investors cited competitive pressures (on valuation or on added services) and an insistence by entrepreneurs for different deal structure as significant reasons for the failure of deal negotiations.

Both of these studies were focused on the VC investors, and obtained information or made inferences about the negotiation preferences of entrepreneurs as incidental product of the data obtained from investors. There appears to have been but a single paper investigating the market directly from the perspective of the entrepreneurs (i.e., entrepreneurs shopping for capital from among competing sources) (Smith 1999). That study looked at criteria used by entrepreneurs in identifying potential sources and applying decision rules to them, but did not address the phenomenon of aversion during the screening process, and the subsequent rejection of VC firms by entrepreneurs.

Entrepreneurs are frequently placed in conditions which increase the likelihood and degree of certain human cognitive biases and errors (Baron 1998). As a result of this, the psychological effects of decisions under risk, described above, may be especially relevant for entrepreneurial decision-making. Of particular relevance may be decisions regarding the choice of VC investments and sources, and the processes and criteria used by entrepreneurs in making such decisions.

The entrepreneur's search for VC investment is a complex information processing and purchase decision challenge. As Brucks points out, in such situations the degree of objective prior information that entrepreneurs have about VC investors is important

(Brucks 1985). Possessing significant amounts of such information leads to asking more and better questions of prospective VC investors, and not asking questions about inappropriate or irrelevant VC attributes. It therefore can make the search process more efficient for the entrepreneur, both by making the information search a more focused exercise, and by permitting the entrepreneur to more efficiently process whatever new information is learned about each VC investor.

Even in the specific case of entrepreneurs intending to rapidly grow their firms through access to external professional capital sources, research into choice criteria has been very limited. Some studies have investigated individually hypothesized factors for selection of capital sources, including affiliation for prestige (Hsu 2002), quality of the negotiation process (Rea 1989), and the reputation of investors and the risk of opportunistic behaviour on the part of investors (Zacharakis 2002). But these studies have not attempted any comprehensive identification of relevant decision criteria used by entrepreneurs, nor have they attempted to link any specific decision criteria to the potential for adverse selection in the VC capital market.

A recent study into the affiliation benefit that entrepreneurs can obtain by accepting VC investment has examined a mechanism by which VC screening skill can act as a signal or endorsement of the quality of the entrepreneur's firm and thereby improve her ability to raise additional capital in subsequent rounds (Janney and Folta 2006). Choosing an investor with known good screening ability is valuable to the entrepreneur, particularly for firms that are perceived to be more uncertain. This uncertainty can be due to differences in firm value, firm age, industry, amount of previous funding, or number of previous investment rounds. In this particular study, "industry experience" was defined as how long ago the investor made his first industry investment that has since gone public, which is a useful but somewhat narrow view of relevant experience of an investor. The direct effect of investor experience in increasing the ability of the entrepreneur to raise subsequent capital was found to be moderated by a number of firm and environmental variables. Generally, the effect showed greater influence in situations of higher uncertainty, such as with firms with

few prior investment rounds, or when these prior rounds were long ago. It also showed greater influence when industries are young or the financing environment is seasonally unreceptive to financing requests by entrepreneurs. This study concluded by recommending that firms that are very young or are undifferentiated seek capital from prominent investors, even at the expense of accepting poorer contractual terms. More established firms can afford a more balanced trade-off, and therefore should place more emphasis on other criteria.

One of the very few studies looking at criteria used by entrepreneurs in selecting VC sources found some consensus on the general prioritization of criteria, but also found some variations among subsets of entrepreneur types (Smith 1999). That study proposed 29 specific criteria, under the categories of reputation of the VC investor, other attributes of the VC investor, value-added services provided, and valuation. Overall, the study found that, while valuation matters dearly to entrepreneurs, it was not the most important criterion in selecting a VC investor. Three other criteria were rated higher:

- The investor's reputation for creating past successes
- Providing a "sounding board" service to the entrepreneur
- The personality and cultural fit between the VC investor and the firm.

The full set of criteria examined by Smith, sorted by category and ranked into quartiles according to the importance to average entrepreneurs, is summarized in table 3-2.

Table 3-2: Preliminary VC selection criteria

Quartile	Reputation	Attributes	Services	Valuation
I	Past successes Personality fit Follow-through	Industry Stage	Sounding board	Price
II	Service competence Co-investing	Available funds Operating experience	Fundraising Recruiting	
III	Not firing founders Not diluting founders Managing team gaps	Years as a VC	Meeting investors Strategy development Monitoring Crisis management Soliciting customers	
IV	IPO orientation	Location SBIC	Marketing plans Motivating staff Product development Vendor selection	

(Smith 1999)

In addition to these results regarding the criteria used by entrepreneurs, Smith also arrives at a number of interesting findings relevant to the present research. First, entrepreneurs devote significant effort to the decision of which investor to choose; it is a high-involvement purchase. He finds that entrepreneurs typically spend more the 40 hours on researching and evaluating investors, and involve teams of three or more people from their firms in the decision-making process.

Secondly, entrepreneurs draw upon several sources for information about prospective investors (average of 5 sources used), but are not particularly efficient in the sources they draw upon. The most commonly cited sources were other entrepreneurs, the VC investors themselves, and the entrepreneur's past experience with investors. Interestingly, these sources share the characteristic of being narrow viewpoints and being limited in the contextual or reference information they can provide. Broader and potentially more useful information sources, such as accountants, lawyers, and consultants, were used much less frequently by entrepreneurs. This may reflect the tremendous time pressures that constrain them from accessing sources that are not immediately close to hand, or may reflect the independent nature of some entrepreneurs and their reluctance to seek outside advice.

Thirdly, entrepreneurs frequently use the expressions of interest of one VC investor to attempt to make a market for their firms. If not contractually constrained from doing so, they use the term sheet tendered by one VC investor to try to influence other VC investors to issue competitive term sheets. In doing so, entrepreneurs are akin to other consumers who play one seller off against another to get a better deal.

Finally, Smith suggests that effective consumer choice behaviour on the part of entrepreneurs can be learned. He found that the satisfaction entrepreneurs later feel with their choice of VC investor varies with the degree of prior experience the entrepreneurs has; more experienced entrepreneurs make choices that lead to higher satisfaction.

This literature provides an initial view of the criteria that may be applicable to the entrepreneurial decision regarding investment sources. Table 3-3 lists an aggregate set of potential decision criteria for entrepreneurs engaged in the choice of which VC investor to deal with, based on these studies. These potential criteria have been grouped for convenience into categories loosely based on Smith's pioneering study. This suggests a rather broad set of starting criteria for any subsequent research into entrepreneurial capital selection. However, this broad set is likely to impair empirical research with low discrimination and the potential for over fitting the data. What is needed is a theoretically informed subset that is directed to the key issues in early-stage market operation.

Table 3-3: Potential criteria used by entrepreneurs

Category	Criterion
Terms & Conditions	Valuation of firm ^{d, e}
	Corporate structure required ^d
	Operational constraints and covenants ^a
Services	Form of financing provided ^{a, g, h}
	Access to corporate partners ^d
	Sounding board to management ^{a, e}
	Fundraising ^e
	Recruiting management ^e
	Interfacing with investor group ^e
	Business strategy development ^e
	Performance monitoring ^e
	Crisis management ^e
	Soliciting customers/distributors ^e
	Marketing plan development ^e
	Motivating staff ^e
	Product development ^e
Reputation	Selecting vendors/equipment ^e
	Past investment successes ^e
	Compatible personality ^{a, f}
	Follow through on tranches ^e
	Competence of services ^e
	Co-investing ^{a, e}
	Keeping entrepreneurs in management ^e
	Not demanding too large a share of equity ^{a, e}
	Investing in incomplete teams ^e
	Preferring IPO exit to M&A ^e
	Non-opportunistic behaviour ^{b, f}
VC Attributes	Reputational rank ^{a, i}
	Networking resources ^e
	Ethical behaviour ^{a, e}
	Industry specialization ^e
	Stage specialization ^e
	Amount of funds available ^{a, c, e}
	Operational experience ^e
	Years experience as a VC ^{c, a, i}
	Location ^e
	Speed of deal-making ^a
Knowledge of industry ^{a, i}	
Potential conflict with existing investees ^a	

a (Bruno and Tyebjee 1983); b (Cable and Shane 1997); c (Hsu 2002); d (Rea 1989); e (Smith 1999); f (Zacharakis 2002); g (Hellmann and Stiglitz 2000); h (Brennan and Kraus 1987); i (Janney and Folta 2006)

Market Model

Building upon the theoretical perspectives outlined above, a model for the exchange of value among participants in the early-stage capital markets will be developed. The objective of this model is to provide a framework for better understanding the role that information asymmetries play in the ongoing operation of this market, in shaping the behaviours and strategies of ongoing participants. This framework provides a new theoretical basis for proposing and empirically testing hypotheses with respect to these behaviours and strategies. Actors in the model include the primary participants in the financing transactions (the entrepreneurs and the VC investors), as well as secondary participants who indirectly facilitate these transaction by supporting or providing value to the primary participants. The scope of the model comprises the

exchange of information and other types of intangible value among the participants, whether directly exchanged, mediated through other participants, or exchanged by reference to some shared context. The model is meant to reflect the net exchange patterns that occur, and therefore does not capture the sequence or time-based nature of some exchange interactions.

Model development

The above discussion of the early-stage capital markets and the operations of VC firms suggests that this market can be characterized as having a knowledge base that is complex, wherein expertise is dispersed among many market participants. Under such conditions, the locus of learning and innovation that supports the development of effective strategies is found in networks of complementary participants (Powell, Koput et al. 1996). Accordingly, firms that need to exchange unformalized knowledge and skills will be more successful in doing so when they adopt an approach of collaborative information sharing. Such an approach can lead to a network form of governance in which social dimensions of the transactions define and reinforce a framework for the exchange structures (Larson 1992). Using this perspective, the development of the model proceeds by examining each participant dyad, in turn, and explicating the forms of value exchange within each social relationship.

The primary dyad in the market comprises the entrepreneurs and VC investors at the heart of the market. As described earlier, a substantial literature has grown to describe how these participants assess each other, and how contracts are formed whereby entrepreneurs provide investors with bundles of potential cashflow and control rights, and investors provide entrepreneurs with capital and intangible services (Fried and Hisrich 1994; Fried and Hisrich 1995). The entrepreneurs seek VC investors for this capital and these services, and to benefit from risk-sharing (Amit, Glosten et al. 1990a). In order to attract the most desirable VC investors, entrepreneurs try to signal their own high quality through a range of observable behaviours and attributes (Dobson 1993; Shane and Cable 2002; Deutsch and Ross 2003; Busenitz, Fiet et al. 2005; Reuber and Fischer 2005). The VC investors likewise attempt to influence their

“dealflow quality” (the entrepreneurs they attract) by signalling their own high quality as investors (Kelly and Hay 2000; Leshchinskii 2003), as entrepreneurs choose their VC investors partly based on their perceptions of investor quality (Berkovitch and Serban-Levy 2004).

The actions of the VC investors in the market are contingent on their access to capital to invest with promising entrepreneurs. This capital access is enabled through the dyad that includes institutional investors. Typically these institutional investors are financial institutions, pension funds, or other large funds that seek to invest a portion of their portfolios into high-risk, high-return instruments that VC investors represent. The institutional investors evaluate VC investors by objective financial measures that allow the performance of VC investors to be compared to the performance of other portfolio holdings (Berlin 1998). Principally, the institutional investors expect to receive an acceptable risk-adjusted rate of return on their capital. The VC investors, in exchange for providing this return, have free use of the capital within the mandate and scope of their fund objectives (Gompers 1995; Gompers 1996; Gompers and Lerner 1998; Gompers and Lerner 2000).

Entrepreneurs are supported in their search for capital by another dyad that incorporates their professional advisors. These advisors provide professional services (accounting, legal, consulting, etc.) to entrepreneurs in exchange for fees. But they may augment their professional services with assistance in raising capital, typically by referring high-quality entrepreneurs to VC investors that are known to that professional (Bruno and Tyebjee 1985; Fiet 1995; Harrison and Mason 2000; Kelly and Hay 2000). This endorsement by the professional is of value to the entrepreneur, because it acts as a signal of quality, one which VC investors heed (Stuart, Hoang et al. 1999).

In the dyad comprising professionals and VC investors, this endorsement signal is valued by the VC investors; VC investors regard professionals with good reputations as excellent sources of dealflow – a source of pre-screened investment opportunities consisting of entrepreneurs known to the professional, and upon whom the professional will stake some portion of his reputation. The professional in effect

provides some pre-screening effort and benefit for the VC investor – so much so that many VC investors will not even consider making deals with entrepreneurs unless those entrepreneurs have been endorsed through a referral from a trusted professional (Chan 1983; Kelly and Hay 2000). These endorsements signal quality, especially for young companies where uncertainty is highest and where the reputation risk to endorser is highest (Stuart, Hoang et al. 1999). The referring professional therefore has an incentive to maintain a good reputation with the VC investor, so that referred clients will be funded by the VC investor and will grow and become more successful. In exchange, the professionals have some assurance that their clients will grow and thrive with VC support and thereby will come to require greater amounts of professional services. VC-backed firms tend to grow faster and have better survival odds than other firms (Megginson and Weiss 1991; Jain and Kini 2000; Manigart, Baeyens et al. 2002), and as they grow they require greater professionalization and support services (Hellmann and Puri 2002). This suggests that the importance of this value exchange will depend on the stage of the company and the prior experience of the entrepreneur, both with the specific company and with VC investments in general.

The role of professionals as credible sources of dealflow can potentially be generalized to include other sources of dealflow who also benefit from the involvement of the VC investor with the entrepreneur. In the case of early-stage equity markets, these could include angel investors who have made previous investments in the entrepreneur's firm. By making such generalizations, the model may be applicable to other later stages of the investment market, whereby VC investors seek dealflow from earlier-stage investors, grow the firm, and in turn pass it along as qualified dealflow to later-stage investors. But the first step in developing such as fully generalized model, and the primary intent of the present research, will be to establish some aspects of the model solely in the case of early-stage VC investments where the challenges of information asymmetries are particularly salient.

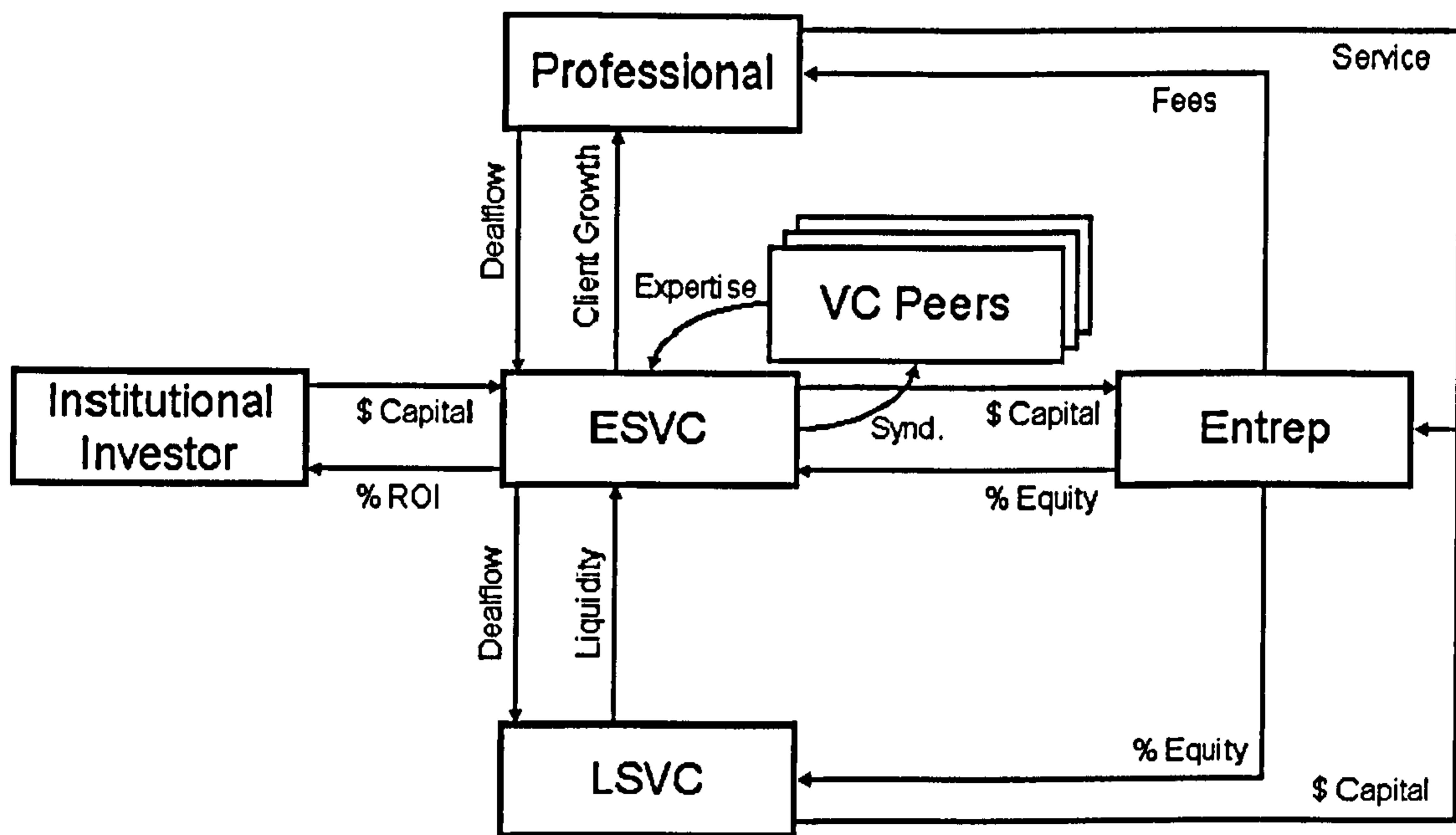
In making investment transactions with entrepreneurs, VC investors often form syndicates with other VC investors (Lerner 1994). A number of benefits accrue to

participants in this dyad, including knowledge-sharing and risk mitigation (syndicate relationships help to protect the VC investor on the downside). These benefits are particularly important in early-stage markets (Lockett and Wright 2001). And, as trust is developed within the dyad, these syndicate relationships tend to persist over time, held together by reciprocal non-legal sanction mechanisms (Wright and Lockett 2003), and thereby to transcend individual investment transactions with individual entrepreneurs (Campo-Rembado 2005). So, individual VC investors form dyad relationships with their peers.

Finally, when the investment with a particular entrepreneur matures and the entrepreneurial firm grows and becomes more successful, the VC investor seeks an exit path by participating in a final dyad with later-stage investors. VC investors typically specialize by the growth stage of companies in which they will invest: early or later (Gupta and Sapienza 1992; Elango, Fried et al. 1995). Some accept the very high information asymmetries and risks of investing in startups. Some invest only in more established companies that have been groomed by the earlier-stage investors. The early-stage VC investors need the later-stage investors for liquidity, to support the mature companies as they seek a trade sale or an initial public offering (Berlin 1998). The later-stage VC investors need the earlier-stage investors as a source of relatively low risk dealflow, since having an early-stage VC investor can be viewed as a legitimizing signal that entrepreneurs can use to attract later-stage VC investors for subsequent rounds of financing (Harrison and Mason 2000).

Integrating these various dyads yields an interesting overview of the market. Figure 3-4 shows the transactional relationships among the participants in early-stage venture capital markets. Here the VC investors have been separated into early-stage venture capitalists (ESVCs) that invest in this market, and later-stage venture capitalists (LSVCs) who do not.

Figure 3-4: Relationships Among Market Participants



In figure 3-4, the Institutional Investors are the providers of capital to the VC investors, for which they demand an acceptable risk-adjusted rate of return. The Professionals represent the advisors to entrepreneurs, such as lawyers, bankers and accountants, who assist the entrepreneurs with access to venture capital. They provide entrepreneurs with their professional services in exchange for fees. They also provide the ESVCs with high-quality dealflow, by introducing the best of their entrepreneurs to the ESVCs. In return, the ESVCs cause the entrepreneurial firms to grow to become larger consumers of professional services.

The ESVCs in turn provide grown and established deals to the L SVCs by nurturing the young entrepreneurial firms in the early days. In return, the L SVCs make investments that provide the ESVCs with an exit liquidity path (such as a trade sale or IPO).

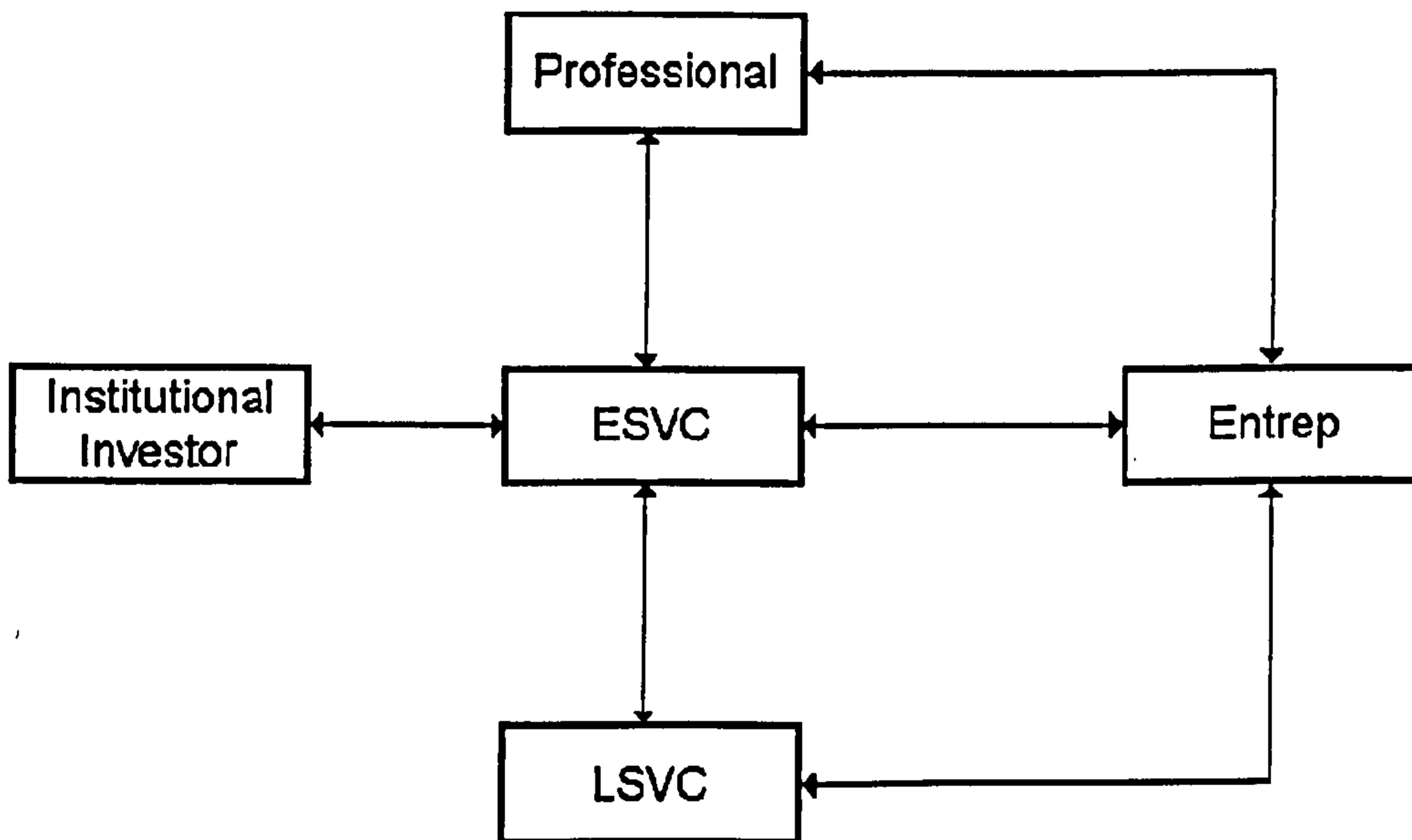
Both the ESVCs and the L SVCs provide financing to entrepreneurs, typically in exchange for equity in the firm, or some other bundle of potential cashflow and control rights.

For some investment deals, the ESVC may syndicate the investment among VC Peers, by allowing them access to the good deal. In return, these peers provide a

portion of the investment capital. But more importantly, they provide additional expertise for the ongoing monitoring and nurturing of the entrepreneur.

Figure 3-5 shows a simplified representation of this market model, where the details of the value exchanges have been omitted.

Figure 3-5: Basic Market Model



The direct value exchanges shown in figure 3-5 are not the only information exchanges possible in this market. Other implicit communication mechanisms may arise to meet the information-exchange demands of screening. The screening process shown earlier in figure 3-3 requires the exchange of a great deal information between the entrepreneur and the VC investor. This exchange can be explicit (such as formal budgets and product description information), or can be implicit (through signals that are intended to refer to elements of shared common knowledge).

Entrepreneurs who seek VC investment are commonly viewed as having to actively market their companies to VC investors, attempting to sell their equity (and associated rights) in exchange for capital. They attempt to capture the notice of investors to present their firms as desirable investments, and to conclude an investment deal on attractive terms. One strategy that they may adopt in this marketing challenge is *signalling* their hidden qualities to prospective VC investors and thereby attempting to differentiate themselves from all the other entrepreneurs likewise seeking VC

investment. This signalling consists of creating an observable attribute that is somehow correlated to hidden dimensions of firm quality, and can therefore be used as a proxy indicator of quality.

The theoretical examination of signalling in a market, as a means of overcoming asymmetries of information about quality, has its origins in Spence's examination of labour markets (Spence 1973). Spence shows how signalling can emerge in markets with adverse selection, as a method to prevent market collapse. Under this model, sellers of high-quality goods will invest in an observable attribute that is difficult for lower quality sellers to mimic. Buyers can then look for the presence of this attribute with any given seller and, from its presence or absence, infer the quality of the goods being sold. By providing a reliable differentiation between high and low-quality sellers, signalling can convert a market of pooled equilibrium into a separating equilibrium in which high-quality sellers receive a higher price. For this reason, high-quality sellers may choose to invest in signalling even when the signal has a cost to them (and not just to the low-quality sellers).

Although signalling can mitigate information asymmetries and thereby mitigate the risk of market collapse, Gale demonstrates that signalling represents an inefficiency that is a net loss to society, and therefore that equilibria in which actors signal their private information are typically inefficient (Gale 1996). In a transparent and efficient market without information asymmetry, these costs of signalling (production, transmission, reception and interpretation) could be avoided. These costs are associated with the prevention of market collapse.

Interpreting signals is not always straightforward; it is simple and effective only in markets where quality is univariate and binary (low and high quality) and where the costs of generating the signal are sufficiently different for the two types of sellers such that the low-quality sellers cannot mimic the signals given by high-quality sellers. When the costs are not sufficiently different, the low-quality sellers will mimic the signals and the pooling equilibrium will remain (i.e., investors will not be able to reliably

distinguish between low and high-quality entrepreneurs by observing the signal, so they will initially treat all entrepreneurs as having equivalent quality).

The situation is further complicated in markets where quality is ternary (low, medium, and high quality). In such markets, the medium-quality sellers will attempt to separate from the low-quality sellers by generating a signal of their higher quality. The high-quality sellers then face the challenge of separating from both the low-quality sellers and the medium-quality sellers. If the Highs also generate the signal to separate from the Lows, they will be pooled together with the Mediums. Feltovich *et al* found that in such circumstances, many Highs will choose to not signal (or even to countersignal with the reverse signal to what the Mediums are generating), as a means of separating from the Mediums (Feltovich, Harbaugh *et al.* 2002). In this strategy they save the cost of signalling, but they risk being pooled with the Lows (i.e., being mistakenly assessed as having low quality).

For example, the personal wealth of individuals and their associated social status can be characterized as having ternary quality: the very wealthy (Highs), the rich (Mediums), and the not-wealthy (Lows). To separate from the not-wealthy Lows, the Mediums generate signals of their wealth through conspicuous consumption (fancy cars and jewellery, for example). The Highs then face the choice of separating from the Lows through similar ostentatious signals (and thereby being pooled with the merely rich Mediums), or separating from the Mediums by countersignalling (driving a very modest car, for example) and thereby potentially being mistaken for not-wealthy Lows. This confusion can be somewhat ameliorated through other contextual or environmental clues – the driver of a modest car parked outside a tony shop is more likely to be thought a countersignalling High than to be a Low. In markets with well-developed signalling protocols, this risk of confusion may actually benefit the Highs, who can more effectively demonstrate their confidence in their high quality, as the potential for confusion between Highs and Lows increases. For example, one might suggest the hypothesis, *the shabbier the car, the wealthier the driver.*

Alternatively, the Highs may switch to a different type of signal, one on which they separate from the Mediums. In the example of the wealth of individuals, this might be the display of possessions so costly that they are utterly beyond the reach of Mediums.

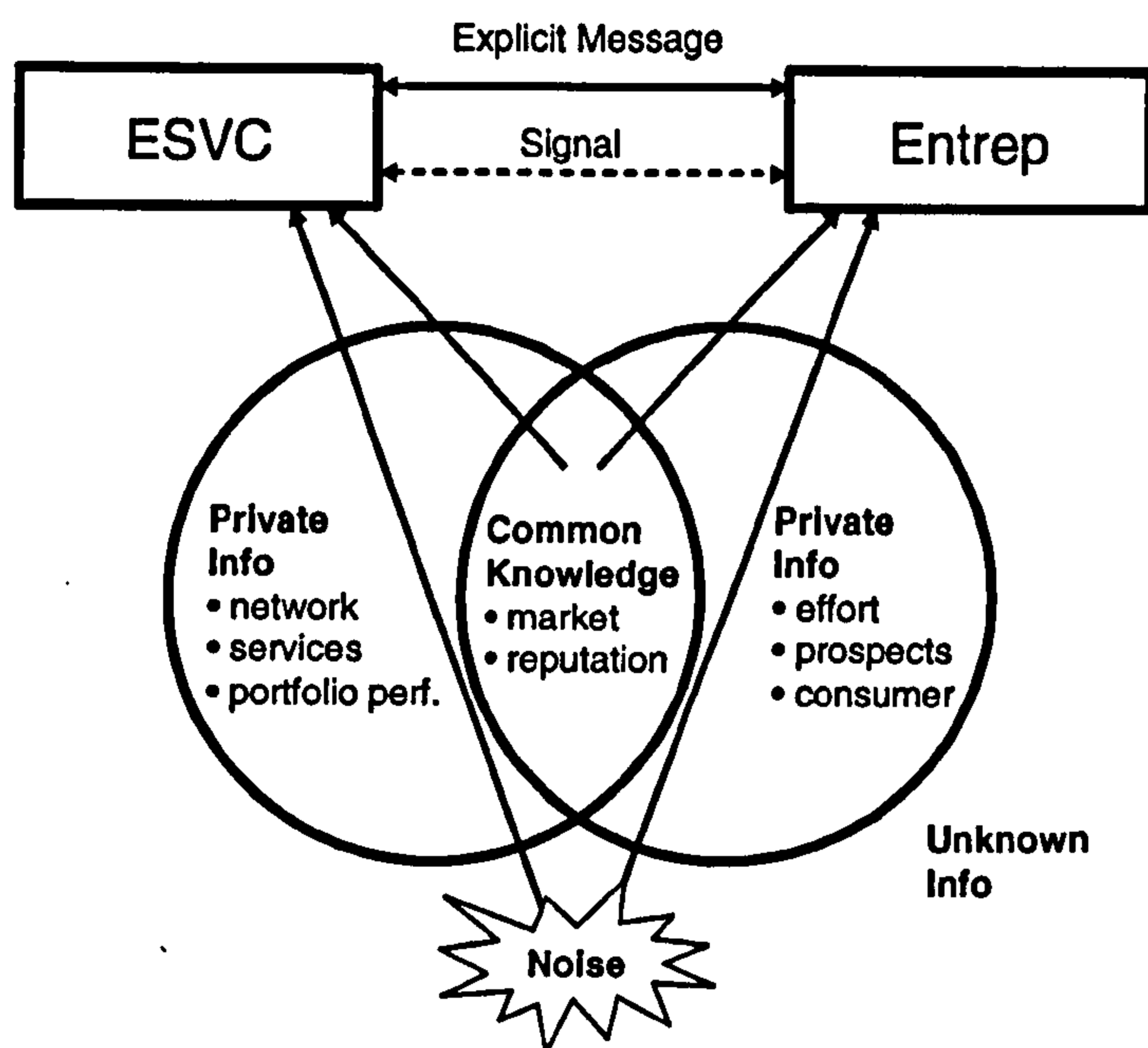
This signalling regime can evolve to become quite dynamic, as costs change and as actors learn new signalling methods. Riley theoretically demonstrates that diverse and dynamic signalling regimes can emerge as market participants explore the many potential dimensions for signalling in an ongoing attempt to separate from lower-quality sellers and to pool with higher-quality sellers. In such real-world circumstances, it may happen that the market is never in true equilibrium (Riley 1975).

Figure 3-6 illustrates how signals can efficiently exchange information by reference to common knowledge shared by the parties. It also shows how this information transfer can be subjected to noise (in practice this might cause the misinterpretation of an observed signal – it is interpreted to carry meaning not intended by the sender, or an intended meaning is not interpreted by the receiver). So it is not enough that an observed behaviour may act as a signal. It must also be unlikely that the behaviour arises from other non-signalling origins, so that the effects of this “noise” can be minimized. The ability of VC investors to invest successfully in early-stage firms is believed to act as a signal of their skill. But this signal is noisy, in that other VC investors believe there are additional valid reasons for making early-stage investments, reasons which may partly obscure the information value of the signal. It is correspondingly difficult for a desirable entrepreneur seeking a skilled VC (in order to receive a fair valuation) to rely solely upon early-stage investment behaviour as a signal of this skill.

Figure 3-6 suggests that participants can be expected to convey some information explicitly, to convey some by signals, and to keep some private. It is the existence of this private information that creates information asymmetries. Screening is an attempt to mitigate these asymmetries through the forced sharing of information. The greater the overlap of private knowledge domains, the greater the amount of information will

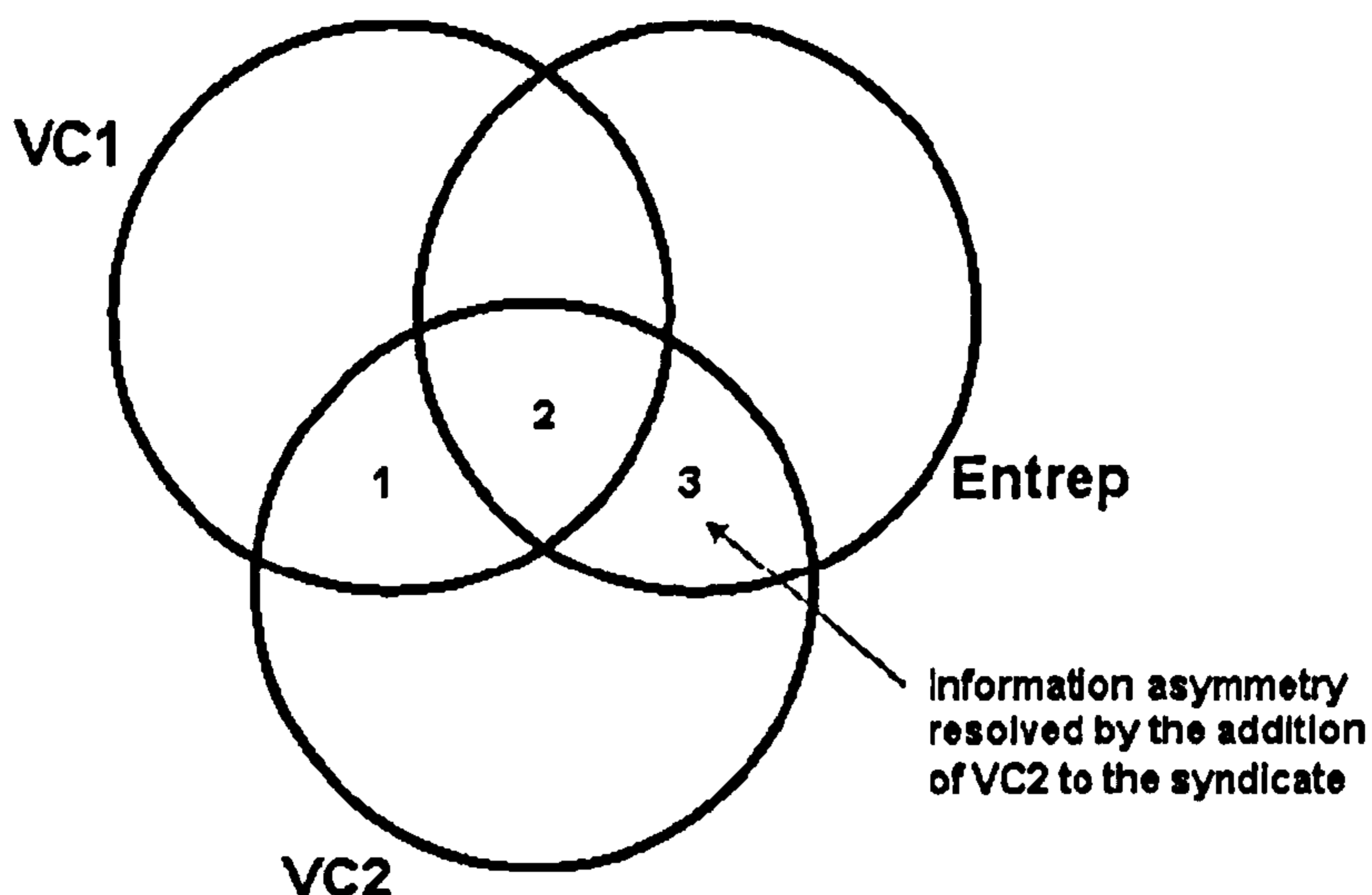
be common to both parties, and the more effective can be a signalling regime in transferring information.

Figure 3-6: Explicit and Signalled Communications



This perspective provides one additional explanation for syndication of VC investments. In figure 3-7, the addition of a second VC investor "VC2" can be seen to further reduce information asymmetries. Region 1 is knowledge shared by the VC investors but not relevant to the investment being considered. Region 2 is knowledge shared by all parties and therefore not asymmetric. But region 3 is relevant knowledge unavailable to VC1 without the participation of VC2. It can be conveyed by signals from the entrepreneurs that are received and interpreted by VC2 alone.

Figure 3-7: Information Effect of Syndication

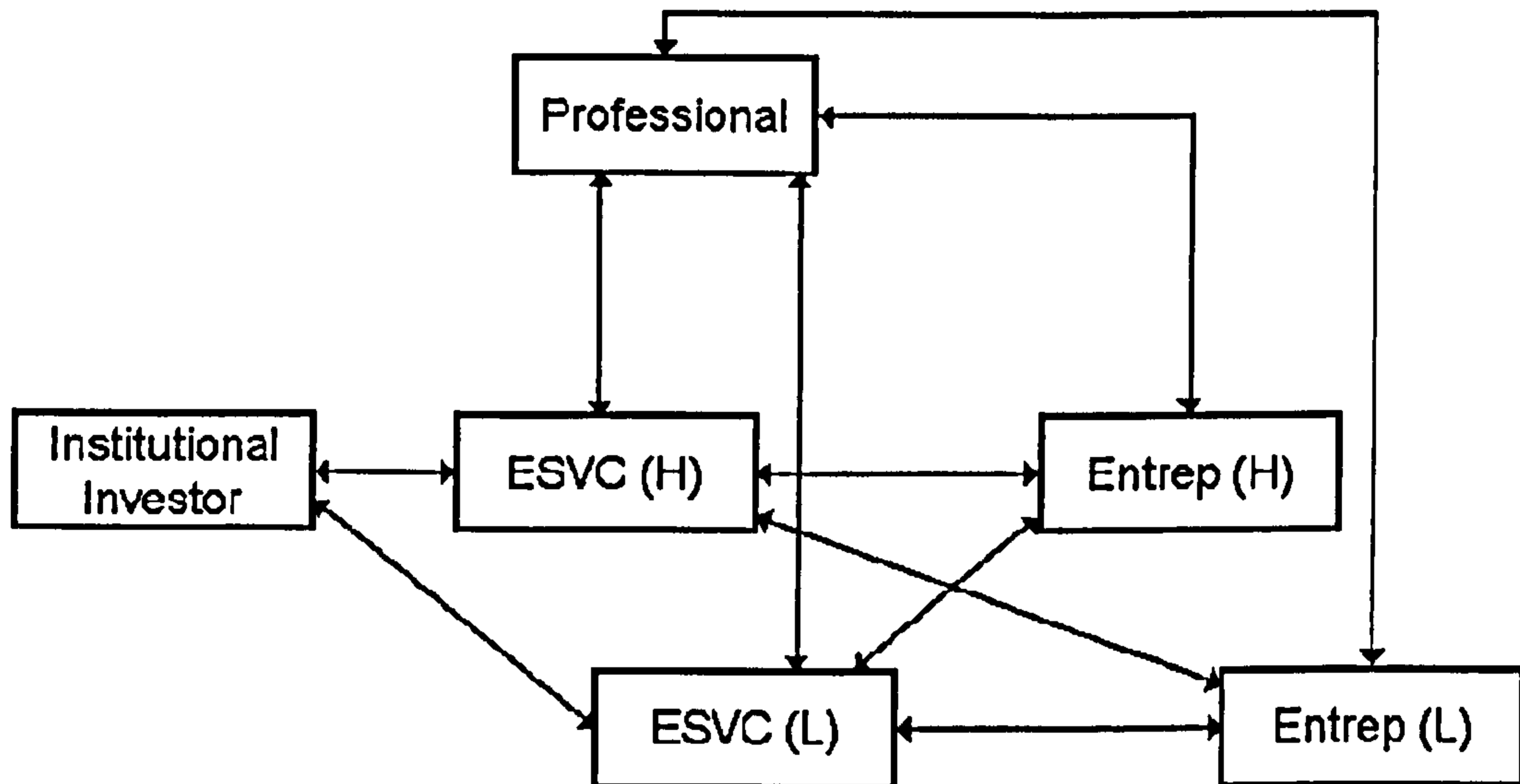


By signalling, the parties try to efficiently convey private information in a manner designed to improve their chance at finding an attractive market partner. Entrepreneurs try to signal that they are “high quality” investment opportunities and thereby establish a high price for their firms, in the form of a high valuation. VC investors try to signal that they are “high quality” advisors and thereby establish a high price for their capital, in the form of a low valuation. This differentiation of quality in entrepreneurs and VC investors can be reflected in the proposed market model.

Figure 3-8 shows a refinement of a the subset of the figure 3-5 model wherein the ESVCs have been separated in high-quality (H) and low-quality (L) investors, and the entrepreneurs have been separated into high-quality (H) and low-quality (L) entrepreneurs. As before, this “quality” attribute is in the eye of the beholder – VC investors are “high-quality” when so perceived by entrepreneurs, and vice versa. However, in this general model it is assumed that quality may include measures that are not directly observable (either being latent attributes, or being contingent on private information). For example, the perceived “quality” of an entrepreneur may reflect her degree of personal commitment to the success of her firm, and this commitment is not directly observable by VC investors. In this situation, signals can be used to convey information about this hidden quality to the other market participants. For instance, the entrepreneur might choose to signal her strong commitment by investing all of her

personal wealth into the business (having a lot of “skin in the game”). This observable fact then acts as a signal to VC investors of her degree of commitment.

Figure 3-8: Introducing Levels of Quality



In this market, entrepreneurs want to be perceived as high-quality and may therefore attempt to use signalling to convey their quality to potential investors (Leland and Pyle 1977). Several mechanisms for signalling from entrepreneur to capital provider have been researched, including the amount of collateral offered (Wilson 1992), the amount of equity retained by the entrepreneur (De Meza and Webb 1987), the quality of directors that have been attracted to the firm (Deutsch and Ross 2003), and the certification of the firm by intermediaries of good reputation (Leland and Pyle 1977; Stuart, Hoang et al. 1999; Hsu 2002).

Some studies (Busenitz, Fiet et al. 2001; Busenitz, Fiet et al. 2005) have raised doubt about whether the particular signal of the amount of entrepreneur’s retained equity is a reliable indicator of quality, since they found no significant correlation to subsequent venture outcome in their sample. The latter study further examined the signalling value of the relative share of the entrepreneur’s personal wealth invested in the business as a signal of quality to reduce information asymmetry, but also found no significant relationship to venture outcome. The questions raised by these contrary findings deserve further and broader investigation.

Myers and Majluf further point out the possibility that some signals of entrepreneurial quality can be observed and interpreted by investors, even when such signals were not deliberately issued by the entrepreneur. In particular, they report on the signalling inherent in the issuing of shares to fund new projects, and show that this can be interpreted as an indicator of private information that the project opportunity is relatively poor, since the best opportunities would presumably be funded by mechanisms less dilutive to existing shareholders (Myers and Majluf 1984).

In this market model, VC investors will also want to be perceived as high-quality, and may similarly attempt to issue signals of their high quality. The market is two-sided, and entrepreneurs may have some degree of choice in the VC investors they take capital from. As a result, VC investors who are able to signal high quality may attract more and better entrepreneurs, and thereby have opportunity to invest in more attractive projects. VC investors who are unable to signal this quality will be left with less attractive entrepreneurs, having projects of higher risk or lower expected returns.

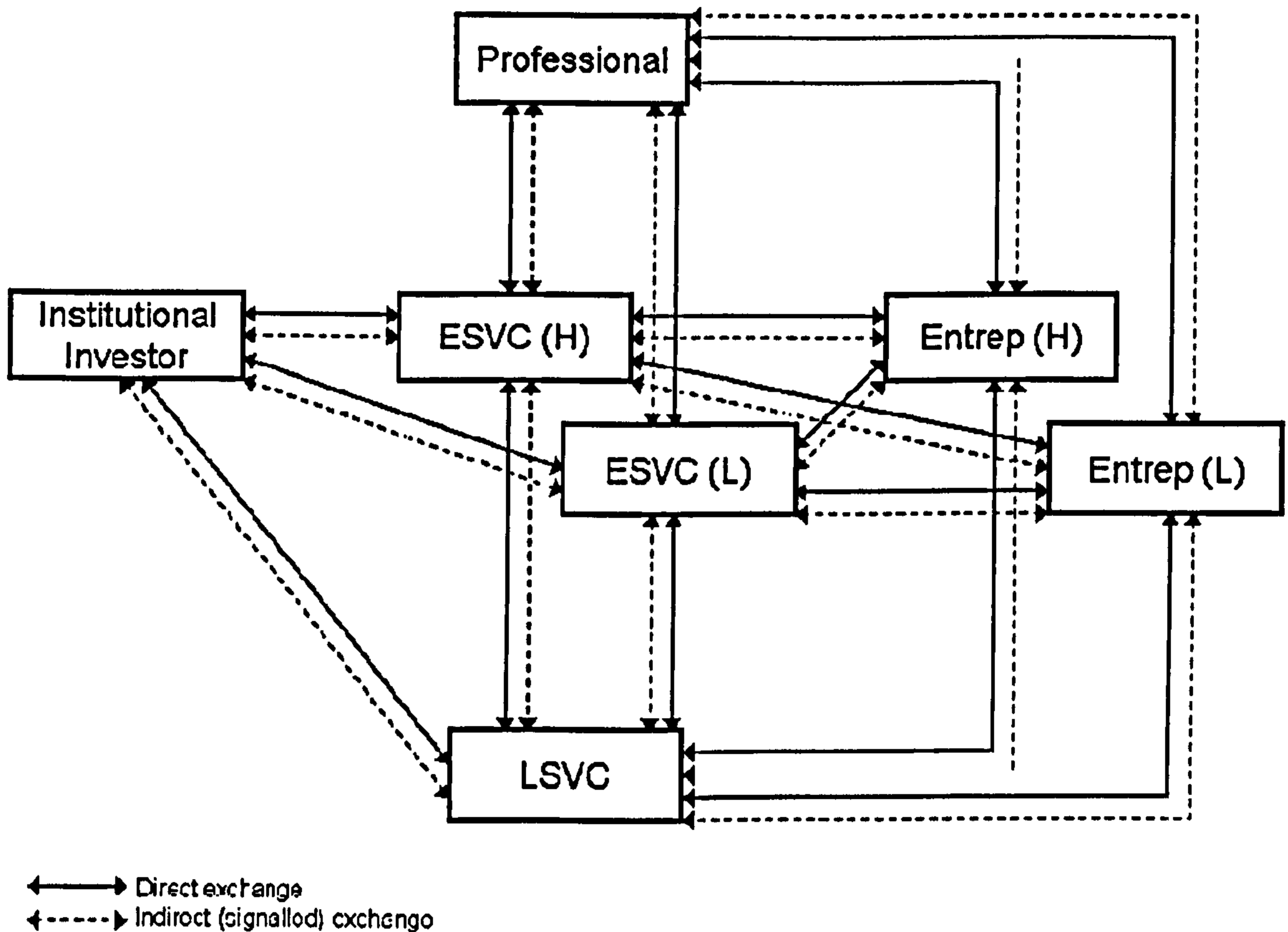
Full market model

Figure 3-9 illustrates the fully developed market model that reflects binary quality levels for VC investors and for entrepreneurs, and also permits both direct and indirectly signalled exchanges among participants.

This model illustrates how, by issuing signals of their quality, the actors can influence the exchange of information among various market participants. In this way, it provides a framework for contextualizing and investigating many possible interactions among market participants, and many possible direct and indirect (signalled) information exchange mechanisms. A full exploration of all of these interactions is beyond the scope of this thesis, particularly for exploratory research where the nature of any indirect information exchanges among each pair of participants is poorly understood. The present research is designed therefore to explore but a subset of the interactions illustrated in figure 3-9 – a subset of market participants, a subset of signals between those participants, and a subset of the potential effects of those signals. In particular, the subset will explore the effects of receiving a credible signal of the high quality of a

particular ESVC investor, and how the other market participants can use this knowledge to make decisions about which market participants they want to transact with. This suggests that six effects may be observed.

Figure 3-9 Full Market Model



These effects are stated as propositions that follow from the developed model. The present research focuses on the last two of these propositions (H5 and H6), with an exploratory purpose designed to illuminate or improve conceptualization rather than confirmatory hypothesis testing. The six proposed effects are:

- H1: Professionals will prefer to refer their high-quality client entrepreneurs to an ESVC issuing a “High” signal, so that these clients can grow to become large consumers of professional services.
- H2: Professionals will avoid referring their high-quality client entrepreneurs to ESVCs who do not issue the “High” signal, on the assumption that these ESVCs are less able to grow their client firms.

- H3: Institutional investors will prefer to invest capital with the ESVC issuing the “High” signal, on the expectation that the high-quality of these ESVCs will result in better investment returns.
- H4: Institutional investors will avoid investing capital with ESVCs who do not issue the “High” signal, on the assumption that these ESVCs cannot earn high investment returns.
- H5: High-quality entrepreneurs (the ones with superior growth prospects) will be attracted to, and will seek financing from, the ESVC issuing the “High” signal, so that their growth prospects will be recognised and so that a financing deal can be easily obtained on attractive terms.
- H6: Low-quality entrepreneurs will avoid approaching the same ESVCs who issue the “High” signal, on the assumption that their lower growth prospects will be discovered and that financing will not be provided, or will be provided on very unattractive terms.

Figure 3-10 illustrates the hypothesized moderating effects of this signal. In the extreme, these signals can have the effect of isolating low-quality VC investors and low-quality entrepreneurs, as shown in figure 3-11, while the other high-quality market participants continue to interact as before.

Figure 3-10: Effects of a “High” Signal

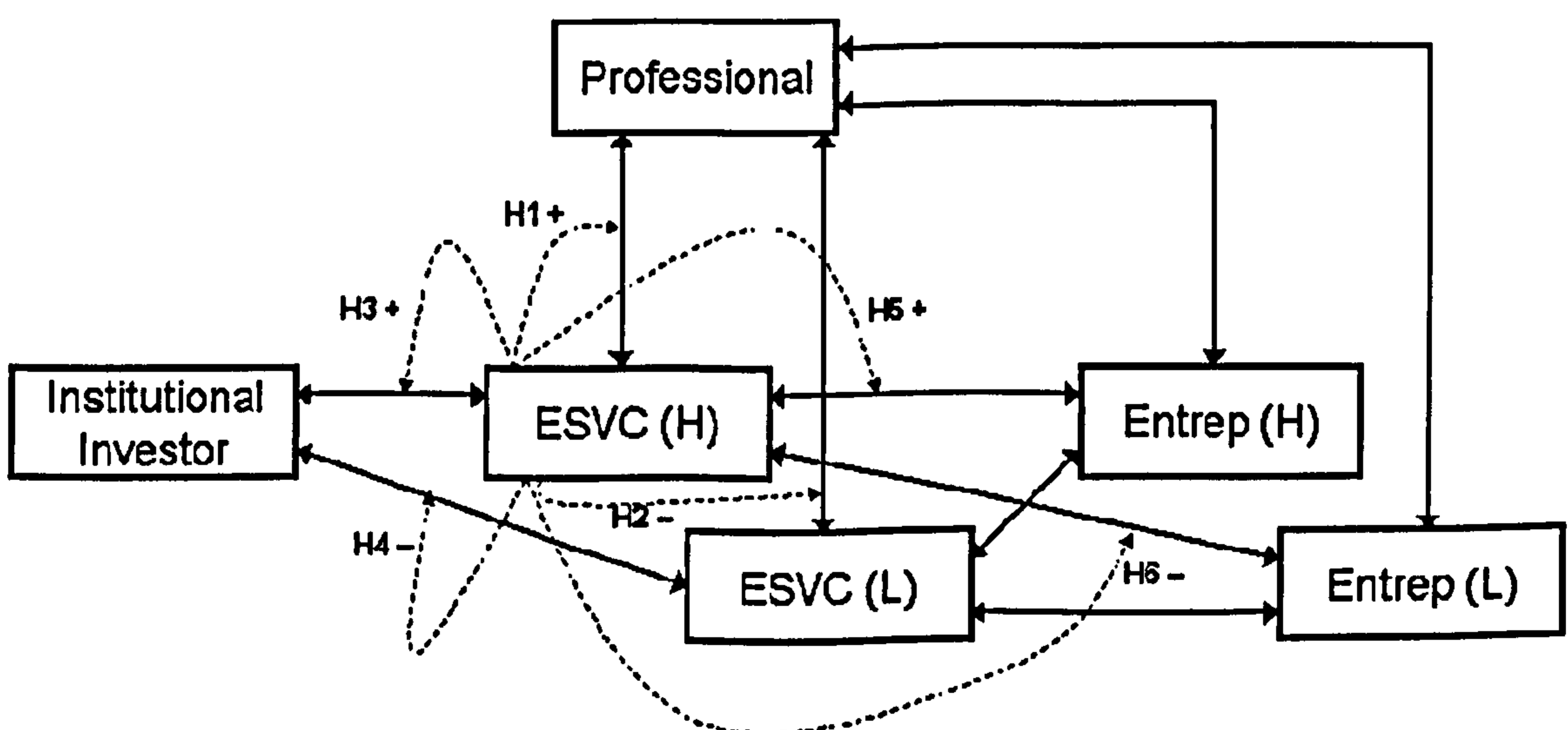
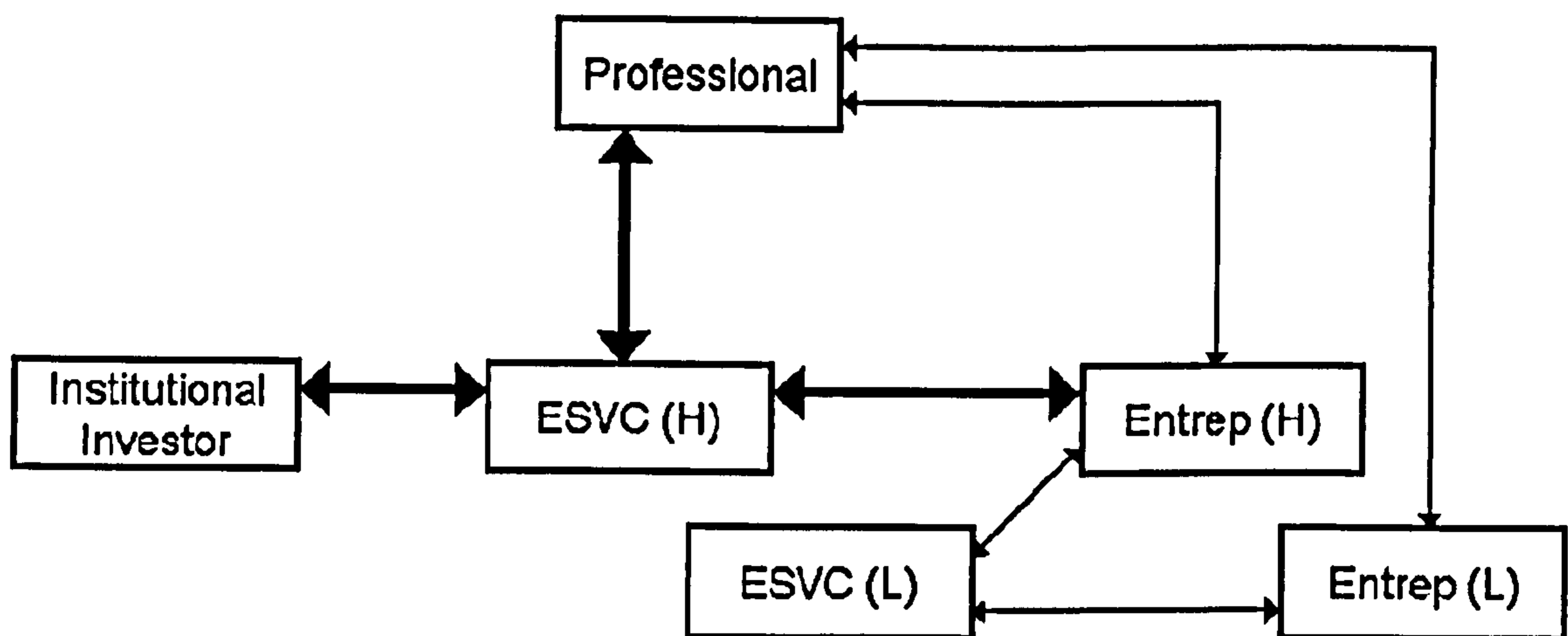


Figure 3-11: Signal Effects In Extremis



Scope of the Research Studies

This model development and supporting review of the literatures of information asymmetry in capital markets, venture capitalist operations and screening, signalling in financial markets, and consumer choice behaviours sets the stage for the specific research questions that will be subsequently addressed. Establishing a broad context is crucial for the successful positioning of research that attempts to integrate a variety of perspectives to address the overall thesis that venture capital investors invest in firms in early-stage capital markets to make themselves appear more attractive to the desirable entrepreneurs in those markets.

In particular, this research examines the role of screening processes on the part of VC investors, the way in which these processes mitigate information asymmetries about entrepreneurial firms, and how they also signal hidden qualities of the VC investor to other stakeholders.

The next four chapters comprise the various research studies that have been conducted to support this thesis. Chapter 4 is a theoretical and quantitatively empirical investigation into the nature of VC screening skill and its relationship to the degree to which VC investors participate in markets with high information asymmetries, such as early-stage private investment markets. This investigation attempts to address the question of why a VC investor would choose to operate in early-stage markets with high information asymmetries. Chapter 5 theoretically and empirically examines the

possibility that this early-stage investment behaviour may be more than a simple pursuit of economic gain, and that it may have an additional information signalling value. In particular, it explores the possibility that early-stage market behaviour on the part of VC investors may act as a signal of quality to other market participants, and by so doing create value for the VC investor. Chapter 6 further expands on the topics of the previous chapter by triangulating with qualitative interview data from practicing VC investors. These data are used to develop a typology of VC investors that supports the interpretations of chapters 4 and 5. The alternative research approach used in this chapter also highlights some future research topics, pertaining to potential non-rational goals of VC investors, which are beyond the scope of the present thesis. Finally, chapter 7 provides an empirical exploratory investigation into how entrepreneurs evaluate potential VC investors for their firms. It investigates the criteria by which VC investors are chosen by entrepreneurs and the role (if any) that signals of screening quality may have in this choice.

With respect to the theorized market model, developed above, these empirical studies will seek to test support for three specific model attributes:

- 1)** Early-stage venture capital investors are not homogeneous, but rather display different levels of quality. This quality includes differing levels of screening skill.
- 2)** Early-stage venture capital investors may deliberately issue signals of their quality for the purpose of conveying information to other market participants, in an attempt to influence the behaviour of these participants.
- 3)** Entrepreneurs may observe and interpret signals of quality from early-stage VC investors, and use this information in their capital sourcing decisions.

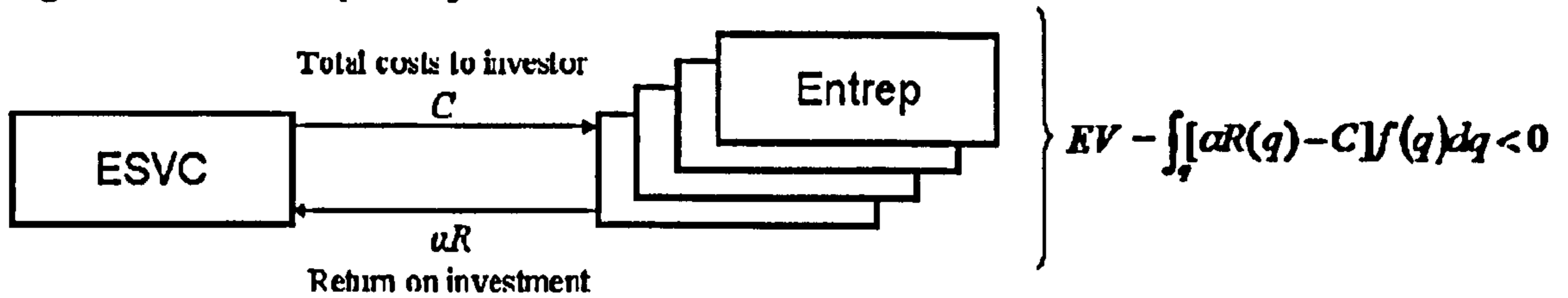
4. Why VCs Invest in Early-Stage Companies

This chapter examines the separation of VC investors and entrepreneurs by levels of quality, as proposed in figure 3-8 in the previous chapter, and the effects of this differential quality on the interrelationships among these actors. It does this by proposing theoretical extensions to an extant model previously developed to explain the existence of venture capital investors. These extensions can accommodate variations in the screening capabilities of different venture capital (VC) investors. This leads to the identification of two additional investment strategies available to VC investors with high screening abilities. Predictions from the extended model are empirically examined via a factor analysis of data from twenty-nine VC investors in North America and Europe. The results suggest that VC investors are not homogeneous in their screening abilities, and that these differences influence their willingness to invest in markets with high information asymmetries. These novel results may suggest a rationale for the participation of some VC investors in early-stage markets.

Introduction

In their work on the theoretical basis for the existence of VC investors, Amit, Brander and Zott develop an insightful model in which the ability to reduce information asymmetries through screening is crucial to mitigating information asymmetries and the adverse selection problem (Amit, Brander et al. 1998). In this model, which encompasses only the VC investor – entrepreneur dyad, the investors incur costs C comprising their capital investment, the cost of providing value-added services, and the monitoring costs associated with the mitigation of moral hazard risks. In exchange, entrepreneurs provide investors with an α share of the positive cashflows R from their projects. In their paper, they argue that, for most entrepreneurs, $(\alpha R - C)$ is negative and therefore that the expected value for the market as a whole is also negative. Figure 4-1 summarizes their view of the market, where a single early-stage venture capital investor has invested in a single entrepreneur.

Figure 4-1: Model Implied by Amit



While providing a firm theoretical starting point, the model makes a number of simplifying assumptions that may not fully capture the range of VC investor abilities and behaviours. In particular, the existing model treats VC investors as homogeneous, in that it does not take into account the variations among investors of their screening abilities, and the resulting existence of investment strategies that can differ from the model's general predictions. The role played by different venture capitalist screening abilities in mitigating adverse selection and enabling competitive strategies for investors has been a somewhat neglected area of research. One study into VC decision-making has found differences in the decision-making behaviours of VC investors operating in early or later-stage markets, which may be indicative of strategic differences based on abilities to screen effectively and to manage information asymmetries (Jorge 2004). The current study seeks to extend the previous model and thereby to permit differential predictions based on the degree of screening ability an investor possesses. This should provide an enriched understanding of how variations in VC investor abilities drive different investment strategies and behaviours. After developing this extension to the Amit model, some illustrative empirical observations are provided to support the practical use of these different investment strategies by VC investors of different levels of screening ability.

In dealing with entrepreneurs, VC investors are at an intrinsic information disadvantage, in that entrepreneurs possess private information about the nature and prospects of their businesses and about the level of effort they are willing to expend towards making their businesses successful. This information asymmetry has the effect of creating risk and inefficiency in early-stage capital markets (De Meza and Webb 1987; Cumming and MacIntosh 2001). This risk and inefficiency may be factors in the low returns typically offered by early-stage investment markets (Bygrave, Fast et

al. 1988), low returns that cannot be easily mitigated without increasing the VC fund size and the related deal size and target firm lifecycle stage (Murray and Marriott 1998). As Amit, Glosten *et al* point out, the mitigation of adverse selection risk is fundamental to venture-capital investing (Amit, Glosten *et al.* 1993). Sahlman further demonstrates that the adverse selection challenge is an important determinant in the practice of VC contracting (Sahlman 1990).

Although organizational theorists have suggested that social ties play an important role for investors seeking to overcome this information asymmetry (Venkataraman 1997), much of the research into the methods used by VC investors has been based in economics. A primary method employed *ex ante* by VC investors to reduce information asymmetry has been the use of screening criteria (i.e., a set of evaluative criteria by which investment opportunities may be ranked and scored against some acceptable benchmarks). As Chan shows, the presence of informed investors (such as VC investors who are skilled screeners) can improve the overall quality of dealflow in the entire VC market (Chan 1983). And the risk-sharing benefits of the presence of these investors has been shown to act to prevent the market collapse normally associated with adverse selection (Akerlof 1970; De Meza and Webb 1990; Amit, Glosten *et al.* 1990a). The presence of skilled screeners who can resolve information asymmetries brings many benefits, and in an efficient market these investors are rewarded for this value creation (Ippolito and Bertoni 2004).

There have been a wide range of studies into the dimensions and effectiveness of screening criteria (MacMillan, Seigel *et al.* 1985; MacMillan, Zeman *et al.* 1985; MacMillan and Subba Narasimha 1987; Sandberg, Schweiger *et al.* 1988; Hall and Hofer 1993; Fried and Hisrich 1994; Shepherd 1997; Shepherd 1999; Shepherd, Ettenson *et al.* 2000; Kaplan and Stromberg 2001). Whereas early research into VC investor screening largely dealt with its application as a single-stage event (Hall and Hofer 1993), Fried and Hisrich have identified a model that more accurately reflects the successive nature of staged screening (Fried and Hisrich 1994). The application of these screening criteria typically occurs over several successive phases or stages,

wherein only the entrepreneurs who meet or exceed the criteria of one evaluation stage are considered for evaluation at the next stage.

Much of the research into VC screening has treated VC investors as a homogeneous group, without allowing for differences in their abilities, efforts or strategies towards the screening challenge. Consequently, there is a lack of a robust theory for the various strategies that different classes of VC investors adopt to address the problem of adverse selection.

Theory

The effects of information asymmetry that create adverse selection increase the risk that entrepreneurs with attractive projects will exit the market, while entrepreneurs with unattractive projects will be funded by VC investors. Exploring this theoretical model in greater depth can benefit from a more rigorous treatment of the expected value of project investments made under risky conditions. For this, theorizing begins with a mathematical model taken from the literature. The model developed by Amit, Brander and Zott (1998) for adverse selection culminates in an equation that shows the expected value of projects that meet or exceed the threshold quality level q_0 for profitability

$$EV = p(d) \int_{q_0}^{\infty} [\alpha R(q) - C(q)] f(q) dq - d \quad (1)$$

where

EV is the expected value of a VC investor's investment in all the high-quality firms in a market, for a given level of due diligence

p is the probability of correctly identifying the quality of a firm, as a function of the due-diligence costs expended

d is the amount expended on due diligence investigations

α is the fraction of net cashflow claimed by the VC investor

R is the net cashflows generated by a firm of a given quality

C is the cost incurred by the VC investor in investing in a firm of a given quality, which includes the amount invested, the cost of monitoring the investment to mitigate moral hazard, and the cost of providing any value-added services to help the entrepreneur to realize R

f is the probability density function of firm quality in the population

q is the quality of a given firm

q_0 is the “threshold quality” defined implicitly as the value of q above which $\alpha R(q) - C$ is positive

and where the implied integral limits have been explicitly shown.

Following Amit, C is assumed to be constant for different VC investors. In practice, it is likely that C is a u-shaped function of q , where VC investors spend more on their winners (trying to maximize their value by adding services) and on their losers (trying to rescue them), but spend comparatively less on the middle-performing firms.

Similarly, the detection function p , would in practice likely not be constant with respect to q , but would be u-shaped. It would be relatively easy for a screener to accurately assess a project that was very high quality or very poor quality, so that at constant d the function $p(d, q)$ would be close to 1. On the borderline, with projects of middle quality, it would be more difficult to accurately assess project quality, so that $p(d, q)$ would be correspondingly lower. However, for the remainder of this analysis, Amit’s assumption of the independence of p and q will be allowed to stand.

The necessity of using a probabilistic detection function p suggests that the threshold quality project cannot be clearly identified as the lower bound of the summation, nor can projects be explicitly and accurately rank-ordered. Therefore, if one has only probabilistic ability to sum these desirable projects, one must also accept the

probability of including some of the undesirable projects (i.e., type I and type II errors are possible). The expected value should therefore correctly include these.

$$EV = p(d) \int_{q_0}^{\infty} [\alpha R(q) - C(q)] f(q) dq + (1 - p(d)) \int_0^{q_0} [aR(q) - C(q)] f(q) dq - d \quad (2)$$

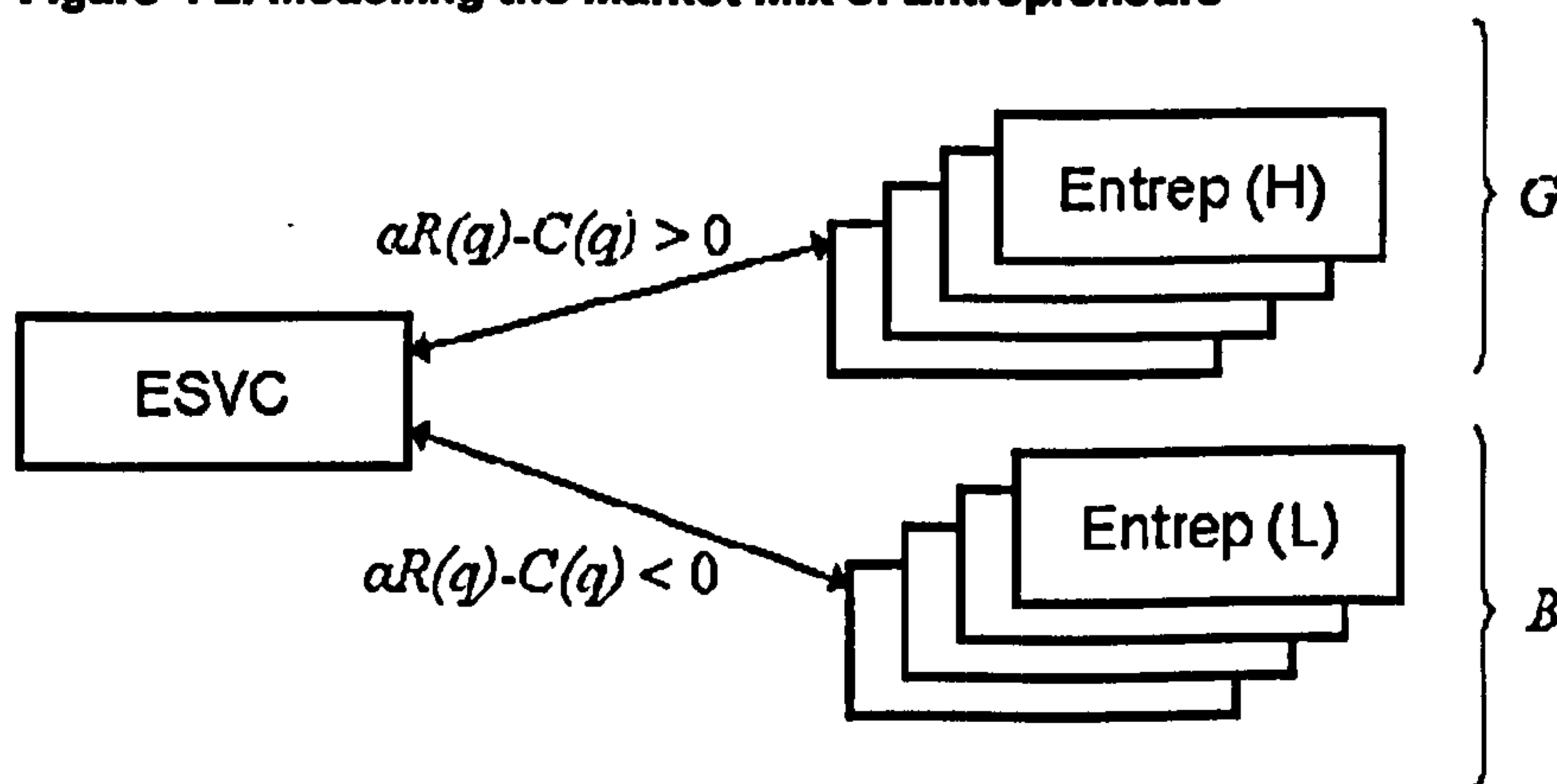
To further simplify the notation, variables are introduced to represent the summed value of the good (G) and bad (B) projects.

$$EV = pG + (1 - p)B - d \quad (3)$$

where $G > 0, B < 0$

From the perspective of the market model of chapter 3, this characterization of the entrepreneurs in the market is akin to viewing entrepreneurs as having two types Entrep (H) and Entrep (L) – but here the H and L quality designations are determined by the sign of the investment profitability expression $\alpha R(q) - C(q)$. The value of the Entrep (H) projects is represented by G , while the value of the Entrep (L) projects is represented by B , as shown in figure 4-2.

Figure 4-2: Modelling the Market Mix of Entrepreneurs



This model assumes that all investors are equally skilled in screening and quality detection. But the model can be extended to allow for differential screening abilities (that is, the responsiveness of p with regard to d). This suggests that p is a function also of the talent and skill of the individual making the assessment, which may vary over time as the individual gains experience and learns to screen more effectively.

Suppose average VC investors can screen with low accuracy p_L , while good screeners have a higher accuracy of p_H , in both cases at a due diligence spending level of d . Further suppose the existence of two different investment markets. The first, characterized by G_1 and B_1 , is one where any average VC investor can profitably detect project quality. The second, characterized by G_2 and B_2 , is such that only unusually good screeners can profitably detect quality. For example, the first market might comprise more established companies with proven track records, while the second market consists of startups. Under these conditions

$$p_L G_1 + (1-p_L)B_1 - d > 0 \quad (4)$$

$$p_H G_1 + (1-p_H)B_1 - d > 0 \quad (5)$$

$$p_L G_2 + (1-p_L)B_2 - d < 0 \quad (6)$$

$$p_H G_2 + (1-p_H)B_2 - d > 0 \quad (7)$$

From the later two inequalities can be seen that the second market is dangerous for any average VC investor when

$$p_L \leq \frac{d - B_2}{G_2 - B_2} \quad (8)$$

While it is safe for good screeners when

$$p_H \geq \frac{d - B_2}{G_2 - B_2} \quad (9)$$

The critical screening ability threshold therefore is

$$\theta \equiv \frac{d - B_2}{G_2 - B_2} \quad (10)$$

For example, consider a market where $G = \$100M$, $B = (-\$100M)$ and $d = \$100k$. By calculation, $\theta = 0.5005$ is the threshold screening ability. If an average VC investor can screen with 40% accuracy, this market will be unprofitable for them to invest in. But if a

good screener can provide 60% accuracy, they may invest in this market where the average VC investor cannot tread. This differential screening ability gives the good screener a competitive advantage when operating in this market.

Markets therefore become attractive for average VC investors when the average project quality q is high and when the quality distribution function f is such that very many projects exceed the threshold quality level q_0 . Such markets are characterized by G much larger than B , and θ correspondingly low. Markets that do not have these characteristics are unsuitable for average VC investors, and may be profitable for only the highly-skilled screeners.

These highly-skilled investors are those who have a high value of p for any given level of d (i.e., where dp/dq is large), which is to say that they can more accurately assess the prospects of an entrepreneurial firm for any given level of expenditure on screening efforts.

Predictions

The result of this theoretical model extension is the identification of investment strategies not entertained by Amit's original model. These alternatives are available to VC investors having an unusually good screening ability.

The first alternative strategy is to operate in the same sectors and stages as average VC investors (as suggested by Amit's first two hypotheses), but to obtain higher profits than an average VC investor. Under this strategy, the good screener provides that same level of detection p necessary to profitably identify the good projects, but does so at a lower due diligence cost d . He therefore obtains a higher overall profit.

The second alternative strategy, which runs counter to the prediction of the original model, is to invest the same due diligence costs as an average VC investor, but thereby obtain a high level of detection and use this to operate in sectors and stages where average VC investors cannot. This strategic alternative can be represented by the following general prediction:

- There is a correlation between screening ability and willingness to invest in markets where information asymmetries are high.

Within the context of the particular focus of the present research, this can be interpreted to mean that VC investors with extraordinarily high screening abilities would be more likely to invest in early-stage markets than would less-skilled VC investors. Operationally, this general prediction can be reflected in the following initial hypotheses:

Hypothesis 1: VC investors with high screening abilities (i.e., where the effectiveness of their due diligence dp/dq is large) are more likely than other VC investors to make investment deals with unknown or unREFERRED entrepreneurs. This is based on the assumption that less-skilled VC investors are less able to assess entrepreneurs who lack track records or strong references. As Shane and Cable have shown, social ties play an important role in beneficial information transfers to mitigate asymmetries (Shane and Cable 2002). Where the entrepreneur has an established relationship with the VC investor, or where a trusted intermediary gives reference (Leland and Pyle 1977), this social information transfer reduces the asymmetry the investor faces. A reference from a trusted source is particularly effective in reducing information asymmetry for young companies, and where the reputation risk to the endorser is high (Stuart, Hoang et al. 1999).

Hypothesis 2: VC investors with high screening abilities are more likely than other VC investors to invest in start-up companies and company expansions into new businesses. This is based on the assumption that less-skilled VC investors are less able to assess the risks and thereby reduce the information asymmetries of dealing with companies that lack an observable track record in their chosen business. The heightened information asymmetries associated with start-up firms have been considered extensively in the literature (Ruhnka and Young 1991; Amit, Brander et al. 1998; Cumming and MacIntosh 2001). Expansion-stage firms have also been associated with higher information asymmetries that may be associated with lack or relevant track record and the potential for window-dressing (Cumming 2002).

Hypothesis 3: VC investors with high screening abilities are more likely than other VC investors to invest in companies having unproven business models. This is based on the assumption that less-skilled VC investors are less able to assess the risks and thereby reduce the information asymmetries of dealing with companies that lack an observable track record with this business model (Ruhnka and Young 1991; Kaplan and Stromberg 2002; Zott and Amit 2002).

Hypothesis 4: VC investors with high screening abilities are more likely than other VC investors to invest in companies in foreign countries. This is based on the assumption that less-skilled VC investors are less equipped to understand and manage the information asymmetries regarding foreign markets and business/regulatory environments (Hall and Tu 2003). It is worth noting that this hypothesized relationship runs counter to the often observed “home bias” of investors favouring investments close to their home base (Coval and Moskowitz 1999; Ackert, Church et al. 2003). This bias has also been observed with VC investors in early-stage markets, who may prefer to invest close to home so they can keep close monitoring of their investees (Gupta and Sapienza 1992).

Hypothesis 5: VC investors with high screening abilities are more likely than other VC investors to invest in companies without syndicating the investment, so that they can claim all of the upside gains and can avoid the complexities of managing a syndicate of investors with possibly divergent objectives. This hypothesis is based on the assumption that less-skilled VC investors will seek the comfort of knowing that their syndication partners have also performed some degree of screening, which may mitigate their own lack of skill. Lerner, in extending the logic of Sah and Stiglitz, argues that syndication improves the quality of investment decisions by bringing more experience to bear, thereby compensating for the reduced skill of an inexperienced investor (Sah and Stiglitz 1986; Lerner 1994). Lockett and Wright have found this risk reduction benefit of syndication to be particularly significant for investors who participate in early-stage markets (Lockett and Wright 2001). Nevertheless, syndicating does entail sharing the upside of an investment with other VC investors.

So, for VC investors who feel confident in their abilities to manage the investment risks alone, syndication may appear undesirable.

Hypothesis 6: The investee companies of VC investors with high screening abilities are more likely than the investee companies of other VC investors to have many prior rejections by other VC investors. This is based on the assumption that good screeners are able to spot opportunities that less-skilled VC investors might overlook. As Bruno and Tyebjee show, denial of capital from one VC investor does not mean that capital cannot be obtained from another VC investor or other source; some VC investors fund companies that have been rejected by other investors (Bruno and Tyebjee 1983).

Empirical Study

During the summer and fall of 2004 an email-based survey of VC investors was conducted, to examine the relationship between screening ability and willingness to invest in asymmetric markets. This examination was exploratory in nature, with the aim of better understanding how VC investors may vary in screening ability, and the role (if any) this variability may have in their participation in investment markets that have high information asymmetries. A quantitative positivist approach was adopted to provide an objective basis for this exploration – the goal was to understand actual differences in VC investor beliefs and strategies, rather than the sense-making or social construction of the perspectives that they take on these differences.

Methodology

The selected unit of analysis was the individual VC investor working in a professional VC firm. Respondents were asked to provide information on their unique individual background and experience, and on the characteristics of investee firms for which they had direct personal involvement in the decision to invest.

The survey was limited to professional VC investors in North America and Europe. In particular, it used a database of VC firms and individual VC investors, based on the membership lists of the respective national venture capital associations (i.e., CVCA,

NVCA and BVCA)². From this list were excluded firms that did not invest capital, but instead provided intermediary services (such as assisting entrepreneurs in raising capital or assisting VC investors in evaluating or managing their investments). Further excluded were firms that had no website, nor any listed contact email address.

Within the range of each VC firm that fell within the sample frame, the individual respondent was identified. These specific respondents were chosen by consulting the contact information provided on the firm's website. The survey sought senior personnel in the firm who were responsible for making investment decisions. Accordingly, named individuals with titles such as "Managing Director", "Partner" or "Investment Manager" were selected, while individuals with titles that suggested they either did not have independent investment decision making responsibility ("Associate" or "Venture Associate") or were focused on other aspects of firm management ("Chairman" or "CFO") were rejected. Whenever a contacted individual declined to participate, a referral to another individual in the same VC firm was sought. Biweekly reminders were sent to non-respondents to encourage participation and completion of the survey (Yu and Cooper 1993). The sample frame and contact information yielded a list of 400 individual email addresses.

Alternative recruitment and contact methods that were considered included direct solicitation at VC conferences ("venture fairs"), telephone cold calling, and personal networking. Forming the list of potential VC respondents in the chosen manner (email solicitation) offered certain advantages over these alternatives. Attendance at venture fairs, while possibly yielding higher response rates due to personal relationships, would be significantly more costly and would introduce a bias against VC investors who are active in early-stage markets but do not attend such fairs (either they do not solicit business plans in this manner, or they see little incremental marketing or networking benefit to their attendance). Telephone contact, while less costly, would exacerbate low response rate challenges, because it would demand not only the busy VC investor's time, but also a fixed schedule commitment. Moreover, telephone

² Canadian Venture Capital Association, National Venture Capital Association (USA), and British Venture

contact can introduce additional gatekeeper personnel, making it much more difficult to get the survey in front of the targeted person. And personal networking, while likely yielding a high response rate among VC investors approached, would be severely limited in geographic scope, and can also introduce an availability bias. On this basis, direct email contact was felt to offer an acceptable trade-off of reach, response rate, cost, and selection bias.

The underlying theoretical constructs of the survey were essentially two: the screening ability of the individual VC investor, and the extent to which they invest in markets where they face high information asymmetries. For each of these, several measures were developed. Some of these were based on the findings of Cumming's study of adverse selection with VC investors (Cumming 2002).

A panel of experts was used to validate the content of the instrument, in terms of the appropriateness of the items to the domain of interest, the categories and scales used, and the clarity of the questions. This panel comprised three professional investors and two academic scholars experienced in research in the VC industry. Their feedback was incorporated into the design of the survey instrument used in pilot testing.

The instrument was tested by administering it to a pilot group of fifteen VC investors (distinct from the panel of experts) not included in the survey sample, not being members of the national associations. Based on information available on the websites of the survey sample VC firms, no pattern of differences was detected between the pilot investors and the national association members, in regard to their chosen investment sectors and stages and the typical background experience of the individual investment practitioners. It appears that the pilot group is thus reasonably representative of the intended sample group for the purpose of instrument validation. Responses from this pilot group were analyzed for reliability and construct validity.

With respect to screening ability, the following variables were operationalized as potential measures of VC screening.

- **YPSE** – Number of years of post-secondary education for the respondent.
- **YIET** – Total number of years of industry experience, in any role and any industry.
- **YFPI** – Number of years of experience in the primary target industries of the current investment fund.
- **YEET** – Total number of years experience as an entrepreneur, in any industry.
- **YEPI** – Number of years of entrepreneurial experiences in the primary target industries of the current investment fund.
- **YVC** – Number of years of experience as a venture capital investor.
- **YOI** – Number of years of experience as some other type of investor (banker, angel investor, etc).
- **PLEAD** – Percentage of investments in the current portfolio, for which the respondent acted as the leader of a syndicate.
- **NARSECT** – Breadth or narrowness of sectoral focus for the current investment fund. Calculated as a percentage of the following sectors in which the respondent actively invests: IT software, IT hardware, Biotechnology, Nanotechnology, Advanced energy technology, Other advanced technology, and non advanced-technology based.
- **NARSTAGE** – Breadth or narrowness of company-stage focus for the current investment fund. Calculated as a percentage of the following growth stages in which the respondent actively invests: Seed, A-round (start-up), B-round (high-growth), C-round (expansion, pre-IPO), Public companies, Management buy-outs, Acquisitions, Turnarounds.

With respect to investing in markets characterized by high information asymmetries, the following variables were operationalized as potential measures of willingness to invest in asymmetric markets.

- PUNK – Percentage of investments in the current portfolio where the entrepreneur was completely unknown to the respondent before the investment.
- PSTAR – Percentage of investments in the current portfolio that were start-up companies.
- PEXPD – Percentage of investments in the current portfolio that were expansion financings.
- PNOV – Percentage of investments in the current portfolio that had novel and unproven business models.
- PFOR – Percentage of investments in the current portfolio that were companies in a foreign jurisdiction.
- PSYN – Percentage of investments in the current portfolio that were syndicated with other investors.
- NREJ – Average number of prior rejections (by other investors) received by successful companies in the respondent's current portfolio.

Analysis of results

Of 400 surveys sent, thirty-two were returned and eight were undeliverable (these cases are not included in the determination of response rate). This data was transcribed from the returned survey Word documents (received either by fax or by email attachment) and collated in Excel. In three cases, minor interpretations of data were made (such as a written-in response of "practically none" being coded as 0). Of the total replies, three were eliminated due to being incorrectly completed, leaving an overall response rate of 7.5%. Securing research participation from VC investors can be very difficult. This is demonstrated by the paucity of primary data source utilization in the extant VC literature. Even a highly practitioner-oriented survey with direct value to practicing investors, such as conducted by *Forbes Magazine*, can have VC response rates of less than 5% (Keller 2001). Academic research of more theoretical bent may expect even lower priority from VC investors, and correspondingly lower

response rates. Partly this may be due to the extreme time pressures that VC investors face, as evidenced by the emphasis they place on developing quick rejection mechanisms in their screening processes (Rea 1989; Fried and Hisrich 1994; Elango, Fried et al. 1995). It may also be due to the overconfidence that many VC investors exhibit, whereby they may perceive the value proposition of participating in research studies to be low – they may overestimate their own knowledge, and therefore believe they have little to learn from such research (Zacharakis 1997; Zacharakis and Shepherd 2001).

Faced with this challenge of small sample sizes, the statistical power ($1-\beta$) of the dataset takes on increased importance. High statistical power increases the likelihood that all significant relationships that may exist in the data will be detected in the analysis. Statistical power ranges from 0.34 to 0.99 for the correlation analyses reported below³.

Table 4-1: VC respondent descriptions

Country	
Canada	31%
UK	31%
USA	38%
Investment Sectors	
Software	76%
Hardware	45%
Biotechnology	38%
Nanotechnology	21%
Advanced energy technology	28%
Other advanced technologies	45%
Non high-tech	10%
Investment Stages	
Seed	52%
A-round	72%
B-round	69%
C-round	45%
Public companies	10%
Management buyouts	24%
Acquisitions	14%
Turnarounds	7%

³ Statistical power was determined using the online calculator provided by the UCLA Department of Statistics, at <http://calculators.stat.ucla.edu/powercalc/normal/n-1/> which is based on Mace, A. E. (1974). Sample-size determination. Huntington NY, Robert E. Krieger Publishing Company.

Table 4-1 provides descriptive measures of the respondents obtained for this survey, by their base country, the sectors in which they invest, and the company stages in which they invest. The sector and stage descriptions total more than 100% because many VC investors target multiple sectors or stages. While the exploratory sample is relatively small, Table 4-1 reveals that the sample is quite diverse.

This exploratory study utilizes single-item measures to attempt to uncover or suggest relationships reflective of the theory work above. However, current theory has not yet evolved to the point of providing clearly defined and unidimensional constructs for screening skills and behaviours, and the forms of information asymmetry present in early-stage markets. Consequently, reliability and predictive abilities for hypothesis testing should be expected to be somewhat low.

The data were analyzed using SPSS software (version 12.0). Table 4-2 provides some descriptive statistics for each screening ability variable. Table 4-3 provides some descriptive statistics for each investment asymmetry variable.

Table 4-2: Screening measures

	N	Minimum	Maximum	Mean	Std. Deviation
Ypse	29	2	20	6.52	3.398
Yiet	29	4	30	15.72	7.530
Yfpl	29	0	30	12.36	7.143
Yeet	29	0	25	5.47	6.793
Yepi	29	0	20	3.47	5.251
Yvc	29	2	18	7.38	5.281
Yoi	29	0	17	3.86	5.572
Plead	29	0	100	60.90	28.059
Narsect	29	0	.857	.374	.221
Narstage	29	.125	.875	.366	.163

For ease of reference, variable names and descriptions are summarized in appendix A-1. Measures for Ypse through Yoi are in years. Measures for Narsect and Narstage are dimensionless.

Table 4-3: Asymmetric investment measures

	N	Minimum	Maximum	Mean	Std. Deviation
Punk	29	0	75	21.59	23.615
Pstar	29	0	100	59.59	35.618
Pexpd	29	0	100	31.28	29.852
Pnov	29	0	100	38.43	38.117
Pfor	29	0	100	12.90	24.332
Psyn	29	0	100	74.03	31.745
Nrej	23	0	15	4.39	5.141

Measures for Punk through Psyn are % of portfolio. The measure for Nrej is integer count.

The data were examined for significant correlations between variables. Table 4-4 lists the observed correlations. Within the screening variables, several highly significant correlations were observed among the various measures of experience. Combining these various measures (YIET, YFPI, YEET, YEPI) into a single scale yields a Cronbach's alpha of 0.76.

Within the asymmetry variables, the strong negative correlation between PSTAR (percentage of startups in portfolio) and PEXPD (percentage of expansion in portfolio) reflects the specialization of investors along the lifecycle stages of companies, where investors who finance startups are not the same investors who finance later-stage expansions (although both cases have potentially high information asymmetries). The strong positive correlation between PSTAR and PNOV (percentage of novel business models in portfolio) reflects the situation where novel business models are frequently treated as experiments by young companies and new entrepreneurs, and are less frequently tried by more established companies with already-proven alternative business models.

Table 4-4: Correlations among variables

	Ypse education	Yiet total exp	Yfpi target exp	Yeet entrep exp	Yepi entrep target	Yvc VC exp	Yoi other exp	Plead synd leader	Narsect sector focus	Narstage stage focus	Punk unknown ent	Pstar startups	Pexpd expansions	Pnov bus. model	Pfor foreign	Psyn syndicated	Nrej rejected
Ypse	1																
Yiet	.289	1															
Yfpi	.438(*)	.813(**)	1														
Yeet	.351	.377(*)	.404(*)	1													
Yepi	.068	.547(**)	.456(*)	.656(**)	1												
Yvc	-.053	-.154	.057	-.117	-.310	1											
Yoi	-.183	.477(**)	.171	.024	.187	-.229	1										
Plead	.186	.283	.239	-.020	.030	-.052	.180	1									
Narsect	.161	-.105	-.199	-.202	-.165	-.021	.135	.183	1								
Narstage	.081	.056	.165	-.026	-.190	.252	-.075	-.062	.128	1							
Punk	-.221	-.025	.104	-.316	-.191	.239	-.068	-.104	.217	.385(*)	1						
Pstar	.349	.136	.135	.058	.231	-.392(*)	.015	.289	.335	-.227	.134	1					
Pexpd	-.389(*)	-.117	-.227	-.009	-.159	.263	.143	-.123	-.207	.172	-.148	-.850(**)	1				
Pnov	.037	-.098	-.114	-.024	.062	-.046	.044	.054	.294	-.216	.164	.658(**)	-.527(**)	1			
Pfor	-.055	.155	-.019	.153	.359	-.246	.212	-.462(*)	-.033	.053	-.194	-.245	.358	-.203	1		
Psyn	.280	-.007	-.029	-.135	-.109	-.381(*)	-.063	.163	.490(**)	.328	.067	.328	-.208	-.013	.110	1	
Nrej	-.162	-.133	-.427(*)	-.223	-.172	-.279	-.098	-.199	.307	-.097	.040	.265	-.179	.301	-.062	.033	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Several interesting correlations are also seen between the screening and asymmetry variables. The correlation between NARSECT (narrowness of sectoral focus) and PSYN (percentage of syndicated deals in portfolio) may represent investors with highly focused industry specializations attempting to broaden their knowledge base by involving investors with other knowledge and experience, as breadth of knowledge has previously been found to be a factor in the focused selection of potential investees (Jungwirth and Moog 2004). The correlation between NARSTAGE (narrowness of lifecycle stage focus) and PUNK (percentage of unknown entrepreneurs in portfolio) may reflect the trust that later-stage investors (such as a C-round investor) place in the judgements of earlier-stage investors (such as a B-round investor), so that a deal coming from a trusted early-stage investor will be considered despite the fact that the entrepreneur is unknown to the later investor. The correlation between YFPI (experience in the target industry) and NREJ (investments in “overlooked” companies) suggests that entrepreneurs with many prior rejections are more likely to find acceptance among investors without a lot of experience in the specific industry sector – in a positive light this may be viewed as an escape from groupthink by these “inexperienced” investors, and in a negative light it may be a case of “fools rushing in” to invest where the more experienced fear to tread. The correlation between YVC (VC experience) and PSTAR (percentage of startups in portfolio) is particularly interesting, as it suggests that as VC investors gain more experience as investors, they tend to move “up-market” and away from startups (in model parlance, ESVCs migrate to the LSVC role). And finally, the correlation between YVC and PSYN suggests that more experienced VC investors may also gain self-confidence to make deals without syndication partners to rely upon for risk reduction. These correlations provide some initial support for the contention that VC investors are indeed non-homogeneous with respect to their screening abilities and investment approaches.

Due to the small sample size, normal distribution of these variables should not generally be assumed⁴. Therefore normality checks were conducted for each variable. These checks included visual inspection of quantile-quantile plots⁵, calculation of Kolmogorov-Smirnov statistics (with the Lilliefors significance correction) (Kolmogorov 1941; Lilliefors 1955), and calculation of the Shapiro-Wilk statistic (Shapiro, Wilk et al. 1968). These statistics are provided in appendix 4, table A4-1. After removing outliers through visual inspection, these statistics suggest normality assumptions may be questionable for YOI, PFOR and PNOV, which may be exhibiting bimodal tendencies.

To check for non-response bias in the data, descriptive means and variances were recomputed for the dataset with 10% of the cases removed, being those received after the longest delays. Since a common reason for busy VC investors to not respond to a survey such as this is that they are simply too busy to respond, these slow responses were taken as indicative of the views of VC investors who were too busy to respond, and thereby adopted as a theory of non-response (Groves and Couper 1996). Under the null hypothesis, the earlier responses should not be significantly different from these later responses. The means and variances of the attenuated dataset were compared via *t*-test and *F*-test to the full dataset. For all variables, the null hypothesis could not be rejected at $p=.05$, which suggests that the later responses do not represent a different population than the earlier responses. From this, no significant non-response bias can be inferred, suggesting that non-response bias has not materially affected the results presented. Furthermore, to the extent that the self-selection of respondents may have yielded a bimodal “interest” bias, this bias is likely desirable for research of an exploratory nature such as this as it acts to accentuate the range of views.

⁴ Normality can be generally assumed for samples of $n > 30$

⁵ “The quantile-quantile (q-q) plot is a graphical technique for determining if two data sets come from populations with a common distribution. A q-q plot is a plot of the quantiles of the first data set against the quantiles of the second data set. By a quantile, we mean the fraction (or percent) of points below the given value. That is, the 0.3 (or 30%) quantile is the point at which 30% percent of the data fall below and 70% fall above that value. A 45-degree reference line is also plotted. If the two sets come from a population with the same distribution, the points should fall approximately along this reference line. The greater the departure from this reference line, the greater the evidence for the conclusion that the two data sets have come from populations with different distributions.” NIST (2006). NIST/SEMATECH e-Handbook of Statistical Methods: section 1.3.3.24.

With the small sample obtained, it would be inappropriate to attempt specific testing of hypotheses, such as those proposed earlier in this chapter, through the development of multivariate regression models and the like. Small samples are more likely to fail to meet the assumptions underlying such statistical techniques (these being linearity, normality of the predictors and residuals, independence of residuals/heteroskedacity, zero mean of residuals, and no autocorrelation) or to lead to overfitted models (where the number of variables exceeds the number of observations, leaving insufficient degrees of freedom). Accordingly, the analysis focused on exploratory technique more suited to discovery of information in small samples.

To explore an improved conceptualization of the data, a principal components analysis was therefore performed on the combined screening and asymmetry variables. The factors were extracted using varimax rotation with Kaiser normalization (Kaiser 1958), which converged after eight iterations. Using a threshold of eigenvalues greater than unity (Kaiser 1960)⁶, six orthogonal factors were extracted. Table 4-5 summarizes the factor loadings calculated for each variable.

⁶ The Kaiser criterion for factor extraction is an eigenvalue of at least 1, meaning that the extracted factor explains at least as much as one original variable. This criterion is more conservative than the alternative "scree" test, which tends to retain fewer factors.

Table 4-5: Principal components factor loadings

	Component					
	Genexp	Asym	Broad	Vcexp	Lead	Othexp
Yfpi	.890	.000	-.012	.226	.200	.061
Yiet	.792	.025	.095	.044	.083	.446
Yepi	.709	.197	-.149	-.271	-.326	.210
Yeet	.705	.003	-.133	-.284	-.204	-.173
Ypse	.516	.129	.409	-.147	.231	-.485
Nrej	-.461	.453	.165	-.082	-.288	.086
Pstar	.165	.882	.284	-.105	.157	-.012
Pexpd	-.203	-.833	-.160	-.002	-.168	.216
Pnov	-.108	.820	-.082	.070	.019	.061
Psyn	-.031	.059	.914	-.009	-.010	-.076
Narsect	-.223	.296	.634	.180	.093	.192
Punk	-.091	.242	.031	.857	-.043	.096
narstage	.121	-.331	.416	.653	-.098	-.136
Yvc	-.074	-.280	-.392	.571	.257	-.261
Plead	.163	.047	.199	-.158	.828	.232
Pfor	.177	-.299	.182	-.171	-.752	.220
Yoi	.176	-.052	.046	-.072	.054	.872

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The first extracted factor appears to represent the general experience measurements of the screening variables, and is therefore labelled GENEXP. This factor, incorporating formal education and industry experience, seems to correspond to the degree of professionalism in the operations of the VC firm (Bottazzi, Da Rin et al. 2004; Jungwirth and Moog 2004; Dimov and Shepherd 2005; Jungwirth 2005).

Several interesting conclusions can be drawn from the factor loadings of items onto this first factor. The four highest loading items represent respectively (with loadings):

- Experience in this industry, in any role (0.890),
- Experience in any other industry, in any role (0.792),
- Experience in this industry, as an entrepreneur (0.709),
- Experience in any other industry, as an entrepreneur (0.705).

These loadings demonstrate that this factor captures *breadth* of experience in addition to simple *amount* of experience; it is more heavily determined by experience gained in other industries and in other roles than just the entrepreneurial role.

The second factor appears to represent the willingness of the investor to participate in markets characterized by high information asymmetries (such as startups with novel business models), and is therefore labelled as ASYM. The NREJ variable (investments in "overlooked" or "rejected" companies) exhibits significant cross loading across these two factors, of approximately equal magnitude but opposite sign. Conceptually, the loading of NREJ onto ASYM is expected, as investments made in companies that have been rejected by many other investors can be expected to correlate with other indicators of high asymmetry. However, the negative loading of NREJ onto GENEXP is more difficult to conceptualize, as there ought to be no causal path between the rejection behaviours of other investors and the experience level of the respondent investor.

Loadings for this factor also are very strong, exceeding 0.8 for three of the items. The negative sign on the PEXPD item shows that VC investors treat expansion financings (of firms with proven track records) as not being analogous to highly asymmetric financings such as startups or novel business models with unknown/unproven entrepreneurs. Also of note is the observation that PSYN did not load significantly onto this factor. The degree of syndication employed by VC investors appears to not be strongly related to the degree to which these investors are willing to tackle information asymmetries.

The third factor appears to represent the effort by the investor to broaden their knowledge base by involving others in the evaluation, and is therefore labelled as BROAD. It is loaded primarily by PSYN and NARSECT, which represent the breadth of industry sectors invested in, and the degree of involvement of other investors (through syndication of the investment). BROAD also shows smaller secondary cross-loadings from NARSTAGE (another measure of investment scope), and from YPSE

and YVC (which suggests that more educated and experienced VC investors are less likely to require and seek input from others).

The fourth factor appears to represent some dimension of the specific VC investment experience level, including dealing with new entrepreneurs, and is therefore labelled as VCEXP. As discussed, two of the variables in this factor also have secondary cross-loadings onto BROAD.

The fifth factor appears to represent the syndicate leadership propensity, and the resulting unwillingness to invest in distant companies in foreign jurisdictions, and is therefore labelled as LEAD.

The final factor represents unexplained variance due to experience as some other type of investor, which surprisingly was not found to load significantly onto VCEXP, and is therefore labelled separately as OTHEXP.

Collectively these extracted factors explain over 77% of the variance in the dataset. Table 4-6 shows sums of squared loadings and variance explained for each factor. Overall general experience level was found to explain the largest portion of the variance, at 18.5%. After controlling for this variance, the next largest source of variance was found to be the willingness to invest in asymmetric markets. In the dataset, over 16.6% of the variance can be explained by this factor alone.

Table 4-6: Explained variance

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
Genexp	3.146	18.508	18.508
Asym	2.838	16.694	35.202
Broad	1.997	11.749	46.951
Vcexp	1.832	10.774	57.725
Lead	1.725	10.149	67.874
Othexp	1.571	9.242	77.116

An analysis of variance was performed for these emergent factors, using three successive independent variables: home country of the VC firm (Canada, UK, USA), a

logistic variable for whether the VC firm invests in early-stage markets (seed or A-round financing), and a logistic variable for whether the VC firm invests in technology-based companies. No significant differences were found ($p=.05$) for all factors and independent variables, except one. Only the BROAD factor was found to differ for early-stage investors. These early-stage VC firms averaged higher scores on the BROAD factor (mean 78.8 vs. 30.7, unstandardized) ($p=.004$). Venture capital investors who make seed-stage or A-round investments are more likely to focus their activities on specific and narrow industry sectors, and to syndicate their investments.

From these initial factor analysis results, three measured variables were subsequently trimmed. YOI did not load together with other variables onto any factor, and was therefore dropped from the structure. And the YPSE and NREJ variables cross-loaded significantly (greater than 0.40) onto more than one factor and were therefore dropped from this exploratory analysis (Ford, MacCallum et al. 1986). After elimination of these three measures the factor analysis was rerun, converging after seven iterations. Table 4-7 summarizes the factor loadings calculated for each variable.

Table 4-7: Principal components factor loadings

	Component				
	Genexp	Asym	Broad	VCexp	Lead
Yiet	.875	-.027	.103	.053	.154
Yfpi	.870	.013	-.057	.256	.225
Yepi	.775	.182	-.067	-.297	-.281
Yeet	.679	.010	-.176	-.241	-.177
Pstar	.155	.877	.315	-.112	.162
Pexpd	-.153	-.846	-.153	-.009	-.167
Pnov	-.120	.844	-.049	.033	-.031
Psyn	-.034	.041	.920	.035	.021
Narsect	-.201	.275	.633	.194	.082
Punk	-.078	.259	.063	.814	-.047
Narstage	.100	-.329	.347	.705	-.064
Yvc	-.167	-.210	-.496	.591	.187
Plead	.189	.028	.224	-.160	.857
Pfor	.216	-.299	.224	-.174	-.777

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Together these trimmed factors explain over 76% of the variance in the data, as shown in table 4-8. Most of the variance among VC investors is due to the wide range

of general business experience they have. But importantly, the second largest component of variance is their tolerance and willingness to manage information asymmetries. This suggests important heterogeneity among investors in terms of their willingness and ability to operate in early-stage markets.

Table 4-8: Explained variance

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
Genexp	2.813	20.094	20.094
Asym	2.617	18.695	38.789
Broad	1.890	13.503	52.292
VCexp	1.831	13.079	65.371
Lead	1.625	11.608	76.979

Limitations

This study has relied upon VC investors to self-assess the nature of their investment portfolios, making judgements on the extent to which they are “early-stage”, with “novel, unproven” business models and with unproven entrepreneurs. The ability of VC investors to accurately make such assessments can be questioned. Studies of the specific criteria VC investors use to screen investments found VC investors to be relatively poor at introspection (Zacharakis and Meyer 1998; Shepherd 1999); this deficiency may also cloud their judgement of the nature of the companies and entrepreneurs in their portfolios. Moreover, some VC investors may have incentive to mischaracterize the nature of the deals they do (Gompers 1996), either overstating the risks they manage in order to enhance a reputation for skilful monitoring of investments, or understating the risks in order to enhance a reputation for prudence; this incentive may also introduce social desirability bias into the self-assessed data such VC investors provide.

Even if VC investors in this sample were accurate in introspection and free of social desirability bias, the potential remains for common rater bias in these empirical results. However, a Harman’s test of the exploratory factor analysis did not yield a single dominating factor in the unrotated solution, which provides support for the conclusion

that common-rater bias is not a significant threat to these results (Podsakoff and Organ 1986; Podsakoff, MacKenzie et al. 2003).

Although this study has demonstrated some connection between VC screening ability and the willingness of VC investors to participate in early-stage markets, it may be that this relationship is significant only to some components of the generic screening ability investigated here; screening ability may be a composite, multivariate construct. These components might include the evaluation of new investment opportunities and the initial decision to offer a term sheet, the creation of a syndicate to form the required amount of investment capital, and the investigation of subsequent information and the decision to complete the investment deal. Success in early-stage markets, or in other markets with high information asymmetries, might therefore be specifically due to skill at only one or more of such components.

Variables omitted from the model may also have significant predictive value. In particular, it may be suggested that regional differences among VC investment practices may influence willingness to invest in asymmetric markets, or that governmental policies (such as matched availability of funding) may provide local investment incentives. Similarly, cyclical effects on asymmetric investing may exist and may be uncovered through a longitudinal empirical approach.

One possible alternative explanation for the observed relationships was that the apparently good screeners are simply more risk-averse than other VC investors. But this explanation appears somewhat unconvincing. Risk aversion in investors is characterized by a reduction in false positives (making fewer investments that *ex post* prove unprofitable), but at the expense of increasing false negatives (also making fewer investments that *ex post* prove highly profitable). Risk adverse investors are likely to make fewer investments overall and particularly fewer where they believe the information asymmetries are unfavourable and large. In contrast, highly skilled screeners have the ability to reduce both false positives and false negatives, and thereby make more investments under conditions of apparent information asymmetry.

One of the negative results obtained in this study suggests that the operationalization of information asymmetry in business expansions was flawed. Contrary to hypothesis, the study found a negative loading of expansion financing onto the asymmetry-tolerance factor, unlike the positive loadings found for other measures of uncertain investment scenarios. Unfortunately, it appears that the relevant survey question did not adequately account for a potential difference between simple expansions of volume (with little perceived risk) and expansions into new lines of business (with higher perceived risk and correspondingly higher information asymmetries) (Cumming 2002). As a result, no test could be made as to whether the tolerance of information asymmetries that highly skilled VC investors display in the face of startups with unknown entrepreneurs and unproven business models is similarly evident in the support of firms that wish to expand into unfamiliar territory.

Conclusions

This study used theoretical extensions to a previous model of VC investing to suggest a relationship between the screening ability of an investor and their corresponding willingness to invest in markets where the information asymmetries between entrepreneur and investor are high. Overall, support was found for the general prediction that a positive correlation could exist.

The theoretical extension also identified two alternative investment strategies that may be pursued by investors with unusually high screening ability. In the first, the investor operates in the same markets as less-skilled investors, but obtains higher profits. In the second, the investor uses their higher screening skill to invest in highly asymmetric markets that other investors avoid. Evidence was found to suggest that some VC investors do practice this second strategy.

The hypothesis suggesting that good screeners would be more willing to invest without syndication was supported; investors with more experience as a VC investor and with narrower industry sector specializations were found to make more investments without syndication.

The hypothesis suggesting that good screeners would be more willing to invest in companies that had been rejected by other VC investors was supported; investors with greater overall industry experience were found to make investments in companies that had experienced more prior rejections by other VC investors.

The hypothesis suggesting that good screeners would be more willing to invest in foreign countries was not supported; investors who often lead their syndicates were found to make fewer investments in foreign companies. This likely reflects the importance of the lead investor being located close to the entrepreneurial company in which they invest – an importance that may overshadow the hypothesized effect.

An exploratory principal components analysis of the data revealed the existence of five factors that together explain almost 77% of the variance in the data. These factors comprise the general level of experience for the investor, their willingness to invest in asymmetric markets, the effort to broaden the investor's relevant knowledge base, the level of VC-specific experience of the investor, and their propensity to lead syndicates.

This factor analysis found that a willingness to invest in asymmetric markets is an important conceptual and explanatory construct for VC investor behaviour, and that it alone explains almost 18% of the variance found in the data set. This factor varies markedly for different individual investors, suggesting that VC investors are indeed not homogeneous in their attitudes and behaviours towards asymmetric markets.

In summary, it appears that VC investors do differ in their screening abilities, and that these differences are important determinants of their behaviour in markets characterized by high information asymmetries. These findings lend some support to the theoretical extensions presented above. With respect to the model developed in chapter 3, these results lend empirical support to the bifurcation of VC investors into separate levels of quality (as in figure 3-8) and further suggest that this differentiation may influence the market strategies of different VC investors.

5. Signals of VC Screening Quality

This chapter examines the indirect information exchanges of the chapter 3 model, as indicated in figure 3-9 above. It specifically explores whether investors, such as venture capital (VC) investors, signal their skill regarding screening investments accurately, in order to influence the quality of their dealflow, as illustrated in figure 3-10 above. A simplified theoretical model, based on a market comprising only investors and entrepreneurs, each having two possible levels of quality, is developed to establish the potential value of such signals to the entrepreneurs receiving them and to the investors generating them. This is followed by an empirical exploration of data from 29 VC investors in North America and Europe, which leads to the identification of three specific observable signals of VC screening skill: the returns earned by VC investors on their investment portfolios, the independence of VC investment activities, and the ability of VC investors to specifically pick winners for their portfolios. These results suggest that successfully investing in early-stage firms can act as a signal of VC investor screening skill.

Introduction

As discussed in chapter 1, financial markets are fraught with information asymmetries. In order to have an equitable exchange of equity and financial capital, entrepreneurs and VC investors must have a mechanism to understand a venture's true prospects, despite these asymmetries (Busenitz, Fiet et al. 2005). One such mechanism is the communication of signals, being new information that changes their views of future states of the world. A signal provides a means for one market participant to reliably and accurately provide to other participants some information that mitigates the information asymmetries.

Much of the research into the role of signalling in the entrepreneur/VC market has focussed on signals provided by entrepreneurs in order to communicate to VC investors the prospective investment opportunity that the entrepreneurs' firms represent (Leland and Pyle 1977; Amit, Glosten et al. 1990; Forsythe, Lundholm et al.

1999; Busenitz, Fiet et al. 2001; Deutsch and Ross 2003). Comparatively little research has yet examined the complementary signalling on the other side of the market – signals provided by VC investors to entrepreneurs. In a competitive market, VC investors may be expected to signal to entrepreneurs their desirable but hidden attributes, such as their ability and willingness to screen skilfully, to provide services to the venture management, and to add other sources of value to the firm. The foregoing leads to the research question of whether VC investors signal their screening skill to entrepreneurs, and what value the information contained in such signals would have.

One possible role for such signalling may be to reduce the risk of adverse selection. In addition to the mechanisms suggested by Akerlof, several other mechanisms have been proposed by subsequent researchers. Capital structure can serve as an information transfer mechanism; in markets where entrepreneurs offer securities to uniformed investors, it was found the risk can be somewhat mitigated through the combined use of debt and equity instruments (Darrough and Stoughton 1986). More recent studies have reported the widespread use of combined debt/equity structures or the use of instruments with hybrid characteristics by VC investors as a means of overcoming asymmetries (Bascha and Walz 2001; Bratton 2002). Contract terms and conditions can also be designed to enforce information transfer (such as investment structure, monitoring and information rights, and staging of investment tranches) (Gompers 1995; Neher 1999; Bascha and Walz 2001). In addition, organizational theorists have suggested that social ties play an important role for investors seeking to overcome this information asymmetry (Venkataraman 1997), which suggests that VC investors to obtain information about the entrepreneur and her opportunity through external social networks (Shane and Cable 2002). Some researchers have further argued that there is a benefit for entrepreneurs to include VC investors as a risk-sharing strategy, and that this incentive is sufficient to encourage entrepreneurs to share their private information (Amit, Glosten et al. 1990).

Starting from the work of Leland and Pyle, a considerable stream of research has emerged on the role of signalling in financial markets (Leland and Pyle 1977;

Forsythe, Lundholm et al. 1999; Gale 1999; Houben 2002). This research has demonstrated the importance of signalling in mitigating information asymmetries, as well as illuminating mechanisms by which signals are created, exchanged and interpreted. Within the specific context of the market between VC investors and entrepreneurs, researchers have examined the mechanisms by which entrepreneurs can signal their private information to prospective investors. These methods include the amount of equity and personal wealth the entrepreneurs have invested in the firm, and the type and quality of advisors and directors they have been able to attract (Deutsch and Ross 2003; Busenitz, Fiet et al. 2005). Considerably less attention has been devoted to illuminating the role of signalling on the other side of this market, that is, signalling by VC investors. Some research has shown that VC investors signal private information to mitigate information asymmetries with key stakeholders in the VC firm, such as principal investors and sources of dealflow (Gompers 1996; Kelly and Hay 2000), but this research has not yet extended to other stakeholders in the VC enterprise. The signalling mechanism has potential to reduce information asymmetry in other key relationships of the VC investor, such as those with current or prospective investee entrepreneurs. These results suggest that, rather than simply receiving and interpreting signals from entrepreneurs, VC investors may also be actively generating and sending signals to entrepreneurs. This study is an attempt to begin to understand the potential role for this signalling from VC investor to entrepreneur – under what conditions would such signalling make sense, and would VC investors engage in the practice of signalling to entrepreneurs.

Two-party Market Model

As precursor to an exploratory empirical examination of signalling by VC investors, the research begins with simple theoretical modelling of a market between entrepreneurs and VC investors in which both types of participant exhibit two levels of quality. In terms of the market model of chapter 3, this assumption corresponds to the participants of figure 3-8, where the roles of Professionals and Institutional Investors are being omitted from the model.

In this market model, the quality of the participants is left deliberately undefined. It is assumed that the participants in the market apply their own definitions and measures of quality for each other; that is, VC investors know what a high-quality entrepreneur means, and entrepreneurs know what a high-quality VC investor means. This simple model is then to establish limits to the value of hidden information about the quality of others. Such limits would represent the maximum value of any perfect signal of this hidden information.

Entrepreneurs

Suppose that there are many entrepreneurs, who each own a firm with some future project opportunities and having a pre-money⁷ value V (the value of the firm, excluding the new investment being contemplated). They have private information about these firms, including details about the projects, and insight into their own level of effort devoted to the firm. These entrepreneurs can be high-quality (E_H) or low-quality (E_L). The proportion that are high-quality is given by α and the low-quality proportion by $(1-\alpha)$, where $0 \leq \alpha \leq 1$. Entrepreneur quality can depend on many factors (including their skills and the financial investment they are able to make into their firms), but for simplicity, it can be assumed that this is reflected in the current valuation of their firms, which may be high (V_H) or low (V_L) relative to the average firm. The entrepreneurs seek investors to provide capital to fund their projects, and a variety of services and intangible benefits to increase the value of their firms/projects (Elango, Fried et al. 1995; Lange, Bygrave et al. 2001; Hsu 2004).

Investors

Suppose also that there are many investors who invest in many firms and provide services to the management of these firms. The investors can be high-quality (I_H) or low-quality (I_L). The proportion of investors that are high-quality is given by δ and the low-quality proportion by $(1-\delta)$, where $0 \leq \delta \leq 1$. The investor quality can depend on many factors, but this model looks solely at their ability to screen projects/firms accurately. By this is meant their ability to resolve information asymmetries and

⁷ That is, the valuation of the firm prior to the investment of any new cash by a prospective investor.

therefore accurately determine whether a given entrepreneur is an E_H or an E_L . Lacking the entrepreneur's private information, they are disadvantaged in dealing with entrepreneurs due to information asymmetries. The two types of investor, by construction, have different abilities to screen accurately; the I_H are able to screen with accuracy β , where $0 \leq \beta \leq 1$, while the I_L are able to screen with accuracy of only γ , where $\beta > \gamma$ and $0 \leq \gamma \leq 1$.

The deal

Suppose the investment deal is a simple cash-for-equity exchange. The investors provide capital in the amount K for which they claim the right to a proportion of the future value of the firm $\iota = K/(V+K)$, $0 \leq \iota \leq 1$. The entrepreneur retains right to the residual value in the proportion $\varepsilon = V/(V+K)$, $0 \leq \varepsilon \leq 1$.

The investor contributes ongoing services (such as expertise, networks, or reputational endorsement). It is assumed that the ongoing involvement of this investor increases the future prospects of a high-quality firm, and therefore has some multiplier effect μ on the immediate post-money valuation of $V+K$. The incremental value thus created, relative to the immediate post-money valuation of $V+K$, is $(\mu-1)$ times $(V+K)$. It is also assumed that, despite the provision of these services by the investor, a low-quality firm will eventually fail, and therefore have a future value of zero (i.e., the investor will lose their investment K).

Screening

The valuation established for firm depends on the expectations of the person setting the valuation. Without separation due to screening, all firms are assessed at the average value for the pool $V_{AVG} = \alpha V_H + (1 - \alpha)V_L$. By reducing the information asymmetry, screening allows separation. High-quality firms are valued separately from low-quality firms, thereby raising the value for the E_H and lowering the value for the E_L .

To reflect this dependency of valuation upon the person doing the valuation and the separation of firm qualities, following notation will be used: V_{ij} is the value of a firm

owned by an entrepreneur of quality i , as assessed by an investor of quality j , where i, j can take on values H or L .

- When an E_H is screened by an I_H , the expected firm value is $V_{HH} = \beta V_H + (1-\beta) V_L$
- When an E_H is screened by an I_L , the expected firm value is $V_{HL} = \gamma V_H + (1-\gamma) V_L$
- When an E_L is screened by an I_H , the expected firm value is $V_{LH} = (1-\beta) V_H + \beta V_L$
- When an E_L is screened by an I_L , the expected firm value is $V_{LL} = (1-\gamma) V_H + \gamma V_L$

Quality-dependent strategies

Under the market situation described above, low-quality participants will adopt unique strategies that depend on their perception of the quality of their corresponding partner in the exchange. For example, when an E_L is screened by an investor of unknown quality I_x , the expected value for their firm is $V_{Lx} = \delta V_{LH} + (1-\delta) V_{LL}$. So, the incremental value of knowing that the investor is an I_H is $\Delta V_{LH} = V_{LH} - V_{Lx} = -(1-\delta) (\beta - \gamma) (V_H - V_L)$. This is strictly negative for $V_H > V_L$ and $\beta > \gamma$. Therefore the E_L is better off being unscreened and thus being assessed at V_{AVG} rather than being correctly screened and assessed at only V_L .

Similarly, the incremental value of knowing that the investor is an I_L is $\Delta V_{LL} = V_{LL} - V_{Lx} = \delta (\beta - \gamma) (V_H - V_L)$. This is strictly positive for $V_H > V_L$ and $\beta > \gamma$. So the E_L is better off being unskillfully screened and thus potentially being mistakenly assessed at V_H rather than being correctly screened and assessed at only V_L .

On the other side of the market, an I_L will keep their quality private, in the attempt to not repel any E_H and not attract an undue proportion of E_L entrepreneurs. They hope to attract a typical mix of high and low-quality entrepreneurs, and invest at the average valuation of V_{AVG} .

The situation is complementary for high-quality participants. When an E_H is screened by an investor of unknown quality I_x , the expected value is $V_{Hx} = \delta V_{HH} + (1-\delta) V_{HL}$. So, the incremental value of knowing that the investor is an I_H is $\Delta V_{HH} = V_{HH} - V_{Hx} = (1-\delta) (\beta - \gamma) (V_H - V_L)$. This is strictly positive for $V_H > V_L$ and $\beta > \gamma$. Therefore the E_H is

better off being skilfully screened and assessed at V_H than risking being assessed at only V_{AVG} .

Similarly, the incremental value of knowing that the investor is an I_L is $\Delta V_{HL} = V_{HL} - V_{IX}$
 $=$
 $-\delta(\beta - \gamma)(V_H - V_L)$. This is strictly negative for $V_H > V_L$ and $\beta > \gamma$. So the E_H is better off being unscreened and assessed at V_{AVG} than being poorly screened and mistakenly assessed at only V_L .

An E_H will seek screening by an I_H , and avoid screening by an I_L . The incremental value to the E_H in pursuing this strategy is in redirecting the $(1 - \delta)$ portion of opportunities that would have gone to an I_L . The benefit to the E_H is therefore

$$B_E = \varepsilon(1 - \delta)(V_{HH} - V_{HL}) \quad (11)$$

$$B_E = \frac{V_H}{V_H + K}(1 - \delta)(\beta - \gamma)(V_H - V_L) \quad (12)$$

This represents the maximum amount the E_H should invest in obtaining information about investor quality.

On the other side of the market, an I_H will seek to communicate their screening quality to all entrepreneurs, and thereby attract E_H and repel E_L . Under perfect signalling, they will attract only E_H and will invest at valuations of V_H . But without the ability to signal or communicate the investor's screening quality, a mix of entrepreneurs will be funded, in the proportion α being E_H and $(1 - \alpha)$ being E_L . So, the incremental value to the I_H in signalling their quality is through replacing these bad $(1 - \alpha)$ projects of $-K$ value with good projects of $\mu(V_H + K)$ value. The benefit to the investor is therefore

$$B_I = (1 - \alpha)\mu(V_H + K) + (1 - \alpha)K \quad (13)$$

$$B_I = (1 - \alpha)\mu K \quad (14)$$

This represents the maximum amount the I_H should invest in signalling information about their own quality.

The quantities B_E and B_I represent upper bounds on the costs that should be incurred, by entrepreneurs and VC investors respectively, to support a signalling regime in which the quality of VC investors is indirectly communicated to prospective entrepreneurs. Note that the upper bound for entrepreneurs depends on attributes of the deal being negotiated with one specific VC investor (the size of the entrepreneur's claim on the upside) and attributes of the market overall (the quality mix of good and bad screeners among the VC investors in the market, and the different valuations these investors would place on her firm). On the other hand, the upper bound for VC investors depends solely on attributes of the specific investment deal being made (amount of capital invested, size of the investor's claim on the upside, and the expected magnitude of the upside), and does not depend on the quality mix of entrepreneurs in the market.

As a result of this examination, it appears that both high-quality investors and high-quality entrepreneurs have incentive to separate the pool of investors according to screening ability, prior to incurring any screening efforts and costs. They both have incentive to spend up to B in signalling private information to the other, or in obtaining and interpreting information from the other. This result supports Leshchinskii's argument that project screening by VC investors increase the project's value (Leshchinskii 2003), and provides additional theoretical support for the proposed effect H5 described in chapter 3.

But entrepreneurs in particular have an added incentive to understand the market overall, and the range of quality types among the VC investors in the market. The benefits that an entrepreneur receives from a signal of VC investor quality depend on her accurate contextualization of this specific investor's quality within the mix of all VC investors active in the market.

Signals of screener quality

The question next arises, how can investors signal their screening ability? What methods do I_H have for signalling or otherwise communicating their skill to entrepreneurs? As Spence first described, there are four key attributes of a good signal (Spence 1973):

- It must be an alterable characteristic of investors which is observable by entrepreneurs.
- It must be informative about the hidden attribute, such as being positively correlated with screening ability.
- The benefits obtained from the signal information must exceed the signalling costs.
- It must be hard to mimic, in that the signalling costs must be higher for low-quality investors, and ideally should be prohibitive for them.

Each of Spence's criteria in turn can lead to further detailed criteria for effective signalling to occur. For example, the requirement that the signal be observable by entrepreneurs suggests that it must also be accessible, noticeable, reliable and sufficiently free of interference or noise to function as an information carrier (cf. figure 3-6 above). This is equivalent to saying that the signal must have adequate strength and adequate clarity (i.e., a high signal-to-noise ratio). Thus when a signalling regime lacks one or more of these characteristics this situation becomes problematic. In a simple signalling regime, noise leads to mistaken information transfer and mistaken decisions. In a more complex signalling regime, noise can confound attempts at countersignalling or meta-signalling. And at sufficiently high noise levels, it becomes difficult to assert that any meaningful signalling is occurring at all. In effect, as noise destroys the information value of a signal, the upper bounds for investment in maintaining the signalling regime, B_E and B_I , are reduced *pro rata*.

The previous chapter found some suggestion that a potential signal that VC investors may use to convey information about their screening abilities is investing in firms in early-stage markets. This study found that VC investors who invest in early-stage markets are the ones with less experience, and that more experienced VC investors are less likely to invest in early-stage markets, a pattern that suggests the possibility that VC investors may be using their early-stage investing to demonstrate their abilities, and subsequently moving to later-stage markets. This behaviour exhibits the four attributes of a good potential signal, in that success is observable when the investee firms seek follow-on money, selecting investee firms requires some degree of screening ability, both B_E and B_I are positive if differential screening ability exists ($(\beta - \gamma) > 0$), and early-stage markets are generally unprofitable for investors, from which can be inferred that they are specifically unprofitable for the least-skilled investors (Bygrave, Fast et al. 1988).

But it is not enough that an observed behaviour may act as a signal. It must also be unlikely that the behaviour arises from other non-signalling origins, so that the effects of this “noise” can be minimized. In the case of early-stage investing, three alternative explanations for the behaviour can be suggested. First, some VC investors have a range of funds aimed at different stages of firm growth (e.g., a seed fund owned and operated by an investment bank). These VC investors may use early-stage investing as a means of identifying and growing clients for their later-stage and more profitable investment businesses, even if these early-stage investments are individually unprofitable or result in the VC investor expending more than B_I in the course of signalling. However, such full-range investors are uncommon among VC investors. Secondly, some VC investors may pursue early-stage investments for non-economic reasons; they seek personal emotional gain by participating in the management of young firms (e.g., “giving something back”), and the perceived value of this emotional gain may effectively increase the rational bound on signalling investment, B_I . Several studies have found that, in addition to economic gain motives, angel investors are motivated by a desire to play a role in the entrepreneurial process and to nurture and mentor the next generation of entrepreneurs (Freear, Sohl et al. 1995; Aernoudt 1999;

Van Osnabrugge and Robinson 2000). Finally, the trend for VC investors to move upmarket as they gain experience may be an artefact of fund size – as they gain experience they are entrusted with larger funds which cannot be deployed in early-stage markets where the transaction sizes are so small. This suggests that upmarket VC investors may be forced out of early-stage markets by practical limitations on their ability to deploy funds, and may therefore create noise in the signal value of staying in early-stage markets. This noise source may be more difficult to dismiss. But it may be argued by contrapositive that the fact that few large investors operate in early-stage markets does not imply that small investors *must* operate there. The existence of small VC investors in the later-stage markets shows that small investors need not remain in early-stage markets where profits are less. They could move upmarket unless some constraint holds them or some hidden value (such as signalling) compels them to remain there for a while. As a result, the signal value of a VC investor operating in early-stage markets can be seen to be somewhat noisy, reducing both the strength and clarity of it.

This potential for signalling by investors leads to three possible strategies that investors of different screening skill levels might adopt:

- 1)** I_L investors will avoid unprofitable early-stage markets and will seek to invest in later stages where they have to compete to attract E_H firms. Or, if they can, they may attempt to join syndicates with I_H investors and “free ride”.
- 2)** I_H investors might choose to invest in early-stage markets, since they can be profitable for them.
- 3)** I_H investors might also choose to make some investments in early-stage markets, use the signalling value of this success to build or enhance their reputations, and then move to more profitable later-stage markets where this reputation is valuable (Kelly and Hay 2000).

Empirical Study

The theoretical development of the preceding section raises the empirical question of whether investors actually behave this way, and in particular whether VC investors of high screening ability use investment in early-stage markets as a signal of their skill. The theoretical development would suggest that VC investors who are skilled screeners should be willing to invest up to B_I in making their early-stage success observable to entrepreneurs, and that desirable entrepreneurs should be willing to invest up to an additional B_E in obtaining this information. A preliminary and highly exploratory response to this question investigated some VC investors and their beliefs about how screening skill can be observed, and about the various reasons for investing in early-stage markets.

Data for this study was collected as part of the survey exercise reported in chapter 4 using the same respondents. Essentially, this research was interested to see if any VC investors believe that early-stage investing can serve as a signal of quality, as theorized above. This objective sought only to find some empirical validation of the theoretical direction. The approach taken in the empirical exploration was an attempt to triangulate this question by examining their beliefs from two sides:

- What observable attributes indicate VC investor screening ability? Is successfully investing in early-stage companies one of them?
- Why do VC investors invest in early-stage companies? Is signalling their screening skill a reason to invest early?

Methodology

The selected unit of analysis was an individual VC investor working in a professional VC firm. Respondents were asked to provide information on their unique individual perspectives on the VC industry. This study utilized the same set of respondents as in chapter 4, through the same survey exercise.

The instrument captures several measures for two hypothesized constructs: the demonstration screening ability of a VC investor, and the potential reasons for a VC investor to invest in early-stage markets.

With respect to demonstration of VC investor screening ability, the following variables were operationalized as potential measures. These correspond to the information content to be conveyed by a correlated signal.

- ROI – Overall portfolio return.
- OVER – Investing in companies that have been overlooked by other VC investors.
- EARLY – Investing successfully in early-stage companies.
- LEAD – Acting as the leader of syndicates with other VC investors.
- HITS – Percentage of firms in the portfolio that were successful “homeruns”

Respondents were asked to rate how effective they think each variable is in demonstrating/proving the skill a VC investor has in screening opportunities/deals. A 5-point Likert-type scale was used.

With respect to potential reasons for VC investors to invest in early stage markets, the following variables were operationalized as potential measures. These correspond to signals or potential noise sources.

- HIRET – Expectation of earning high returns on these investments.
- COMP – Less competition from other VC investors.
- SCRN – Having a unique ability to screen/assess early-stage companies.
- ROFR – Securing a right of first refusal for subsequent investment rounds.
- ABENT – Demonstrating VC investor abilities to other entrepreneurs.
- ABINV – Demonstrating VC investor abilities to current/future investors in the fund(s).
- ABPRO – Demonstrating VC investor abilities to others (professionals, other VC investors, etc).
- FLOW – Maintaining relationships with sources of dealflow.

Respondents were asked to rate how important they think each is as a reason for a VC investor to make investments in early-stage companies. A 5-point scale was used.

It was expected that some form of correlation or factor structure among these measures would be found, but that this structure might not mirror this simple duality.

Analysis of results

As with the chapter 4 study, the same 400 surveys were sent, with an overall response rate of 7.5% from the same respondents as described in table 4-1 above. The previously described checks for non-response bias and normality were also performed.

The data obtained were analyzed using SPSS software (version 12.0). Table 5-1 provides some descriptive statistics for each “screening ability” variable. These results show that overall, VC investors consider portfolio ROI and the proportion of “hits” in the portfolio to be the best demonstrators of screening skill, while investing in companies rejected by other VC investors is considered to be a considerably poorer indicator. Table 5-2 provides some descriptive statistics for each “investment reason” variable. These results show that VC investors consider the best reason to invest in early-stage companies to be a belief that high returns can be obtained, while they believe that demonstration of skill to others is a comparatively poor reason for investing early. These results are for the full sample taken together, and do not reflect any differences of subsets within the sample.

Table 5-1: Screening ability measures

	N	Minimum	Maximum	Mean	Std. Deviation
Roi	29	2	5	4.59	.780
Over	29	1	4	2.38	1.049
Early	29	1	5	3.52	1.430
Lead	29	1	5	2.86	1.060
Hits	29	3	5	4.52	.785

For ease of reference, variable names and descriptions are summarized in appendix 1.

Table 5-2: Early-stage Investment reason measures

	N	Minimum	Maximum	Mean	Std. Deviation
Hiret	29	3	5	4.76	.577
Comp	29	1	5	2.45	1.325
Scrn	29	2	5	3.66	1.045
Rofr	29	1	4	2.59	.867
Abent	29	1	5	2.41	1.211
Abinv	29	1	5	2.69	1.365
Abpro	29	1	5	2.21	1.207
Flow	29	1	5	2.48	1.153

The data were examined for significant correlations between and across variables. Table 5-3 lists the observed correlations.

Within the measures of screening skill, the leading of syndicates was found to be significantly correlated with successful investing in early-stage companies, and with investing in companies that had been overlooked by other VC investors ($p < .05$).

Within the reasons for investing in early-stage markets, high and very significant correlations were found among the variables for demonstrating VC investor abilities to different stakeholders (entrepreneurs, primary investors, and other professionals) ($p < .001$). These results suggested that these measures may be indicative of a single underlying desire to demonstrate skill to others. Combining these measures into a single scale yields a Cronbach's alpha of 0.87.

Due to the small sample size, normal distribution of these variables should not generally be assumed. Therefore normality checks were conducted for each variable. These checks included visual inspection of quantile-quantile plots, calculation of Kolmogorov-Smirnov statistics (with the Lilliefors significance correction) (Kolmogorov 1941; Lilliefors 1955), and calculation of the Shapiro-Wilk statistic (Shapiro, Wilk et al. 1968). These statistics are provided in appendix 4, table A4-2. These statistics suggest normality assumptions may be questionable for EARLY and HITS, which may be exhibiting bimodal tendencies.

Non-response bias was tested for, in the manner described in chapter 4. For all variables, the null hypothesis could not be rejected at $p=.05$, which suggests that the later responses do not represent a different population than the earlier responses. From this, no significant non-response bias can be inferred, suggesting that non-response bias has not materially affected the results presented.

Table 5-3: Correlations among variables

	Roi	Over	Early	Lead	Hits	Hiret	Comp	Scrn	Rofr	Abent	Abinv	Abpro	Flow
Roi	1												
Over	-.063	1											
Early	-.153	.364	1										
Lead	-.115	.434(*)	.402(*)	1									
Hits	.187	.100	-.024	-.040	1								
Hiret	.008	.039	.070	-.115	-.030	1							
Comp	-.021	.182	.401(*)	.427(*)	.113	-.321	1						
Scrn	-.094	.189	.076	-.012	.269	-.084	.141	1					
Rofr	.160	.218	.381(*)	.091	.011	-.064	-.019	-.242	1				
Abent	.188	.322	.346	.241	-.233	-.210	.303	-.250	.407(*)	1			
Abinv	.177	.359	.103	.093	.055	-.280	.257	.123	.250	.685(**)	1		
Abpro	.284	.303	.288	.135	.109	-.234	.275	-.055	.324	.771(**)	.647(**)	1	
Flow	.111	.020	.081	-.031	.188	-.302	-.030	.173	.278	.210	.507(**)	.285	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Demonstrating abilities to primary investors was significantly correlated with the desire to maintain sources of dealflow ($p = .005$), and demonstrating abilities to entrepreneurs was correlated with desire to secure rights to subsequent investment rounds ($p < .05$).

Between the major two hypothesized constructs, moderate but significant correlations were found for three relationships ($p < .05$). Investing early to avoid later-stage competitors is correlated with leadership of syndicates, and is also correlated with success in making early-stage investments. Success with early-stage investments was also correlated with desire to secure rights to subsequent investment rounds, reflecting that right of first refusal is only available to those who commit funds on the early rounds.

As in the previous chapter, with the small sample obtained, it would be inappropriate to attempt specific testing of hypotheses through the development of multivariate regression models. Accordingly, the analysis focused on exploratory technique more suited to discovery of information in small samples.

To gain an improved conceptualization of the data, a principal components analysis was performed. The factors were extracted using varimax rotation with Kaiser normalization (Kaiser 1958), which converged after twenty-one iterations. Using a threshold of eigenvalues greater than unity (Kaiser 1960), five orthogonal factors were extracted. Table 5-4 summarizes the factor loadings calculated for each variable.

Table 5-4: Principal components factor loadings

	Component				
	Relation	Indep	Pickwin	Avoid	Return
Flow	.803	-.108	.282	-.083	-.117
Abinv	.791	.179	.030	.220	.201
Abpro	.622	.313	-.141	.202	.460
Abent	.610	.389	-.477	.212	.285
Rofr	.499	.359	-.248	-.413	.124
Early	.133	.798	-.042	-.041	-.120
Over	.176	.732	.182	-.050	.039
Lead	-.084	.685	-.065	.359	-.072
Scrn	.080	.082	.787	.146	-.223
Hits	.022	.041	.740	-.040	.409
Comp	.012	.451	.072	.736	.119
Hiret	-.454	.195	-.016	-.659	.142
Roi	.125	-.169	.012	-.050	.848

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The first factor corresponds to the belief that building and maintaining relationships and their associated future business opportunities is a good reason for early-stage investing. Venture capital investors who score high on this factor invest early to maintain relationships and dealflow, not to make money (as indicated by the sizeable negative cross loading this factor receives from the HIRET item (investing in early-stage markets in order to earn high returns)). This factor has therefore been labelled as RELATION.

The second factor reflects the belief that skill can be demonstrated by the degree of independent action the VC investor displays, by investing early in companies overlooked by others, and by leading when involved in syndicated deals. This independence of action is further reflected in the sizeable cross loading from the COMP item (investing in early-stage markets to avoid competition) suggesting that independence allows VC investors to avoid crowding from competitors. This factor has therefore been labelled as INDEP.

The third factor reflects a combined belief that having high screening ability is a good reason for early-stage investing, and that such VC investors demonstrate this skill by having a high proportion of "hits" in their portfolio. Investors who score highly on this factor demonstrate their skill through their ability to pick winners, and invest to exploit this skill. This factor has therefore been labelled as PICKWIN. This factor also picks up

a sizeable negative cross-loading of the ABENT item (investing in early-stage markets to demonstrate VC abilities to entrepreneurs). This suggests that investors who score highly on this factor believe that early-stage investing should be driven by the exploitation of unique skills, rather than the demonstration of these skills to entrepreneurs. This interpretation is supported by the negative correlation between the two factors, as discussed below.

The fourth factor reflects the belief that early investing is a means of avoiding competition, rather than a means of earning high returns. This factor has therefore been labelled as AVOID.

The fifth factor reflects the belief that skill is demonstrated by earning high returns on invested funds. This factor has therefore been labelled as RETURN. This factor also picks up a sizeable cross-loading of the ABPRO item (investing in early-stage markets to demonstrate VC abilities to professionals), which loads primarily onto the RELATION factor. This suggests that professionals, peers and other similar sources of dealflow may evaluate the reputation of VC investors primarily on the basis of portfolio ROI.

Together these factors explain over 71% of the variance in the data, as shown in table 5-5.

Table 5-5: Explained variance

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
Relation	2.564	19.725	19.725
Indep	2.342	18.018	37.743
Pickwin	1.601	12.314	50.057
Avoid	1.445	11.116	61.174
Return	1.355	10.421	71.595

From these initial factor analysis results, three measure variables were subsequently trimmed to improve the interpretability of the results. ROI did not load together with other variables onto any factor, and was therefore dropped from the structure thus

removing the single-item factor RETURN. And the HIRET and COMP variables loaded significantly (greater than 0.40) onto more than one factor and were therefore dropped from this exploratory analysis (Ford, MacCallum et al. 1986). After elimination of these three measures the factor analysis was rerun, converging after six iterations. Table 5-6 summarizes the factor loadings calculated for each variable.

Together these trimmed factors explain over 63% of the variance in the data, as shown in table 5-7.

Table 5-6: Trimmed principal components

	Component		
	Relation	Indep	Pickwin
Abinv	.857	.078	.192
Abpro	.821	.206	-.020
Abent	.810	.296	-.348
Flow	.625	-.184	.393
Rofr	.518	.234	-.239
Lead	-.013	.796	-.051
Over	.235	.734	.220
Early	.197	.728	-.046
Scrn	-.097	.131	.814
Hits	.050	-.024	.701

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 5-7: Trimmed explained variance

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
Relation	2.830	28.304	28.304
Indep	1.945	19.448	47.752
Pickwin	1.576	15.765	63.516

Limitations

As mentioned earlier in chapter 4, the empirical findings of this study are clearly limited in statistical significance due to the sample size. However, within these constraints, the sample appears to have reasonably good external validity and generalizability to the larger VC investor population.

This study has relied upon VC investors to self-report their beliefs regarding demonstration of ability and rationales for early-stage investments. This represents a threat to internal validity as self-reported data can be subject to the common rater effects of consistency motif or social desirability bias (Podsakoff and Organ 1986). The anonymity of the survey and the general absence of widespread lay theories of VC signalling may have served to mitigate this risk of bias. Also, the data were obtained from a single source for all variables, which raises the potential for common method bias. The data were therefore examined via Harmon single-factor test, which did not yield a factor indicative of common method bias.

The findings of this study, which support the view that some VC investors are active in the early-stage capital markets for the purpose of building or maintaining relationships with key stakeholders, are open to an alternative interpretation at a different level of analysis – that the relationship benefits accrue to the VC investor as an individual, and not as a representative of the VC firm. Under this interpretation some VC investors may participate in the early-stage capital markets in order to create private personal career benefits. Unfortunately, the design of the chapter 5 study did not account for this possibility and so did not control for the level at which relationship benefits were experienced or expected.

Finally, this study has been highly exploratory of VC investors as a whole, and has treated such investors as homogeneous. Further study would be required to determine if the effects described here are dependent on a range of VC investor and firm attributes, including portfolio size, stage focus, country, level of education, and industry focus, and whether subgroups or types exist within the VC investor community.

Conclusions

This exploratory study has examined the value of information about the quality of participants in early-stage markets between entrepreneurs and VC investors, and has used exploratory empirical data to support theorizing of how VC investors may signal their screening skill quality to entrepreneurs. Primary of these findings is that VC

investors are not homogenous in their beliefs, both about how to demonstrate screening skill and about the potential reasons for investing in early-stage markets. They differ in their beliefs whether screening skill can be demonstrated by investing in early-stage markets, investing in companies overlooked or rejected by other VC investors, and leading syndicates. Some VC investors clearly believe such independent investing behaviours are signals of screening skill. But this is not universal. Similarly, VC investors differ in their belief that screening skill can be demonstrated by earning high returns on the investment portfolio. These two beliefs are highly correlated with the belief that early-stage investing is about building and maintaining key relationships. Among VC in early-stage markets, there is greater belief in the importance of doing so to build relationships, and less in doing so to avoid competition or to earn high returns.

VC investors also differ in their belief that screening skill is closely associated with the ability to pick winners, and thereby to exhibit a greater proportion of successful companies in the portfolio. Venture capital investors who believe this may choose to signal their screening quality through the proportion of successful investments in their portfolios, rather than the overall portfolio return on investment. This is a potential signal that was not originally envisioned, and suggests the need for future research to explore the range of possible other signals that VC investors may be using, and the conditions under which each may be used. And these questions also suggest a need for complementary research into the reception and interpretation of such signals by entrepreneurs – do they look for these observable attributes of VC investors, and do they correctly interpret them as signals of VC investor screening ability?


This study has suggested that investors may wish to exhibit observable attributes that signal their screening ability, and that entrepreneurs may benefit from observing and interpreting these signals. These results confirm recent similar findings by Berkovitch and Serban-Levy, in which they found that investors with high screening ability somehow attract better quality of entrepreneurs than other investors, while poor screeners are left with the less-desirable entrepreneurs (Berkovitch and Serban-Levy

2004). For some VC investors, the ability to invest successfully in early-stage firms is believed to act as a signal of such skill. But this signal is noisy, in that other VC investors believe there are additional valid reasons for making early-stage investments, reasons which may partly obscure the information value of the signal. The diversity of observed beliefs about this signal suggests that the signal is neither strong nor clear at the aggregate level. It would be correspondingly difficult for a desirable entrepreneur seeking a skilled VC (in order to receive a fair valuation) to rely solely upon early-stage investment behaviour as a signal of this skill. This signal could only be used in concert with a variety of other indicators of VC investor skill.

With respect to the market model developed in chapter 3, these results provide general support for the existence of indirect (signalled) information exchanges (as illustrated in figure 3-9) and specific supported for the proposed effects H5 and H6 (the other proposed effects H1 – H4 were not explored as part of the present research). ESVCs attempt to influence the behaviour of other market participants (being Entrepreneurs, Professionals, Institutional Investors, and LSVCs) by signalling the hidden screening abilities.

Finally, the results reported in table 5-7 may serve as a starting point for the development of a robust set of scales for the three emergent constructs in this area: importance of relationships, independence of action, and ability to pick winners. Much further research will be required to validate and refine these constructs and to establish their roles in a theory of venture capital. But this initial support for the theoretical framework provided in chapter 3 may provide a useful start. To the extent that these factors are seen as noisy signals of VC screening skill, further investigation will be required to establish whether they are easily observable by entrepreneurs, or whether the cost of observation will exceed the theorized beneficial limits. Some limited independence and “winner-picking” information may be inferred by entrepreneurs by investigating the portfolio holdings and exits obtained by various VC investors. But more detailed information may be elusive. Relationship information may

be especially difficult for entrepreneurs to obtain, as it primarily represents attitudinal characteristics of the VC.



6. VC Typology and Qualitative Validation

This chapter aims to provide a validity check on the interpretations of the quantitative results of previous two chapters, by adopting a broader multimethod perspective that compares those positivist findings with findings obtained from an interpretivist approach and based on qualitative data.

Summarized to a high level, the previous two chapters demonstrate two primary findings:

- 1)** Venture capital (VC) investors are not homogeneous in their beliefs and attitudes towards early-stage markets.
- 2)** They profess highly-rational reasons for holding these various beliefs.

The design of these quantitative studies did not afford the opportunity to explore the potential for any emotional or non-rational reasons behind VC investor behaviours and attitudes, and to validate the findings of previous chapters using a multimethod approach. Consequently, a qualitative extension of the results of the chapter 5 study was subsequently performed. This interpretative follow-on study was intended to afford a more open-ended investigation, whereby VC investors would have opportunity to express additional reasons and themes that were not reflected in the original study designs, including personal, emotional and other non-rational aspects.

As a precursor to this qualitative investigation, an attempt can be made to formalize some of the differences among the heterogeneous VC investors by using the factors determined in the previous studies as a basis for an initial typology of VC investors. This typology is then used to drive a purposive sampling of respondents. The previous quantitative examinations are thereby enriched with a qualitative examination based on semi-structured interviews with six VC investors of widely ranging types. Analysis of within-group and between-group response patterns is augmented with supporting verbatim contributions that amplify the conclusions of chapters 4 and 5.

Methodology

For the qualitative part of this study, six respondents were selected from the individual professional VC investors who participated in the quantitative studies above. Interviews were approximately 60 minutes in length, were based on the questions listed in table 6-1, and were conducted in private at a location chosen by the respondent (typically their own offices)⁸. The interviews were recorded and transcribed, and coded using the factors identified in chapters 4 and 5 as preliminary schema. As analysis proceeded, the coding schema was iteratively refined and expanded to reflect the developing interpretation.

Table 6-1: Interview guide

Broad Question	Probes
Why do some VCs invest in early-stage markets, and others not?	<ul style="list-style-type: none"> • Sourcing dealflow (referrals from peers, past investees) • Risk and return tradeoffs • Possessing asymmetric knowledge, special skills • Future benefits with the investee (right of first refusal, preferential terms for follow-on investments) • Future benefits with other parties (keeping in the "club") • What are the key success factors for investors in your stage?
What is the role of competition among VCs?	<ul style="list-style-type: none"> • Competing for access to entrepreneurs or principal investors • Amount/type of competitive pressure • Basis of competition, strategy differences • Stakeholders, constituencies, audiences (investors, peers, referral sources, entrepreneurs) • Types of observable skills (sourcing, screening, structuring, monitoring, managing) • Role of "skill" in determining who to invite into a syndicate, and who leads it
Should VCs try to demonstrate that they are good at screening incoming opportunities (picking winners)?	<ul style="list-style-type: none"> • It this important to demonstrate? To whom? • How to separately evaluate this skill from subsequent skills (eventual ROI) • Who benefits from this information transfer? How do they benefit? • Examples (senders and/or receivers)

⁸ This interview guide is based on the "grand tour" approach recommended by McCracken, G. (1988). The long interview. Newbury Park CA, Sage.

Selection of respondents

Since the objective of this part of this study was to develop an enriched and thicker understanding of early-stage investing behaviours and intentions, purposive sampling was used to identify investors with some direct experience investing in early-stage markets and with broad perspectives on the VC industry – for example, one respondent was also an executive of a national venture capital association, and one was also an executive of a private firm that specializes in monitoring and reporting on activities and trends in the venture capital industry.

Cluster analysis and VC typology

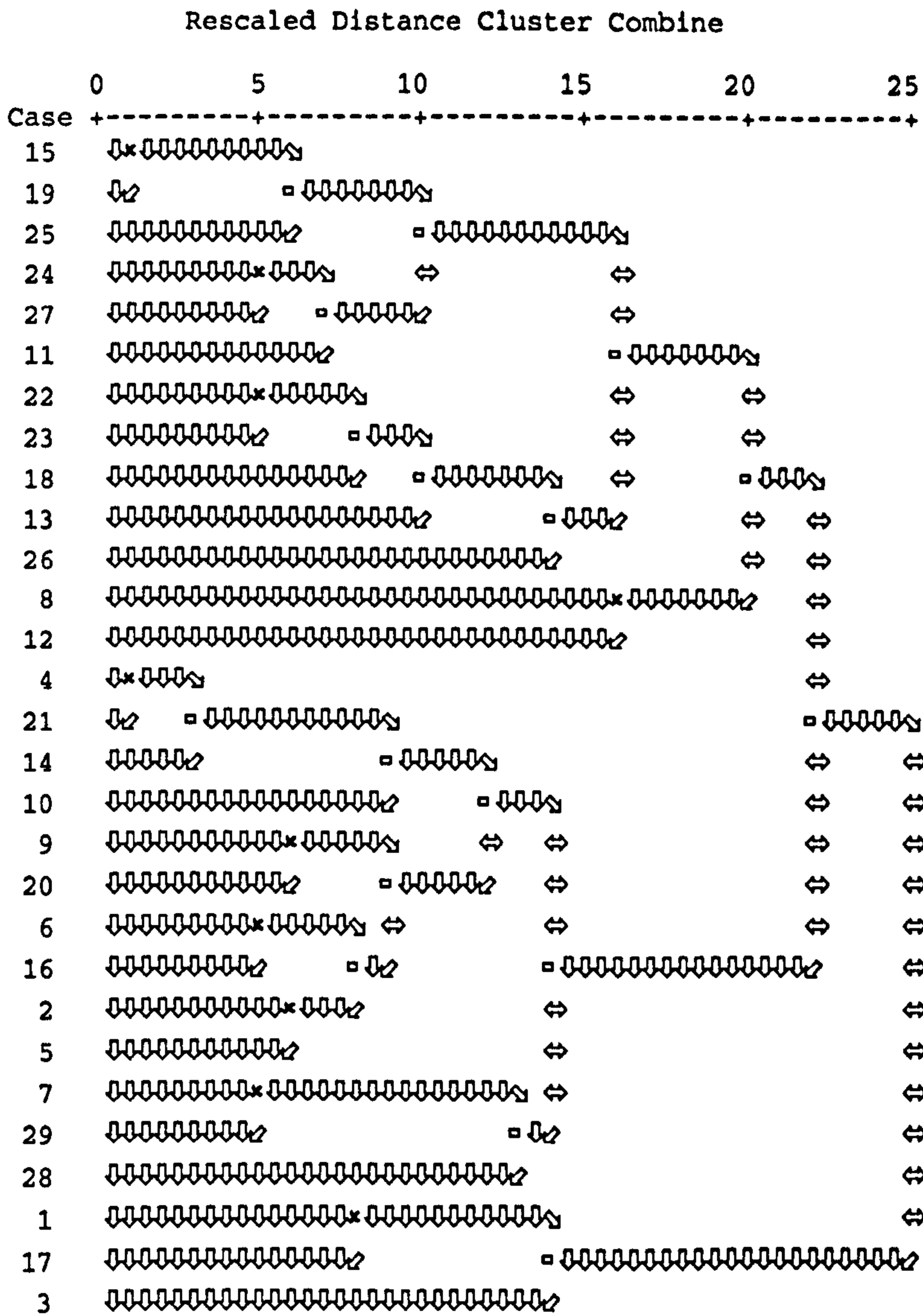
To ensure the selected respondents would reflect a diverse range of perspectives, a cluster analysis of the data from chapters 4 and 5 was performed so that respondents could be drawn from each major type of VC investor. Figure 6-1 shows a dendrogram representation of the results of the cluster analysis, which was performed using the SPSS (ver. 12.0) hierarchical cluster analysis function, for average between-group linkage and using simple Euclidean distance⁹, based on the calculated values for the factors identified in chapters 4 and 5.

From visual inspection four clusters can be identified¹⁰: cluster #1 comprising eleven cases, cluster #2 comprising two adjacent cases, cluster #3 comprising thirteen cases, and cluster #4 comprising a final three outlier cases.

⁹ Simple Euclidean distance calculation has the advantage that the distance between any two objects is not affected by the addition of new objects to the analysis, which may be outliers.

¹⁰ The number of clusters retained is somewhat arbitrary in that, as greater inter-cluster distances are accepted, fewer but larger clusters form. In the present case, increasing the distance serves only to collapse the cluster #2 outliers into cluster #1, without otherwise simplifying the results. And decreasing the distance serves only to split cluster #1 into halves, without otherwise changing the results. Neither change results in a markedly improved interpretation.

Figure 6-1: VC Dendrogram



To assist with the interpretation of these clusters and the development of a corresponding typology, Anova analyses were performed to determine whether these clusters differ significantly in their associated values for the underlying factors. As the group sizes differ, these Anova analyses were performed using unweighted means¹¹.

Table A4-3 in appendix 4 shows the one-way Anova results testing for significant factor differences between cluster #1 members and non-members. This analysis shows that cluster #1 members differ in that they have less experience as VC investors ($p=.001$), less general experience ($p=.050$), less willingness to invest in asymmetric markets ($p=.001$), greater willingness to involve others to broaden their

knowledge ($p=.043$), and less belief in investing in early-stage markets as a method of avoiding competitors ($p=.016$). Accordingly they can be given the descriptive label of **“Cautious Novices”**.

Table A4-4 in appendix 4 shows the one-way Anova results testing for significant factor differences between cluster #2 members and non-members. This analysis shows that cluster #2 members differ in that they have more experience both generally ($p=.032$) and specifically with other (non-VC) forms of investing ($p=.006$), but are less willing to invest in asymmetric markets ($p=.002$). Accordingly they can be given the descriptive label of **“Cautious but Experienced”**.

Table A4-5 in appendix 4 shows the one-way Anova results testing for significant factor differences between cluster #3 members and non-members. This analysis shows that cluster #3 members differ in that they have greater willingness to invest in asymmetric markets ($p<.001$), greater propensity to lead ($p=.033$) and less need to broaden their knowledge ($p<.001$), greater experience as a VC ($p=.001$), and greater belief in investing early-stage to avoid competitors ($p=.015$). Accordingly they can be given the descriptive label of **“Confident Leaders”**.

Table A4-6 in appendix 4 shows the one-way Anova results testing for significant factor differences between cluster #4 members and non-members. This analysis shows that cluster #4 members differ in that they have lower propensity to lead investments ($p<.001$). Accordingly they can be given the descriptive label of **“Followers”**.

The largest cluster comprises experienced investors who tend to operate in markets with high information asymmetries where their abilities allow them to avoid competitors. They differ in their higher propensity to lead syndicates and invest in foreign jurisdictions, and do not seek outside assistance to broaden their knowledge bases. This cluster may be indicative of VC investors who are overconfident in their

¹¹ This adjustment is made using the default “unique sum of squares” option in SPSS, which attempts to minimize the confounding of effects by adjusting for differences in group sizes. Nevertheless, the potential for differences in group sizes to inflate or deflate observed differences remains as a reason for caution when interpreting statistical results of these analyses.

abilities and therefore believe they can operate profitably in highly asymmetric markets despite having only limited experience in industry and as entrepreneurs. Overconfidence is a common cognitive bias, where one's estimate of abilities exceeds the objective measures of these abilities (Russo and Schoemaker 1992; Klayman, Soll et al. 1999). Venture capital investors have previously been found to be overconfident in their abilities (Zacharakis 1997; Zacharakis and Shepherd 2001) – although these studies treated their VC respondents as a homogeneous group, and therefore did not isolate this cluster from other respondents.

The other large cluster comprises newcomers to VC investing, who exhibit many of the opposite traits. They have significantly less experience and are less active in asymmetric markets, and compensate for these shortcomings by involving the expertise of others.

Testing for country effects

Before proposing this interpretation of the identified clusters, it is appropriate to understand any potential confounding effects of country of origin. Country-specific socio-cultural effects may result in different approaches to VC investor business strategy (Sapienza, Manigart et al. 1996). These country-specific effects have been found to include government policy (Isaksson and Comelius 1998; Jeng and Wells 2000), legal and institutional factors (Cumming 2002a) and the operating parameters of individual VC firms (Manigart, De Waele et al. 2002). If such effects are present among VC investors, and if these effects are manifest in any of the factors underlying the cluster definitions, then these country effects may confound the discriminant cluster attributes (the factors that are significantly different between cluster members and non-members) and may therefore lead to incorrect interpretation of the cluster analysis results.

To check for this possibility within the two larger clusters ($n = 13$ and 11 respectively), Anova comparison of means tests¹² were performed for the cluster attributes, based

¹² Again using the SPSS adjustment to account for differences in group sizes, and with the corresponding caveats with respect to interpretation of observed differences.

on the specific country in which the VC investor operates primarily. Table 6-2 shows the means of each attribute of the cluster, for the total cluster membership. Given the small sample sizes, the external validity of these results should be interpreted with caution.

Table 6-2: Cluster attributes by country

Cluster	Attrib.	Population Total	Cluster Total	Cluster Canada	Cluster USA	Cluster UK
Confident Leaders	ASYM +	73.67	105.30	97.99	95.36	134.94***
	LEAD +	-68.20	-50.16	-39.03	-51.39	-62.55
	VCEXP +	33.78	48.80	50.64	53.84	36.27
	AVOID +	3.05	3.53	3.72	3.43	3.45
	BROAD -	68.85	38.90	44.97	51.59	5.45**
Cautious Novices	BROAD +	68.85	87.01	77.83	91.24	90.20
	VCEXP -	33.78	16.31	1.70	22.67	21.50
	GENEXP -	38.90	27.39	42.11*	27.78	19.90*
	ASYM -	73.67	39.52	29.81	25.86	48.90
	AVOID -	3.05	2.50	2.97	1.86	2.49

The attribute label "ASYM +" indicates that the ASYM factor was found to be significantly *higher* for this cluster than for the overall sample population (i.e., 105.30 vs. 73.67 was significant, as reported above).

No differences were significant at the .05 level, except as noted:

* Significant at .05 level

** Significant at .01 level

*** Significant at <.001 level

Regarding the mean value of the ASYM factor for the UK members of the Confident Leaders cluster, the 134.94 value is very significantly different ($p < .001$), but this difference is in the direction that distinguishes this cluster from the remaining population. The other two countries have mean values that are not significantly different from the cluster mean. The cluster definition is internally consistent.

Regarding the mean value of the BROAD factor for UK members of the Confident Leaders cluster, the 5.45 value is significantly different ($p = .01$), but this difference is in the direction that distinguishes this cluster from the remaining population. The other two countries have mean values that are not significantly different from the cluster mean. The cluster definition is internally consistent.

Regarding the mean value of the GENEXP factor for UK members of the Cautious Novices cluster, the 19.90 value is marginally different ($p = .05$), but this difference is in

the direction that distinguishes this cluster from the remaining population. The cluster definition is internally consistent.

Regarding the mean value of the GENEXP factor for Canadian members of the Cautious Novices cluster, the 42.11 value is marginally different ($p=.05$), and further, this difference is contrary to the direction that distinguishes this cluster from the remaining population. A possible interpretation of this anomaly is that for these more experienced Canadian investors, the timidity suggested by the other defining attributes of the cluster is somehow not mitigated by having an unusually high level of general business experience. It could be that these Canadian VC investors do not recognize or credit their general business experience as affording them adequate background for early-stage investing in asymmetric markets. This might be attributable to the largely "branch plant" nature of many Canadian businesses, where chronological measures of experience may not correlate with functional expertise or levels of autonomy in decision-making (MacIntosh 1994; Daniels 1998). But this explanation should be considered with caution, as it is based on a small sample. On all other attributes of the Cautious Novices cluster, the Canadian VC investors have means that are not significantly different from the total cluster.

The foregoing analysis of country-specific attributes suggests that country-specific effects have not significantly confounded these results, and that the proposed cluster interpretation is reasonable. Table 6-3 summarizes the discriminant attributes of each cluster.

Table 6-3: VC typology

Cluster	<i>n</i>	Higher factors	Lower factors
Confident Leaders	13	ASYM ($p < .001$) LEAD ($p = .033$) VCEXP ($p = .001$) AVOID ($p = .015$)	BROAD ($p < .001$)
Cautious Novices	11	BROAD ($p = .043$)	VCEXP ($p = .001$) GENEXP ($p = .050$) ASYM ($p = .001$) AVOID ($p = .016$)
Followers	3		LEAD ($p < .001$)
Cautious but Experienced	2	GENEXP ($p = .032$) OTHEXP ($p = .006$)	ASYM ($p = .002$)

Based on this analysis it was decided that, in addition to the purposive sampling approach outlined above, sampling would be stratified across the clusters identified, with two Cautious Novices and two Confident Leaders, and one each from the Cautious but Experienced and Follower clusters. Within these parameters, and having shown that country is not a significant factor determining variance among these particular participants, VC investors for each cluster were selected from those VC investors located in Canada, for reasons of cost and ease of access.

Qualitative data collection

Interviews were conducted in the offices of the selected VC investors and were recorded electronically. The interviews were each of approximately 60 minutes duration. The trustworthiness of the research data and findings was assessed by applying criteria from the interpretive research methodology literature, focusing on credibility, transferability, dependability, confirmability, and integrity (Lincoln and Guba 1985; Hirschman 1986; Wallendorf and Belk 1989). This assessment is summarized in table 6-4, which provides an interpretation of the criterion and an assessment of the degree to which the current research meets the standard. This assessment suggests that the results provide reasonable evidence in support of the developed interpretations.

Table 6-4: Trustworthiness assessment

Criterion	Interpretation	Assessment
Credibility	The results appear to be an acceptable representation of the data – akin to positivist internal validity	Emerging constructs were confirmed with participants as interviews progressed. Key points were triangulated with a variety of interview probes.
Transferability	The interpretations are applicable to other contexts – akin to positivist external validity	Purposive sampling was employed to enhance generalizability to other VC populations.
Dependability	The results are stable and consistent over time and place – akin to positivist reliability	Findings are analyzed and compared with previous quantitative findings of chapters 4 and 5.
Confirmability	The interpretations are supported by the data – akin to positivist objectivity	Interpretations were confirmed with participants for reasonability and recognizability.
Integrity	The interpretations are free of misinformation or evasions by participants – akin to positivist self-report bias	Respondents were assured confidentiality and anonymity. Hypotheses from chapters 4 and 5 were not presented to respondents.

Analysis and Interpretation

Interview recordings were transcribed for subsequent analysis. The coding and analysis of this material proceeded in an iterative fashion. Initial coding was based on schemata developed from the previous two studies, which reflected the super-rational dimensions, and on the expectation of additional dimensions reflecting less super-rational drivers (such as agency risks, emotional objectives, or other irrationalities). As the iterative analysis progressed, themes and patterns of response were identified and developed. Within and across case comparisons were performed and tabulated to provide a higher-level basis for interpretation. Appendix 5 provides a summary of the concordance of these coded themes across the six respondents. The validity of these proposed interpretations was tested in follow-up discussions with interview respondents.

Support for earlier findings

Respondents from all VC clusters provided support and agreement with the conclusion that VC investors with higher degrees of screening ability are more willing and able to participate in markets characterized by high information asymmetries, such as early-stage markets. Confident Leaders expressed it as, “If you do it [early-stage investing] right, there is an opportunity to get the homerun. And what I mean by that is, we realize that by doing this early-stage investing, before May of this year, that

the biggest gap was with [the] management gap, management expertise... Why are we into early-stage? We think that if you really roll up your sleeves, there is a potential to (a) preserve the capital you're putting, and (b) to optimize it and really ensure there's some meaningful events taking place". Cautious Novices said things like, "Well, from an investor thesis, it's all about return. So it's return-driven risk. Why do we invest in early-stage? Buy more of the company at a lower valuation" and "Those of us who came in and were looking at early-stage, it didn't work that well, and so we're out. And the ones that were in that more mature capital market could sustain themselves". Even the outlier Cautious but Experienced respondent said, "The earlier you go, the higher the rate of return. So if you're really good at it, you get much better rates of return... If you're not good at it, you crash and burn".

The different VC types also expressed similarity of views about the importance of widespread general business experience, as reflected in by the GENEXP factor. The Confident Leaders said, "You need judicious business judgement... More than half the population are IT guys. So they're more comfortable with IT investments, not surprisingly, because they can touch and feel it and they can analyze it based on their experience and education. Whereas another company... for a lot of these guys it's more of a flyer because they can't evaluate it – the technology, the market potential. So it really comes down to sound business judgement", and "I think you need a two-fold approach to it. One, you do need to have the strategic kind of thinking, which you get by having done or doing a lot of venture capital activity. The experience comes from that, the exposure. So you do get the benefit of that. You need that level of expertise involved. The second is definitely operational expertise, whatever that might be. 'Operational' meaning creating a sense of accountability, systems, processes, discipline... Most of the time there is a gap in the rigors of sales and marketing". While the Cautious Novices expressed it more as, "You have to have somebody who understands the business, who's done it, who's run a business just like that, who knows how to get economies of scale, who already has the networks" and "It comes down to what kind of investor you are, where you feel comfortable. If you were an entrepreneur and you've done startups before, then you feel much more comfortable

with all of the unknowns around early-stage [investing]... You have to have a feel for it; you have to have been through this before. In the early stages, you take somebody who has been an entrepreneur and done startups. That's the skill set that is most important, because you know what the issues are. There are those who say you've got to be an engineer, you've got to know how to develop software. Or ideally, you were an entrepreneur in a software environment. But most of the founders are really smart people. And most of the founders can build the products. Whether it's built or not, or they have the great idea but don't know how to execute, you can compensate for that. You can build your team. But what the investor needs to understand is all of the dynamics: what the growth is going to look like, what our first sales guy is going to do, how to scale the sales organisation. So you have to have this general business knowledge. I think if you're going to be a hands-on working investor and you're going to grow those businesses, that's the skill set you need".

With respect to the issue of *why* some investors would pursue an early-stage strategy, the participants provided uniform support for importance of building and maintaining key relationships, and the role that early-stage investing might therefore play. A Confident Leader said, in referring to early-stage syndication partners, "I worked with this guy before. So therefore syndicates tend to form around people who have already done things together. And also the VC community is pretty small anyway. Once you've been in it for a few years you do get to know, even in a non-business setting, you get to know everyone on the street... When I have looked at who will I bring to the table [in a syndicate], or who is getting together, I would say the number one [criterion] would be alignment of objectives. That's the biggest. And what I mean by that is 'thinks in a similar fashion'". A Cautious Novice confirmed the role that early-stage investing plays in developing relationships among new VC investors, relationships that would endure when they later moved away from the early-stage market, saying. "There's a lot more sharing going on than there used to be. You see the young VCs, they get together at the wine thing. Those guys talk a lot. The industry is promoting that sort of cross-discussion. So, as they move up, they see the new deals in groups". Another Cautious Novice explained "It's a personal relationship business... We try to do business with

those funds, and that gets us into other deals... I've been on the Board of a company with the Managing Partner of a legendary Silicon Valley fund for three years, and we've built this relationship. And because he likes us, now we're seeing those deals". The Cautious but Experienced investor explained how early-stage investing provided a basis or "currency" in maintaining relationships with other investors: "I'll take [the entrepreneur] to other people to decide if they want to put money in, because they owe me a favour, or I owe them a favour... people that you like, people that you've done deals with before".

The experienced investors, whether Confident Leaders or Cautious but Experienced, agreed that early-stage investing had the benefit of locking up access to subsequent later-stage investments, saying, "[Early-stage] investing is a means of helping nurture along an investment to make it ready for one of their larger funds... It's sort of like an angel investment to get it to the next level, where it's a more attractive candidate". The Cautious but Experienced respondent further pointed out a strategy whereby some investors lock up subsequent financing rounds as a means of maintaining relationships with later-stage investors, saying: "[The early-stage investors] want control. They want 51% ownership... They go in early, wrest control, gussie it up, and then do a big round to their buddies and say, 'Well, we're a merchant bank. We know what we're doing. Look what we brought you.' So, they have to move upstream because they just don't have the cash to do a late-stage company". This comment seems to be suggesting that some investors are acting to maintain relationships with their friends in other investment firms, and that the best way they can bring value to these friends is to use their modest amount of investment capital to lock-up opportunities in early-stage markets and later bring these investment opportunities to their friends, almost as gifts (and presumably to the detriment of the entrepreneurs and the institutional investors that fund these early-stage VC investors). The Follower respondent confirmed this, but cast it more as a risk mitigation strategy when dealing with better-financed later-stage investors, saying "If you are putting money in and letting somebody take over after that, your ownership gets dwindled down so much. Because you may do a seed round on a good valuation, then the Series A [investor]

may come in and say 'yeah, we like it', but not at enough bump... Hopefully they look at you as a feeder fund and say 'I'd better not crush this guy, or he's not going to show me anything in the future'".

The respondents provided wide support for the strategy of demonstrating skill in early-stage markets as a means of improving their dealflow. A Confident Leader put it as, "Actions speak louder than words. You can say all of that, but the real test is going to come in 'how have you added value to these companies?' I think that's the key to it. No matter how much you say, at the end of the day, it is going to be how much did that person that you had in your shop, even if he or she may be operational, how did they go and bring about results... The actions will speak for themselves in due course. That can give you a basic differentiator. It's got an all-around benefit... Hopefully it will bring you an enhanced quality of dealflow. Because hopefully these entrepreneurs won't see it as a challenge, they'll see it as a help to them". A Cautious Novice further explained how an entrepreneur might interpret this signal of skill by thinking, "If you raise more money, that means you're a 'good' VC and you're going to start getting the dealflow. 'Such and such' a fund raised their next round of financing, they were supported by X number of LPs, all the [entrepreneurs] say 'Oh, those guys got more money, and they're good. Maybe I should take my deal to them'. Certainly you'll attract more business plans. But there's a group of people out there for whom VCs are a last resort. They have a business plan, it's a good business, and they can grow organically. They don't need venture capital. They're in no hurry to take VC money. So then they start to get confidence, [saying] 'This VC has attracted more money, they have depth, they have network connections. They know the LP is connected. Now we've got a couple layers of support'. So maybe they will take their deal to the VC. Entrepreneurs so good that they don't even need VCs". These respondents were suggesting that entrepreneurs do notice the signals of early-stage investor skill, and do use this information in deciding from whom they would seek future financing. This suggestion is the subject of the third study, reported in chapter 7.

Finally, the cautious investors commented on how early-stage investing provides a method of avoiding competition. A Cautious Novice said, "If the more mature VCs are getting all the deals, then you'd start looking at earlier deals. There's too much competition in the later stage. You're not going to go up against a VC who has lots of money and connections... When you're new, you're trying to find a niche. So why would you go up against the guys that are well-established, right in their main market, who get to have a quality dealflow, who are working [and] collaborating with all their other colleagues, who've got solid networks?". The Follower respondent repeated this belief, saying "Some of the larger funds have the strategy of feeding a pipeline – a seed fund that feeds the main fund. I think it's a very good strategy, because that means that they can continue to fund and they don't have to necessarily give in to a third investor who is going to crush them. They can continue funding if they want, by themselves or with their other partners. It's what allows some of the smaller funds to play in venture capital. Some of the smaller funds can't play in the larger [investment rounds]. If you haven't got \$500 million in the bank, you can't get into those [Series A or Series B] rounds. It's probably part of why we're in this [early] stage... it's a space where the competition is not that great". But the Confident Leaders did not share this view, as they typically did not think much competition exists in the VC investor industry. One remarked rather definitively, "I would say there is really very little competition. I've not seen it, other than in maybe one or two instances. Competition doesn't exist. [VCs] don't compete with each other for deals".

Turning now to the issue of what specific behaviours VC investors can undertake to signal their specific skills, the VC respondents expressed uniformity of opinion that the primary signal of investor skill remains the overall return on investment for the portfolio. The Confident Leaders expressed views like, "The most important benefit is, if you're adding value to your portfolio, you're going to see it in return". A Cautious Novice said about the marketing of VC investors to their principal investors, "They go out and market themselves. They have good investor relations with LPs, and can show them what they're doing. But as one fellow said to me, 'at some point in time we need to show [returns]'. It's all about returns to our shareholders... You have to show returns.

Even when you talk to really good [investors] that you know, with really good portfolios, they'll be the ones to say, 'So far we've acted on faith. But there comes a point in time where you have to be able to show returns'. That's what you need to show" and "When we go out fundraising, we are going to have to show that we have a proven track record of portfolio return. And it has to be a real track record; it can't be a one-hit wonder. It's got to be consistent returns. Ideally if you had multiple funds, you're showing consistency across funds. Clearly for us, at the end of the \$100M fund that we've got, to convince [the LP] to do another fund – did we have a successful return on the \$100M that we invested? Do we have a cohesive team who have stayed together throughout that time, that have proven they can work together, and have committed to stay for the next fund?". And a Cautious but Experienced investor summarized it as, "There are three tiers of VCs. There's the upper tier [like] Sequoia Capital. Any time they ever want money, anyone will give it to them. So they have no trouble raising money. They don't even announce it. Word gets out on the street that they might be considering it, and people flock to them – because their rates of return are so high. So there's huge stratification [among VCs]. There's first tier, and then there's *not*. Like there's Harvard and then there's everybody else. The people [VC investors] are selling to are financial weenies. All they care about, they're just looking for their rate of return, so all they care about is beta and risk and rate of return. All they care about is risk-adjusted rate of return... If what you show me is that of the \$100 million that you had invested you had one big success that gave you a 55% portfolio rate of return, that's not as exciting to me as five homeruns that gave you 55% rate of return, because that lowers your risk. So, it's rate of return and risk, and that's all that it is". These comments seemed to suggest that portfolio ROI was the sole measure of VC investor performance. But later comments question this interpretation by identifying other signals too.

Since portfolio concentration and the attendant level of portfolio risk are perceived by these investors as important measures for their principals, they therefore believe that the ability to accurately assess opportunities and picking the future winners is an important signal of their skill, one which should matter to their principals. One

Confident Leader explained this saying, "It really comes down to sound business judgement, and also people who are very resourceful, that can spend a lot of time doing a lot of research on the Internet and doing a lot due diligence to try to know as much as they can about a particular investment opportunity, knowing full well that it's high risk and that with investment there's a likelihood that you'll lose everything. But the more you can do to minimize that risk and try to pick a winner... that's why I say 'be selective'".

Respondents also provided some further examples of super-rational reasons to signal their screening skill, which were not included in the previous quantitative studies. The Confident Leaders remarked on the role that early-stage investing play in a well-diversified portfolio strategy, even for investors who do not have particularly high degree of screening skill, saying, "For passive [investors], it really comes down to higher potential returns to reflect the higher risk profile. And some will do it as part of a diversified or balanced portfolio" and "An approach which could work, [is to] take a portfolio approach and say 'okay, I'm going to deploy an amount of capital. And it's going to be so much in this company, so much in that company'. And you just hope that one of them takes off and will take care of all the other stuff. That could work. There's no reason why it cannot work."

When prompted, the respondents also provided more detailed examples of reasons why VC investors should try to demonstrate their abilities. These included securing commercial partners for their investees, securing future funding from principal investors, and being invited to join syndicates with peer investors. Some of their specific comments along these lines include:

- "The higher profile and better known you are, especially if you've been associated with winners in the past, will bode well for future funding and commercial partners." This suggests not only signalling to the institutional investors of the chapter 3 market model, but also another audience not reflected in that model: potential commercial partners of the entrepreneur (i.e., the legitimacy of the

successful VC investor improves the entrepreneur's ability to conduct business with other firms.

- "If you raise more money, that means you're a good VC, and you're going to start getting the dealflow." This reinforces the view that any signals of VC investor skill should influence entrepreneurs.
- "You get to know everyone on the street. You could know that one VC, he's a decent guy, he's strong at this, he's got a reputation." This suggests that signals of VC investor skill may influence the syndication decisions of other VC investors.
- "[A particular VC investor] has sector expertise in the semiconductor field. You want them there [in the syndicate]. And if they're not there, you're scared." This indicates that the signal effect on potential syndication decisions may be quite strong.

Despite this high level of agreement among the different types of VC investors, the various respondents did not express uniform opinions about some of the findings of the previous studies. Some findings were supported only by a subset of respondents. For example, the Cautious Novices, being new entrants in the VC industry, were stronger proponents of the importance of the signals inherent in the independence of their actions ("There was a time when you didn't share your deals, in general. When you found a good deal, you want to make a big splash."), and of the strategy of using early-stage markets as a signal during the early phases of their investor careers, but moving out of it once their skill reputation was established ("They get a really good return. Probably had to work a lot harder. Now that their funds are more mature, they realize they can probably invest in later-stage stuff."). They also had a stronger belief that they could find undiscovered opportunities in early-stage markets ("The big guys aren't looking at these deals, or they're going to turn them down. So there's going to be some good ones in there.").

Beyond super-rationality

Besides providing support for the conclusions of the previous two studies, interview respondents provided insights into a number of other reasons for VC investor behaviours, such as investing in early-stage markets, signalling their skill, and participating in syndicates. Many of these additional insights reflect less super-rational objectives on their part, perhaps even non-rational reasons. To some extent they are indicative of agency risk, whereby the individual VC investor may be pursuing personal objectives that do not necessarily support the objectives of the VC firm or its principal investors. For example, there may be individual career benefits sought through particular VC investor behaviours. A Cautious Novice remarked on how early-stage investing can be driven by short-term career grandstanding objectives (Gompers 1996) to impress more-established VC investors, saying, "The old guys are saying you're 'flavour of the month'... When you find a good deal, you want to make a big splash. But now everybody says 'yeah, we saw that [successful] deal'. Everybody claims they've seen everything". The Follower respondent commented on the emotional validation of being recognized for making good deals, saying "When you bring a Series A investor to the table, you're relatively excited just to get him to the table. There's a validation in having him there". The Cautious but Experienced respondent gave a longer-term career example, "[By making bad investments,] you *don't* get burned so bad that you die; you just spend all your money. [Laughs] Then [you] go get another job", referring to VC investors who achieve poor portfolio results but still manage to use the investor experience to achieve positive personal career results – an agency risk perspective that suggests a further personal benefit to developing and maintaining good relationships when working as a VC investor. And several investors gave examples of the personal emotional benefit of early-stage investing, which may supersede portfolio risk/return objectives. One investor remarked, "It can be an exciting time to get involved and help grow the company and help shape it and be involved in the day-to-day supervision and strategic decision-making", while another gave the example of an investor peer who "does it just because he has a passion for early-stage companies. They [already] made their

money. They're entrepreneurs; they [just] want to get involved in a company". These appear to be situations where the return to the individual VC investor is of a non-economic form. And finally, the Cautious but Experienced respondent gave several examples of VC investor behaviours designed to help friends working in other investment firms: "Conceivably I would say I'm going to lock you [the entrepreneur] up, and then take you to other [VC] people...because they owe me a favour or I owe them a favour", and "[VCs] do a big round to their buddies and say... 'look at what we brought you'". These comments suggest that, in addition to the super-rational economic objectives of VC investing, individual investors find a variety of personally enjoyable and non-economic reasons for their specific behaviours, which begin to blur the distinction between angel investors on the one hand, and VC investors with agency risk on the other.

Another example theme of VC investor beliefs and behaviours that appear non-rational is the profession of a lack of competition among VC investors, and their professed desire to avoid initiating competition. In a purely super-rational market, VC investors would compete aggressively with each other to obtain the right to finance the most attractive entrepreneurial opportunities. Abstaining from such competition would have detrimental economic impact on the VC investors; they might miss good opportunities, their share of realized gains from successful investments would be diluted by excess syndication, and their capital deployment would be spread among more investments than optimal portfolio diversification would require, thereby increasing their costs and reducing their profits. Nevertheless, despite these risks, respondents remarked often on the apparent lack of competition among VC investors – expressing approval for this arrangement in many ways:

- "Competition among VCs? It doesn't exist... If you could do [the deal] yourself, then you would do it yourself. But as soon as another VC catches wind of it, then there *still* wouldn't be competition. They would gang up on the entrepreneur and drive the valuation down. [Laughs] They would not get into a bidding war with each other."

- “In the venture capital world, I would say there is really very little competition. I’ve not seen it, other than in maybe one or two instances... In mainstream venture capital type of stuff, people are wanting to cooperate for all the obvious reasons.”
- “They are more collaborators than competitors... I wouldn’t want to get into a situation where we’re competing against another group and artificially jack up the price.”

This apparent lack of competition among VCs might initially be seen as a challenge to the market assumptions underlying the model presented in chapter 3. Yet it may be defended on three bases. First, the classical marketplace assumption requires only that individual participants can be replaceable without affecting the equilibrium of the market, not that these participants believe themselves replaceable. Secondly, this “no competition” opinion is being expressed by established market-leader VCs, and has been balanced by comments from the newer VCs (quoted above) pertaining to the importance of signalling to make a big “splash”. And finally, regardless whether the established VCs do not recognize their competitive environments, the entrepreneurs do – they are the ones choosing among the VCs (as will be explored in chapter 7). It is unclear whether this represents a lack of awareness of competition among established VC investors, or a lack of understanding among entrepreneurs as to how the early-stage capital markets work (i.e., a lack of competitive pressures). Since VCs have been found to be poor at introspection into their decision practices (Zacharakis and Meyer 1998; Shepherd 1999), they might also be poor at introspection into their competitive behaviours.

Only the Follower respondent explicitly recognized the competitive reality and the basis on which many VC investors compete with their non-VC competitors (competing on distribution, but not on price), saying “I’m not one, personally, to compete for a deal. The entrepreneur needs to make up their mind, do their due diligence and say ‘this is who I want’, versus saying ‘this one gave me a 10% higher valuation’. If it’s just based on valuation and deal terms, I’m not sure how much I’d play in that competitive market... But for the companies we seem to focus on, often our competition is angels.

And we're struggling with why that is. Maybe it's because a lot of the technologies we invest in are understandable. It's not complex telecom software. A new material that's lighter and cheaper? Simple. So we tend to be competing with angels, and their terms are an order of magnitude better than ours. [But] they are difficult to find. It's much easier to go after venture capital. The channels to venture capital are much more visible and acceptable".

Conclusions

This qualitative exploration, in addition to triangulating the findings of the previous chapters, has shed some light on a number of VC investor motivations and behaviours that extend beyond the super-rational boundaries quantitatively investigated in the previous two studies. These include agency risks, career concerns, and personal emotional rewards for individuals.

The range of opinions voiced by the respondents, and the variability of these opinions among the different identified types, lends support to the primary finding of chapter 4 that VC investors are not homogeneous and that one of the important ways in which they differ is in their willingness and ability to exploit screening skill in order to successfully invest in the early-stage markets. VC investors embody a wide range of beliefs towards screening skill and the effective operation in markets with high information asymmetries. And they recognize that this diversity in abilities acts to influence the adoption of various strategies among their peers.

Further, they provided a range of support for the findings of chapter 5, by which VC investors do attempt to signal their abilities, and that investing in the early-stage markets is one way to do so. They recognize the utility for some VC investors to operate in early-stage markets in order to signal information to stakeholders. But they also believe that investing in early-stage markets has many benefits beyond the pure signal value to entrepreneurs: building and maintaining key relationships, improving their dealflow, securing commercial partners for their investees, securing future funding from principal investors, diversifying portfolio holdings, being invited to join syndicates with peer investors, and enjoying individual private benefits (such as career

benefits and personal pleasure in advising early-stage firms). The cautious investors also believe that early-stage investing provides a method of avoiding competition until their VC firms had become sufficiently established to either compete effectively or to be asked to join with more established VC firms.

Although the VC investors believe that the primary signal of skill is the overall return on investment they are able to achieve for a portfolio, they also recognize the signal inherent in the fact that VC investors with higher degrees of screening ability are more willing and able to participate in markets characterized by high information asymmetries (such as early-stage markets) because this higher degree of screening skill is related to broad business experience and the ability to add value to the investee firm.

The primary finding of these qualitative interviews has been an enriched confirmation of many of the previous findings, as to why some VC investors choose to participate in highly asymmetric early-stage markets, and why and how they may choose to signal their skills to various constituencies. In the market model of chapter 3, the distinction between high and low-quality ESVCs is essentially behavioural – being based on the exhibited skill in screening behaviours. But the findings of this chapter provide an additional perspective on this distinction, by suggesting a number of attitudes and motivations that may underlie the willingness of some individual VC investors to develop the ability to operate in early-stage markets.

7. How Entrepreneurs Choose Their VC Investors

The market interactions between venture capital (VC) investors and entrepreneurs reflected in the chapter 3 model are two-sided, in that the capacity and willingness of both parties is prerequisite for achieving any investment deal. Not only must VC investors find and successfully screen potential entrepreneur transaction partners, but entrepreneurs must also do the converse – find and screen potential VC investors. However, research into the search operations within the market between entrepreneurs and VC investors has been primarily focused on the VC side of the market – how VC investors screen and select the entrepreneurial firms in which they wish to invest. In addition to the studies of the previous chapters, this existing research has included a diverse range of studies that have helped to develop a robust set of criteria used by VC investors to select their entrepreneurs (Bruno and Tyebjee 1983; Rea 1989; Cable and Shane 1997; Zacharakis 2002; Hsu 2004).

In contrast to this well-developed research stream, comparatively little is known about how entrepreneurs select their financial sources – relatively little is known about the information flows from VC investor to entrepreneur. This is unfortunate, as entrepreneurs often do have choices. In particular, the most desirable entrepreneurs with the most attractive projects often have choice from among competing capital suppliers; Over 70% of entrepreneurs seeking VC financing have competitive bids to consider, and over 50% have three or more competitive sources (Smith 1999). Indeed entrepreneurs seek to bring about this situation by attempting to establish a market once they received their initial financing offer, by seeking out additional competitive bids. Even if they are unsuccessful in creating this market, or are precluded from doing so by contractual terms with a prospective VC investor, they can still apprehend a freedom to choose. If they reject the first “take it or leave it” term sheet from a VC investor, they expect to be able subsequently to solicit a competing term sheet from another VC investor

Given that entrepreneurs can face the same freedom of choice as VC investors, it is important to develop an understanding of how this choice is made. Yet, compared to the literature of the selection criteria used by VC investors, the literature of entrepreneurial selection criteria is scarce. This is unfortunate since, as Venkataraman observed, the existence of a choice of different investor types in this market raises important questions about market stability (Venkataraman 1997).

There appears to have been but a single study to-date that explicitly made empirical examination of the criteria used by entrepreneurs to select their source of venture capital (Smith 1999). This study asked 143 entrepreneurs in the USA, and primarily in high-technology industries, to rate the importance of 29 criteria in their selection of a VC investor, on a scale from 0 to 10. The sample was drawn from the Price Waterhouse National Venture Capital Survey, as being in the "start-up/seed" or "early" stage of development and as having received "initial/seed" or "first stage" venture funding during the last three quarters of 1997 and the first quarter of 1998. The companies selected were limited by stage of development and type of investment to companies that were thought to be those most likely to have recently gone through the process of selecting a venture capitalist.

The results showed that entrepreneurs invest significant effort in this selection process, devoting 100 hours or more, involving many different information sources, and involving other members of their teams. The study also found several differences between different types of entrepreneurs, with variations in criteria importance being related to geographic region, industry, and the age and experience of the entrepreneur.

Subsequently, Leshchinskii attempted a theoretically based normative recommendation for appropriate criteria by which entrepreneurs may select a variety of different types of capital provider (Leshchinskii 2003). This study further argued that the screening abilities of active investors (such as VC investors) adds value to the entrepreneurial firm by resolving information asymmetries, a result later reiterated by studies that suggest that in an efficient market such investors are rewarded for this

value creation (Ippolito and Bertoni 2004), and by the results reported in chapter 5 above.

The value of this differential screening ability has been shown to act as a potential signal of VC investor quality, which may attract the more desirable entrepreneurs; high-quality entrepreneurs will seek out high-quality VC investors (Kelly and Hay 2000; Berkovitch and Serban-Levy 2004). For example, one study found that entrepreneurs will pay a 10-15% price premium (in the form of reduced valuation) in order to be affiliated with VC investors of high reputational quality (Hsu 2004). More recently, investor experience in making successful investments in a particular industry has been shown to signal screening ability, and thereby act as an endorsement for firms with high uncertainties in the future prospects (Janney and Folta 2006).

Collectively, these studies provide the basis for a rich set of potential selection criteria for further examination. This set can be somewhat simplified by aligning related definitions and concepts under a single construct. Examples of constructs having a multiplicity of operational measures in the existing literature include the services provided by a VC investor, the structure of a proposed investment deal, and the reputation of a VC investor.

The modest extant research that examined the selection criteria used by entrepreneurs has assessed espoused importance only, a significant limitation. In-use criteria may turn out to be quite different than those espoused by the entrepreneurs. For example, research into the decision processes of VC investors has found that they are poor at introspection into their decision practices, and that their in-use criteria are different from the criteria they espouse (Zacharakis and Meyer 1998; Shepherd 1999). Such may also be the case with entrepreneurs, although it appears not to have been studied previously. Furthermore, it may be particularly likely with entrepreneurs, since entrepreneurs have been found to have high levels of overconfidence with regard to new ventures they found, particularly if possessed of voluminous data (Forbes 2005). Entrepreneurs engaged in marketing their firms and their detailed business plans to

VC investors may therefore be overconfident in their ability to introspect and determine their actual selection criteria (Zacharakis 2002; Forbes 2005).

Research question

Given the two-sided choice available in the market among entrepreneurs and VC investors, and the importance of an efficient matching process both to entrepreneurs and VC investors, an examination of the entrepreneurial side of the market is clearly overdue. Knowledge of the selection behaviours of entrepreneurs should be brought on par with the extent of knowledge of the selection behaviours of VC investors. In particular, the current study of VC investment in early-stage markets was developed to examine the central questions:

- How do entrepreneurs select their VC sources?
- What criteria are considered?
- What relative importance are these criteria given?
- Is there correspondence between espoused and actual decision criteria?

These questions are framed to allow for different types of entrepreneurs, who may place different importance on the various selection criteria, following Smith (1999), who, in the initial exploratory study on the topic, found differences with respect to the geographic region in which the entrepreneurial firm operates (Smith's study was limited to the USA), the industry in which the entrepreneurial firm operates, the level of experience the entrepreneur has in business generally and with VC investments specifically, and the age of the entrepreneur.

The current study does not intend to explore entrepreneur choices for other types of investment (e.g., bank financing) or for later-stage firms, nor the decision rule that entrepreneurs use to evaluate the criteria data about potential VC investments. As an initial position, it is assumed that the decision rule is some form of compensatory rule where poor scores on one criterion can be offset by very good scores on another. In doing so, entrepreneurs are making a trade-off in favour of decision-making optimization, and at the expense of decision-making simplicity and effort. Consumers

tend to make such a trade-off when the perceived costs of making suboptimal choice are high and the required information processing efforts are low (Wright 1975). The evidence provided by Smith, that entrepreneurs are willing to devote significant information processing efforts to the decision of selecting a capital provider, suggest that entrepreneurs do adopt such a compensatory optimizing decision rule (Smith 1999). These situations are particularly amenable to analysis using conjoint techniques.

Empirical Study

This descriptive quantitative study was aimed at discovering the importance of various criteria in making the decision of which VC investor source to use, and at comparing espoused and in-use importance.

Methodology

Previous attempts to address the question “how do entrepreneurs choose their sources of VC financing” have either asked them directly, as with the Smith study (Smith 1999), or have indirectly inferred criteria from VC selection studies such as those summarized in table 3-3 above. Both of these approaches are somewhat unsatisfactory, in that the results have low discrimination (entrepreneurs may appear to have very many criteria, all of which are important to the decision process), the espoused importance might not match actual practice (entrepreneurs may say a particular criterion is important, but the criterion has low correlation with actual choices made), and the results ignore interaction effects and other trade-offs that occur with real-world attribute bundles (such as when the importance of criterion A depends on whether criterion B is below a particular threshold value). What is needed is a technique that identifies actual “in-use” criteria, measures their importance, and accounts for their simultaneous effects on real-world choices. This is the goal of conjoint analysis.

Conjoint analysis is a research technique developed to identify and quantify the criteria used in making multidimensional judgements, such as when consumers select and

purchase a product that has several desirable attributes. It differs from other marketing research techniques in that it attempts to capture actual choice behaviours through simulated choice scenarios, and it captures preference information about several attributes simultaneously (potentially allowing for the identification of interaction effects). It works by presenting respondents with combinations of attributes that realistically mimic the kinds of products offered in the real-world marketplace. Respondents are then asked to evaluate these combinations, either by ranking them individually or by making choices among them. From this evaluation information, preferences and relative utilities of the various attributes can be deduced (Luce and Tukey 1964; Green and Rao 1971; Curry 1996). As a research technique it therefore has the benefits of evaluating realistic bundles of attributes, requiring the consumers to make realistic tradeoffs among these attributes, and allowing the determination of relative attribute importance from real choices (rather than isolated rankings that are separated from the choice event). However, it assumes that consumers have sufficient accurate information about the attribute levels of offerings they are considering, and that they use a weighted additive (compensatory) function to determine the utility of each offering.

Conjoint analysis has a long history of application in the domain of marketing research, for the purpose of uncovering and analyzing consumer preference information (Luce and Tukey 1964; Green and Rao 1971; Johnson 1974; Green and Srinivasan 1978; Louviere and Woodworth 1983). One reason is that, rather than providing rather abstract "utilities", conjoint analysis can provide concrete predictions of relative "market shares" of proposed combinations of attributes. This has significant practical application for marketing practitioners who are designing competitive product offerings.

Conjoint analysis has been successfully applied in domains other than marketing (Bonner 1990; Hitt and Tyler 1991; Priem and Harrison 1994; Davis 1996a), but is a relatively new methodological approach for research into entrepreneurship. On a limited basis, this methodology has been applied to the study of decision-making by

venture capital investors, to improve the validity of prior research into the relative importance of various investment criteria (Riquelme and Rickards 1992; Muzyka, Birley et al. 1996; Shepherd 1999a; Shepherd 1999b).

Traditional conjoint analysis presents the respondent with profiles that contain values for all of the attributes under study. Respondents are asked to rank these profiles, often through implementation of some form of "card sort" exercise or series of pairwise choices. Compared with other approaches, this inclusion of all attributes has the benefit of more fully mimicking real-world evaluations. It also can be used with relatively small sample sizes. Factorial designs are often employed due to the many possible combinations of many attributes with many levels. However, for offerings that include very many attributes, the cognitive demands placed on respondents can be high, and can therefore lead respondents to adopt simplifying strategies that may introduce biases. One common heuristic developed in the domain of marketing studies recommends limiting this approach to situations with six or fewer choice attributes (Orme 2003).

Adaptive conjoint analysis attempts to reduce the demands placed on respondents by presenting them with only a subset of possible attribute/level combinations. This subset is determined algorithmically (typically by a computer program), by asking the respondent to rank order levels within each attribute, and to rate the individual importance of attributes. Then the respondent is asked to select from a series of pairwise conjoint questions that show only a small number of attributes in each question. The selection of which attributes and levels to include in this questions is designed to focus data collection on the attributes deemed most important by that respondent. This approach is very efficient in collecting much preference information in a short time, and for dealing with situations that involve very many attributes (as many as 30 have been suggested). However, this approach suffers from the independence of irrelevant alternatives property, in that importance may be biased upwards for any attributes that are not truly mutually independent (Johnson 2001).

Choice-based conjoint analysis extends traditional conjoint analysis by presenting respondents with a simultaneous choice among several competing offers with different attribute combinations. This is considered to be a choice task that better mimics real-world choices. Moreover, the data obtained can be easily pooled across respondents. This facilitates the estimation of interaction effects, which cannot be easily determined from other conjoint analysis approaches. However, it rests on an assumption of respondent homogeneity that should be validated (Chrzan and Orme 2000).

Table 7-1 summarizes the relative merits of these three different approaches to conjoint analysis, as a guideline to choosing the approach to be adopted in any particular research study (Orme 2003). Based on this perspective, a traditional conjoint approach was adopted.

Table 7-1: Capabilities of different conjoint approaches

	Traditional	Adaptive	Choice-based
> 6 attributes	No	Yes	Yes
Small sample size	Yes	Yes	No
Paper-based	Yes	No	Yes

The selected unit of analysis was individual entrepreneurs responsible for obtaining VC financing for their firms. Since the research question includes examining differences in how they choose versus how they espouse they make their choices, it did not matter whether the entrepreneurs ultimately completed a financing with capital suppliers, only that they had faced a choice of supplier to proceed with or to reject. The sample frame was simply that they apprehended a choice of financing sources from more than one competitive supplier (i.e., they would potentially have to walk away from somebody's money).

Entrepreneurs from Canada, USA and UK were included in the sample frame. Potential participants were identified by referral from professional VC firms (such as members of the Canadian Venture Capital Association, National Venture Capital

Association, and British Venture Capital Association) and entrepreneurial associations (such as Entrepreneurs' Organization, United States Association for Small Business and Entrepreneurship, and Young Presidents Organization). Entrepreneurs were also identified by review of databases of recently completed VC investment deals (e.g., www.vcreporter.com). Alternative recruitment and contact methods that were considered included advertisement in entrepreneurship magazines and reliance solely on direct targeted solicitations. Forming the list of potential entrepreneur respondents in the chosen manner offered certain advantages over these alternatives. Open advertisement, while possibly yielding a large number of potential respondents, would likely generate a higher proportion of unqualified respondents (having no experience in choosing VC investors), and thereby increase cost and administrative burden to obtain the same number of qualified respondents. Relying solely on direct solicitation, while minimizing responses from unqualified respondents, would have a greatly reduced scope and would lack the additional endorsement from the entrepreneur's professional association or from her current VC investor. On this basis, a combination of referred and direct contact was felt to offer an acceptable trade-off of reach, response rate, cost, and selection bias.

The potential participants were contacted by email and invited to participate in the research by completing the interactive survey on a website. Alternative survey data collection methods that were considered included mailed paper-based surveys and self-contained software surveys on CD-ROM. Collecting respondent data in the chosen manner (interactive website) offered certain advantages over these alternatives. Paper-based surveys offer little advantage over web-based, and would be more costly to administer and would potentially appear more daunting to the respondent in the conjoint question section (leading to potentially lower response rates). Self-contained software would offer roughly equivalent benefit as web-based, but would add to the cost and potentially reduce the likelihood of obtaining a respondent in a particular VC firm in a case where the initially-contacted individual was inappropriate (that individual might be less likely to trouble themselves to forward a physical CD-ROM to their colleague than to simply forward an email with an

embedded link to a website). On this basis, web-based data collection was felt to offer an acceptable trade-off cost, administrative convenience, and response rate effects.

A panel of experts was used to validate the content of the online instrument. This panel comprised two entrepreneurs with experience in obtaining venture capital investments and two venture capital investors. Their feedback was incorporated into the design of the survey instrument used in pilot testing.

The instrument was tested by administering it to a pilot group of six entrepreneurs, whose feedback was used to further refine the instrument. These pilot participants were Canadian entrepreneurs with varying levels of experience in VC fund raising for their firms. All had previously faced choice scenarios among competitive VC investors. It therefore appears that the pilot group is thus reasonably representative of the intended sample group for the purpose of instrument validation.

Based on previous research and the results of these validation exercises, the following seven selection criteria were included:

- Valuation
- Terms and conditions
- Value-added services
- Reputation
- Skill and independence
- Overall personal compatibility
- Ease of deal-making

Participants were asked to rate the relative importance of each criterion on a 7-point scale (1 = not at all important, 7 = very important). They were also asked to indicate any other criteria they use, but that were missing from the initial list of seven. These additional criteria are reported below, but were not included in the comparative analysis.

Respondents were then presented with a conjoint exercise that required them to evaluate bundles of criteria (attribute and level pairs that simulated potential financing offers) in the context of making a choice of a venture capital provider in a competitive situation. Each bundle contained the seven proposed selection criteria at different levels. Valuation occurred at three levels (33% higher than other VCs, same as other VCs, 33% lower than other VCs) and each of the other attributes occurred at two possible levels. The respondents were asked to imagine they were seeking venture capital for their firms, and to consider each bundle as a potential VC financing offer. They were asked to individually rate their likelihood of accepting each of these bundles on a 7-point Likert-type scale (1 = not at all likely, 7 = very likely). This task was intended to simulate the choice of whether to accept similarly offered VC investment deals in the real world.

The orthogonal design of the conjoint bundles was achieved using Bretton-Clark Conjoint Designer software (version 3). From this, twelve bundles were defined as an orthogonal design set. One bundle, having the greatest number of attributes at the desirable level, was manually replaced with an optimum bundle having all seven attributes at the desirable level. This provided a validity-check mechanism, in that such a bundle should have the highest likelihood ratings for all participants. After making this substitution, the orthogonality of the conjoint was reconfirmed by inspection of the correlation matrix. No significant off-diagonal correlations were introduced by the substitution, indicating sufficient orthogonality in the design.

The conjoint design of twelve bundles, each displaying seven attributes, was within the range that may be effectively evaluated by respondents examining full-profile bundles, rather than selective or adaptive bundles (where only a subset of criteria are shown in any given bundle) (Curry 1996; Chrzan and Orme 2000; Orme 2003). It also mitigates the risk of any attribute additivity threat to validity, in which a too large number of attributes with relatively minor importance can overwhelm the deduced importance of a smaller number of extremely important attributes.

To help to reduce the risk of common rater consistency bias in these responses (where responses to the espoused-criteria questions may tend to act as anchors during the in-use conjoint simulations), a set of unrelated questions were interposed between these two sections of the survey (Podsakoff, MacKenzie et al. 2003). These questions included estimates of items of general knowledge related to financing. These novel questions additionally served to reduce respondent fatigue and to thereby improve response rates (Yu and Cooper 1983; Podsakoff, MacKenzie et al. 2003). It is expected that the cognitive shift induced by these questions has served to mitigate the potential for self-report and common rater bias (Podsakoff and Organ 1986; Podsakoff, MacKenzie et al. 2003). Conjoint bundles were also presented in random order to each participant to help mitigate potential common rater effects and item characteristic effects.

As noted earlier, entrepreneurs frequently wish to use the expressions of interest of one VC investor to attempt to make a market for their firms. To prevent the formation of this competitive market, VC investors typically constrain entrepreneurs from doing so. They achieve this constraint by placing an expiry date on their financing offers ("term sheets") and binding the entrepreneur to secrecy until after this expiry date. The effect of this practice is that entrepreneurs typically face "take it or leave it" decisions about an individual VC investment offer, without having the ability to make comparison to other possible investment offers from other VC investors. To replicate the "take it or leave it" staged nature of competition among VC investors, the respondents were asked to rate each proposed financing bundle individually in turn. They were not asked to make choices from among competing simultaneous offers.

To assist with control and analysis of population subgroups, respondents were asked several demographic variables for their firms and their experience in raising venture capital financing: the lifecycle stage of the firm, sales and sales growth rate, number of completed VC rounds, total VC funds obtained, size of the most recent VC round, and whether they had ever been unsuccessful in obtaining venture capital. Respondent were also asked some personal demographic variables: their age and sex, amount of

business experience, self-assessed level of knowledge about VC financing, and the country and industry in which they have the most experience in raising VC financing.

Analysis of results

Two-hundred and seventy entrepreneurs were invited to participate in the research. Seventy-seven survey responses were obtained. Of the total responses, 18 were eliminated due to being materially incomplete or incorrectly completed, leaving 59 responses and a final response rate of 22%. Of these responses, six were partially incomplete but usable¹³. Respondents included entrepreneurs from a range of industries, firm sizes, growth rates, and firm age. All respondents were experienced in obtaining VC financing. Table 7-2 summarizes the firm characteristics of the sample. The entrepreneurs also exhibited a range of personal background and familiarity with VC financing. Table 7-3 summarizes characteristics of the respondent entrepreneurs.

Table 7-2: Firm characteristics

Lifecycle stage		
	Seed	34.0%
	Launch	35.8%
	Rapid growth	26.4%
	Expansion	3.8%
	Maturity	0.0%
Sales revenues		
	Less than \$1M	62.3%
	\$1 – 10M	30.2%
	More than \$10M	7.5%
Sales growth rate		
	Less than 20% CAGR	35.8%
	20 – 100% CAGR	37.7%
	More than 100% CAGR	26.4%

N = 53

Table 7-3: Entrepreneur characteristics

Age		
	Younger than 20	0.0%
	20 – 29	15.1%
	30 – 39	17.0%
	40 – 49	43.4%
	50 or older	24.5%
Sex		
	Male	92.5%
	Female	7.5%
Years of business experience		

¹³ They provided espoused importance data, but not conjoint or demographic data.

	Less than 5 years	7.5%
	5 – 10 years	15.1%
	More than 10 years	77.4%
VC knowledge (self-assessed)		
	Novice	5.7%
	Average	28.3%
	More than average	54.7%
	Expert	11.3%
Country of VC experience		
	Canada	73.6%
	USA	22.6%
	UK	0.0%
	Other	3.8%
Industry of VC experience		
	Biotech/life sciences	11.3%
	Information tech/telecom	67.9%
	Other technology	11.3%
	Manufacturing	3.8%
	Distribution	0.0%
	Retail	0.0%
	Services	1.9%
	Other non-tech	3.8%
Total VC rounds		
	None	11.3%
	One	32.1%
	Two or three	18.9%
	More than three	37.7%
Total VC funding		
	Less than \$1M	26.4%
	\$1 – 10M	47.2%
	More than \$10M	26.4%
Completed round within previous 12 months		
	Yes	34.0%
	No	66.0%
Size of most recent round		
	Less than \$1M	45.3%
	\$1 – 10M	47.2%
	More than \$10M	7.5%
Had ever failed to obtain VC funding		
	Yes	71.7%
	No	28.3%

N = 53

The substitution of an optimum bundle provided an additional validity check. For all but two respondents this bundle received the highest desirability ranking, suggesting little overall risk of item characteristic bias¹⁴. The two respondents who did not rate the optimum bundle highest rated it second highest, suggesting an interpretation dependent on exogenous factors, such as correlation of errors.

With respect to espoused importance of the seven criteria tested, modest levels of discrimination were found among the criteria. Entrepreneurs rate personal compatibility higher than other criteria (6.24 vs. 5.44 mean rating), and are more uniform in this rating (S.D. 0.95 vs. 1.41). They rate value-added services lower than other criteria (4.88 mean rating), but are less uniform in this rating (S.D. 1.68). Table 7-4 summarizes the espoused importance, as well as *t*-tests for discrimination among these criteria. Overall, these results suggest that entrepreneurs generally value all of these criteria in making their choices. In addition to the seven criteria tested, some participants also suggested other criteria they considered important. Of 59 respondents, 19 suggested additional criteria as important. Table 7-5 summarizes these additional suggestions.

Table 7-4: Espoused Importance

Criterion	Mean	S.D.	<i>t</i> -statistic
Personal compatibility	6.24	0.95	-4.838***
Terms and conditions	5.95	1.02	-3.042**
Valuation	5.44	1.16	-0.014
Ease of deal-making	5.32	1.44	0.685
Skill and independence	5.15	1.52	1.688
Reputation	5.08	1.44	2.093*
Value-added services	4.88	1.68	3.324***
Group Mean	5.44		

N = 59, Scale: 1 = not at all important, 7 = very important

t-test for deviation of selected criterion from group mean

* significant at *p* = .05 level

** significant at *p* = .01 level

*** significant at *p* = .001 level

¹⁴ Such bias might include effects of the order in which scenarios are presented.

Table 7-5: Additional suggested criteria

- Ability to provide follow-on investment (7 mentions)
- Deep, relevant industry expertise (3 mentions)
- Shared vision, common objectives (3 mentions)
- Source of capital (i.e., who is investing in their fund)
- Transaction costs (e.g., due diligence expenses)
- Size of current investment round
- References from other entrepreneurs
- Commitment
- Integrity
- Tolerance of risk
- Degree of managerial involvement

Data obtained from the conjoint simulations were analyzed using Bretton-Clark Conjoint Analyzer software (version 3). Table 7-6 presents the deduced conjoint importance for the seven criteria tested. These importance figures indicate the relative weighting that entrepreneurs gave to each criterion, when presented with a proposed financing bundle. These results show marked importance given to valuation and personal compatibility, and relatively little importance given to skill and independence, and to value-added services.

Table 7-6: Conjoint importance

Criterion	Importance	S.E.
Valuation	28.04	1.51
Personal compatibility	20.87	1.39
Terms and conditions	13.78	1.37
Ease of deal-making	10.91	1.00
Reputation	10.71	1.24
Skill and independence	8.13	0.84
Value-added services	7.56	0.75

$N = 53$, average adj. $R^2 = 0.755$

Comparing these results to the previously presented espoused results yields some interesting insights. Table 7-7 shows the comparison between normalised importance

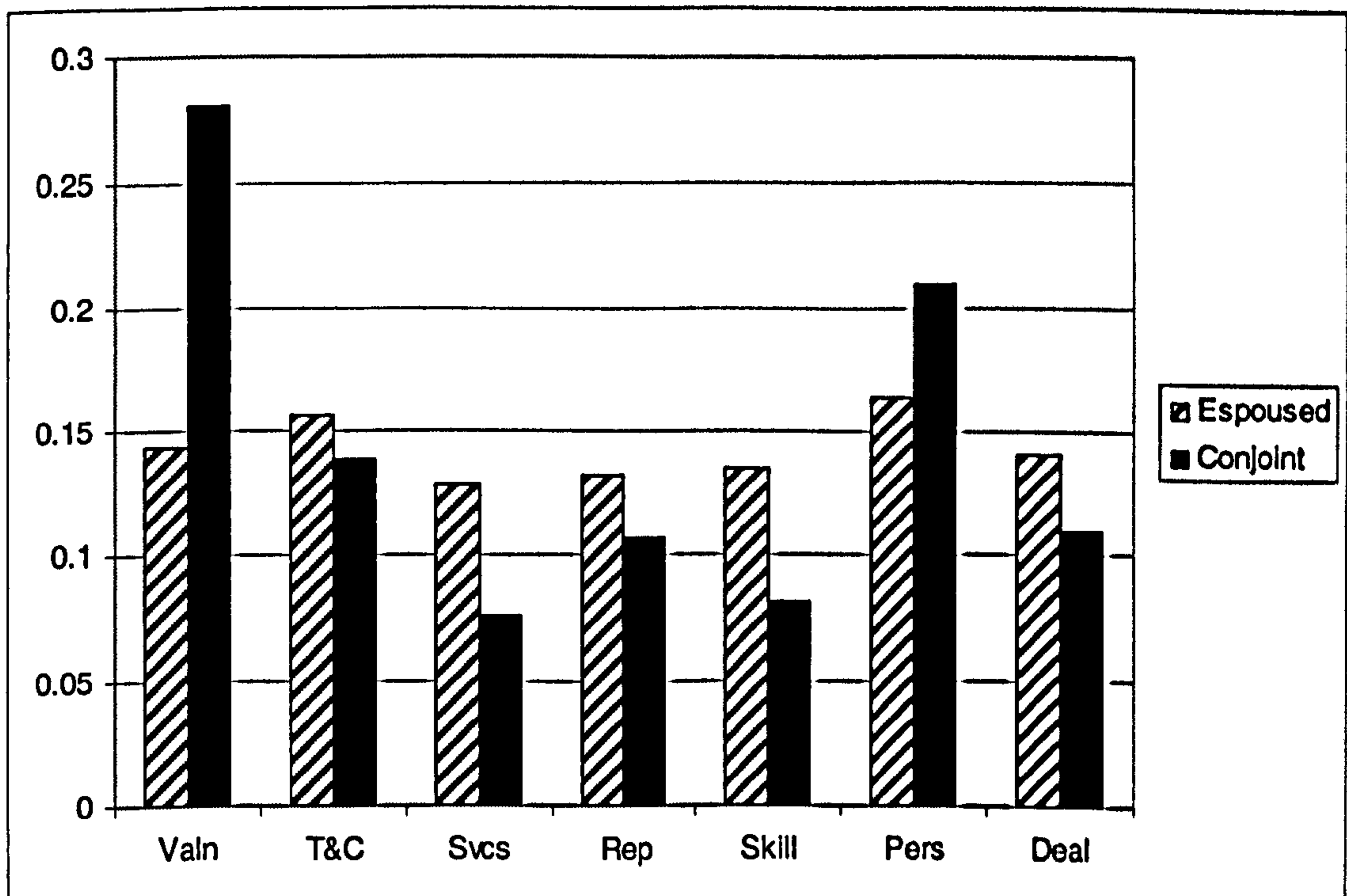
obtained by the two research methods; these are graphically represented in figure 7-1. This comparison further highlights the substantial difference in importance afforded to valuation and to personal compatibility; the conjoint results show these criteria to be markedly more important than other criteria, an insight that was not seen with the espoused results. It also demonstrates a relative decline in all other criteria.

Table 7-7: Comparison of Importance

Criterion	Espoused (N=59)	Conjoint (N=53)	Beta ¹⁵
Valuation	0.143	0.280	<0.001
Terms and conditions	0.156	0.138	<0.001
Value-added services	0.128	0.076	<0.001
Reputation	0.132	0.107	<0.001
Skill and independence	0.135	0.081	<0.001
Personal compatibility	0.164	0.209	<0.001
Ease of deal-making	0.140	0.109	<0.001

Importance values have been normalized to total 1.0 within each column.

Figure 7-1: Relative Importance



For ease of reference, variable names and descriptions are summarized in appendix 1.

To test the specific hypothesis for between-group differences, the data obtained were analyzed using SPSS software (version 12.0). Anova analyses¹⁶ were performed to

¹⁵ Beta was determined using the online calculator provided by the UCLA Department of Statistics, at <http://calculators.stat.ucla.edu/powercalc/> which is based on Mace, A. E. (1974). Sample-size determination. Huntington NY, Robert E. Krieger Publishing Company.

test for differences in espoused criteria importance for a range of demographic subgroups. Table 7-8 summarizes these results. In practice, slow-growing firms place less importance on valuation than do other firms. The reputation of the VC investors matters more to IT and telecom firm than to other firms. Reputation also matters more to entrepreneurs with greater than average knowledge of VC financing, presumably indicating that increased experience with VC investors leads entrepreneurs to give greater consideration to the reputation of potential future investors.

Table 7-8: Espoused differences between subgroups

Criterion	Subgroup Displaying Difference (size)	Members	Non-members
Valuation			
	Revenue growth < 20% per year (19)	4.84	5.74**
Reputation			
	Industry = IT telecom (36)	5.44	4.29**
	VC Knowledge = More than average (29)	5.48	4.58*
Personal compatibility			
	VC Knowledge = Average (15)	5.53	6.42**
Deal ease & speed			
	VC Knowledge = More than average (29)	5.55	4.75*

N = 59, Scale: 1 = not at all important, 7 = very important

* significant at $p = .05$ level

** significant at $p = .01$ level

Discussion

Consistent with Smith (1999), the espoused results and the suggested additional criteria indicate that the capital-sourcing decision is a complex one in which entrepreneurs attempt to assess and integrate information about many criteria. They believe it is important to consider a breadth of information and devote time and energy to obtaining such information.

The conjoint methodology provides a novel perspective on the actual utilization and importance of this information. Comparing conjoint results to the espoused results yields some interesting discrepancies. First, the existence of several significant differences in the importance derived from espoused and conjoint methods suggests that entrepreneurs may be poor at introspection into their capital-sourcing decisions.

¹⁶ Again using the SPSS adjustment to account for differences in group sizes, and with the corresponding caveats with respect to interpretation of observed differences.

As with many compensatory consumer decisions, entrepreneurs like to believe that they consider many criteria of relatively equal weight. But in practice, a few criteria tend to dominate their decision making, and in ways that are not readily apparent to the decision makers.

Regarding the importance of individual criteria, the conjoint analysis reveals that in the simulated choice scenarios the entrepreneurs placed significantly higher importance upon valuation and a higher importance upon personal compatibility. Espoused views notwithstanding, it appears that entrepreneurs seeking financing are primarily price-shoppers. The significant difference in the importance of valuation, as derived by the two different methodologies, may be indicative of a substantial social desirability bias inherent in previous research using solely espoused measures. Entrepreneurs may not want to admit to others, or even to themselves, the extent to which questions of price dominate their capital sourcing decisions. The importance of valuation may be driven by several possible objectives on the part of entrepreneurs, including maximization of personal wealth (e.g., maximizing their retained equity share of the firm), the signalling value that obtaining a high valuation may have with other audiences of the entrepreneur (e.g., social prestige associated with having created something that is valued highly by others), and fears of loss of voting control over their firms (i.e., being diluted to below 50% ownership).

The other criterion of notably high conjoint importance is personal compatibility. It appears that, in practice, entrepreneurs place high value on the quality of the relationship with their VC investor. Given their caution with respect to accepting external advice, this is understandable. It is likely that they view this relationship quality as a moderator of all other benefits that flow from the VC, such as value-added services for the present and follow-on investment for the future.

The conjoint analysis also reveals that entrepreneurs place low importance upon value-added services, and upon the skill and independence of prospective VC investors. This suggests that, in addition to being price shoppers, entrepreneurs are not looking for “smart money” – financial capital from an investor capable of providing

a range of additional services to help the business thrive. Instead, they are simply seeking money at a good price, from someone they can work with. This may be indicating that entrepreneurs do not value these services very much, or that they are suspicious of what the VC investor is likely to charge for providing these services (e.g., in terms of reduced valuations).

The low importance given to skill and independence of the investor is somewhat surprising, as these behaviours on the part of VC investors has earlier been suggested as potential signals of VC investor quality, which should attract high-quality entrepreneurs and repel low-quality entrepreneurs. Venture capital investors displaying these attributes are better able to make accurate valuations of entrepreneurial businesses and therefore offer higher valuations for the best entrepreneurs. Yet the present results suggest that entrepreneurs in general place little importance on these signals. This may be due to a presumption on the part of high-quality entrepreneurs that such skills have already been factored into the initially offered valuations. Or, for a more typical entrepreneur, this may reflect their expectation that such skills will not translate into better valuations for their firms.

The Anova comparisons of population subgroups suggest that capital-sourcing decision processes are not uniform for all entrepreneurs. Significant differences appear for subgroups. The espoused importance of valuation was found to be uniformly lower than conjoint importance, and appears particularly for companies with small growth rates. For these firms with low growth rates, this lower importance may simply be reflecting more modest expectations of valuation by the entrepreneurs.

The espoused importance of the VC's reputation was found to be particularly higher for the information technology and telecommunication industry and for entrepreneurs with self-assessed "above average" levels of VC financing expertise. This marked difference in the importance of reputation to entrepreneurs in the information technology industry may be a lingering effect of the dot-com boom and bust of 1999-2001, during which inexperienced or opportunistic VC investors preyed on firms in this industry to exploit unsustainable market conditions (Valliere and Peterson 2004).

The espoused importance of personal compatibility was found to be lower for entrepreneurs with self-assessed “average” levels of VC financing expertise, suggesting a *U*-shaped relationship. Novice entrepreneurs with little or no VC financing experience may rate personal compatibility more highly because they believe it may influence their chance of obtaining financing. On the other hand, entrepreneurs with greater than average VC financing experience may also rate personal compatibility more highly, but for different reasons. In their case, it is possible that prior experience with VC investors has taught them the practical importance of having and maintaining strong personal relationships with their investors. Given the herd behaviour espoused by the VC investors in chapter 6, this is may be a productive strategy for entrepreneurs. These combined influences may result in the appearance of entrepreneurs with moderate levels of VC financing experience placing relatively less importance upon personal compatibility.

The espoused importance of deal-making ease and speed was found to be higher for entrepreneurs with self-assessed “above average” levels of VC financing expertise. These entrepreneurs may also have learned from prior experience that the VC financing process can be long and arduous.

Limitations

This study is subject to some limitations to overall validity. With respect to the sample of entrepreneurs, and despite efforts to enrol entrepreneurs from a wide range of businesses and with a wide range of experience, the sample is ultimately self-selected from the population that fell within the sample frame. As a result, extreme views may be overrepresented. The emulation of the “take it or leave it” decision process, as implemented in the conjoint survey instrument, may serve to reduce this bias somewhat. However, to the extent that the self-selection of respondents may have yielded a bi-modal “interest” bias, this can be desirable for research of an exploratory nature such as this.

The sample frame also excluded entrepreneurs (both successful and not) who have deliberately avoided venture capital financial sources as part of their financing

strategies. And the study design did not assess the desirability of the respondent entrepreneurs, from the perspective of potential VC investors. As such, it did not investigate whether the obtained results are specifically applicable to the most desirable entrepreneurs.

The responses for espoused and conjoint criteria may also be vulnerable to some degree of self-report bias. Although attempts have been made to minimise this threat to validity, the obtained data have not been triangulated through multi-trait, multi-method approaches. Moreover, the conjoint research technique, while providing much improved insight into actual capital buying decisions of entrepreneurs compared to previous research methodologies, is still limited as a measure of *intent* rather than actual *behaviour*. In particular, it is likely that entrepreneurs completing the conjoint survey spent less time evaluating the cards than they would a real financing offer, and therefore may have employed a different simplification rule that they would in practice. The conjoint results should therefore be corroborated against measures of real financing deals completed by entrepreneurs.

Overall, the statistical power of this dataset appears good, as illustrated by the β values reported in table 7-6. Power exceeds 0.99 for all of the multi-method differences among the examined criteria. This provides substantial assurance that the conjoint methodology has identified all material differences in importance that exist in this dataset. The high power of the dataset may also help to mitigate any concerns about potential non-response bias in the self-selected set of participants.

This study was an extension to Smith's work (1999) and not a replication, and as such did not attempt to investigate and confirm certain of his previous findings, such as the breadth of information sources that entrepreneurs draw on in making financial sourcing decisions, and the possible effects of entrepreneurial experience and learning on the relative importance of espoused decision criteria.

Conclusions

This study has found that entrepreneurs are poor in their understanding of their own capital-sourcing decision processes; the criteria they actually use to make capital-source decisions are not what they espouse to use. An observed lack of discrimination among the espoused importance results, along with the breadth of suggested additional criteria, suggests that the capital-sourcing decision is a complex one in which entrepreneurs believe that they assess and integrate information about many criteria. And they believe it is important to consider a wide range of information and devote significant time and energy to obtaining and processing this information.

But the results of the conjoint simulation research tell a different story. When faced with hypothetical financing choices of only seven criteria, and at only two or three levels for each criterion, entrepreneurs appear to already be making substantial simplifications in order to reduce the decision complexity. In practice, they simplify the decision to be substantively driven by valuation, with an additional consideration of personal compatibility. Other criteria that were of high espoused importance, such as ease of deal-making or VC skill level, became only minor considerations in practice. And, in particular, the signalling efforts of some VC investors, identified in chapters 4 and 5, do not seem to be resonating with entrepreneurs when they make their capital sourcing decisions.


Furthermore, differences among the reported espoused importances were also observed among various entrepreneurial subgroups. These subgroup differences stand in contrast to those found in Smith's initial study of entrepreneurial finance criteria (Smith 1999). That earlier study found that the industry affected the importance of some criteria. Biotech, information technology, and retail all rated value-added services higher. Biotech also rated reputation higher. But these results were not confirmed here. In the present study industry effects for the importance of value-added services were seen only for the services industry. And industry effects for reputation were observed for information technology and other high-tech industries, but not for biotech. Smith's earlier study also found that the entrepreneur's degree of business

experience affected the importance of some criteria. More-experienced entrepreneurs rated value-added services and reputation much lower than they were rated by other less-experienced entrepreneurs. These results were also not confirmed in the present study; no significant differences in importance were observed for experience-based subgroups. Finally, this study did not find support for Smith's conclusion that age matters but sex does not. Smith found no difference between male and female entrepreneurs, but did find that younger entrepreneurs place more importance on value-added services, while older entrepreneurs place more importance on reputation. The present study had opposite results, finding significant differences between male and female entrepreneurs regarding terms and conditions, but finding no significant differences due to age of the entrepreneur.

Overall, the results suggest that attempts to understand how entrepreneurs make their capital sourcing decisions must be wary of the potential biases inherent in espoused approaches. Entrepreneurs do not choose according to how they say they choose. This study has found marked differences that are consistent with social desirability bias – entrepreneurs claim to choose based on a wide range of equally important criteria. But in practice, they decide based primarily on valuation and personal compatibility with the VC. Whether their espousals represent an attempt to look good to others, or a genuine lack of accurate introspection, remains a question for subsequent research.

These results may have practical value for VC investors trying to more successfully attract desirable entrepreneurs and improve their dealflow. The espoused importance results may give some perspective on factors to be considered in the initial stages of evaluation – investor attributes that can initially interest and attract an entrepreneur. But the conjoint importance results give the insight on what really matters as negotiations progress – the entrepreneur's decision to accept or reject a term sheet will depend mostly on valuation and the quality of the personal relationship between the entrepreneur and the VC. Other factors will likely pale in importance.

These results may also have practical value for entrepreneurs seeking financing. The discrepancies identified in this multi-method study should alert entrepreneurs to the potential for inaccurate introspection, and enable them to make explicit adjustments in their decision processes so as to achieve the criteria weightings they consciously desire.



8. Discussion and Synthesis

Each of the individual research studies reported in the earlier chapters has found results germane to the scope of research questions underlying this thesis. However, synthesis of the collective findings may help to shed additional light and provide a more comprehensive perspective.

Discussion of Chapter 4 Results

The research reported in chapter 4 aimed to examine heterogeneity of VC investors with respect to their beliefs and responses to high information asymmetries. In particular it examined the role that differential screening abilities might play in any observed differences in early-stage investing. Most important of the findings from this research, therefore, is that there is a positive correlation between the screening abilities of VC investors and their willingness to invest in markets with high information asymmetries. Venture capital investors do differ in their screening abilities, and these differences are important determinants of their behaviour in markets characterized by high information asymmetries. For example, some VC investors exploit their high screening abilities by operating in markets where the information asymmetries are so high that other, less-skilled investors cannot operate. This creates a competitive advantage for the good screeners. These good screeners are also more likely than other investors to operate independently; they participate in syndicates less often, and they are more willing to invest in companies that had been rejected by other investors. Although these investors with high screening abilities might also be better able to therefore invest in foreign markets, it appears they do not do so. They, like other VC investors, prefer to invest close to home.

An exploratory principal components analysis of the data revealed the existence of five factors that together explain almost 77% of the variance in the data. These factors comprise the general level of experience for the investor, the willingness to invest in asymmetric markets, the effort to broaden the investor's relevant knowledge base, the

level of VC-specific experience of the investor, and the propensity to lead syndicates. These factors form an initial basis for an emergent typology of VC investors.

Discussion of Chapter 5 and 6 Results

VC investors are not homogenous in their beliefs about how to demonstrate screening skill and about the potential reasons for investing in early-stage markets. The research of chapters 5 and 6 aimed to explore these differences and the potential signalling value of early-stage investment behaviour. Results of this research indicate that VC investors differ in their beliefs whether screening skill can be demonstrated by investing in early-stage markets, investing in companies overlooked or rejected by other VC investors, or leading syndicates. Some VC investors clearly believe such independent investing behaviours are valuable signals of screening skill, which can communicate information to their stakeholders. But this is not a universal belief among VC investors. Similarly, VC investors differ in their belief that screening skill can be demonstrated by earning high returns on their investment portfolio. These beliefs are highly correlated with the belief that early-stage investing is about building and maintaining key relationships. Among VC investors who actually invest in early-stage markets, there is greater belief in the importance of doing so to build relationships with stakeholders, and less in doing so to avoid competition or to earn high returns. This result further supports the suggestion that good screeners are investing in early-stage markets as a signal of their skill, to attract good entrepreneurs, professional peers, and principal investors.

VC investors also differ in their belief that screening skill is closely associated with the ability to pick winners, and thereby to exhibit a greater proportion of successful companies in the portfolio. Venture capital investors who believe this may choose to signal their screening quality through the proportion of successful investments in their portfolios, rather than the overall portfolio return on investment.

An exploratory principal components analysis of the data revealed the existence of three factors that together explain over 63% of the variance in the data. These factors comprise the belief that early-stage investing demonstrates skill to stakeholders and

thereby influences dealflow quality, the degree of independence of investor actions (including investing in deals with high information asymmetries), and the belief that skill can be demonstrated by picking winners in these asymmetric markets.

These observed differences reflect the potential formation of multiple market equilibria, one of which incorporates the cost of signalling – the cost of generating, transmitting, recognizing, receiving, and interpreting the information content of the signals. In this equilibrium, prices have incorporated these costs to the participants and the respective benefits of the information transfer.

The potential for multiple equilibria and the related potential for polychotomous or multidimensional measures of participant quality further complicate the available signalling regime. In the simplest case, it creates the potential for countersignalling by participants of the highest quality. In the case of VC investors, this may confound the signalling value of participation (or not) in early-stage investment markets. Non-participation in this market can have several interpretations: the non-participating VC investor may simply be too unskilled in screening (they would lose money in early-stage markets), or the investor may be sufficiently skilled but pursuing later-stage investments at higher expected profits (they could operate in early-stage markets, but choose not to), or the investor may be very highly skilled but keeping their participation private to countersignal and differentiate themselves from more moderately skilled investors (they are very confident in their abilities to operate in any market, and see no need to specifically demonstrate their early-stage abilities).

The qualitative extension of chapter 6 confirmed many of the findings of the quantitative study in chapter 5. The interview respondents supported the fundamental hypothesis that good screeners would be more willing and able to participate in early-stage markets. They agreed that demonstrating skill in early-stage markets should have the effect of improving dealflow, by signalling to good entrepreneurs that they are desirable investors and signalling to bad entrepreneurs that this fact will be uncovered by them. They further supported the importance of broad business experience, and of

using success in early-stage markets to build and maintain relationships with stakeholders.

The qualitative research also suggested that the belief in the importance of signalling skill (by investing in early-stage markets) is strongest among newcomer VC investors. This raises a question regarding the direction of any potential causality, which has not been addressed by the present studies: do skilled screeners remain in early-stage markets where they have a competitive advantage, or do they stay there only long enough to create a signal of their skill and then move to later-stage markets to exploit the value of the skill in a less asymmetric market?

Finally, the qualitative study highlighted the potential importance of a number of non-rational, non-economic, or emotional factors in the decision of whether a VC investor will operate in early-stage markets.

Synthesis of VC Results

An integrated view of the heterogeneity of VC investors and their resulting range of approaches to managing the information asymmetries in early-stage markets can be obtained by synthesizing the perspectives of chapters 4 and 5. A first stage of this integration can be achieved by examining the combined set of descriptive factors that have been determined. The trimmed set of five factors obtained in chapter 4 reflects a range of behaviours and attributes that characterize different types of VC investors. And the trimmed set of three factors obtained in chapter 5 reflects a corresponding range of beliefs and strategies they adopt with respect to early-stage investing. The correlations among these factors, shown in table 8-1, provide an initial integrated view of these investors.

Table 8-1: Correlation of VC factors

		relation	Indep	pickwin	genexp	asym	broad	vcexp	lead
relation	Pearson	1							
	Correlation								
Indep	Pearson	.602**	1						
	Correlation								
pickwin	Pearson	.014	-.059	1					
	Correlation								
genexp	Pearson	.080	-.054	.072	1				
	Correlation								
asym	Pearson	-.200	-.109	.118	-.147	1			
	Correlation								
broad	Pearson	.027	.050	-.299	-.103	-.526**	1		
	Correlation								
vcexp	Pearson	.100	-.045	-.082	.369*	.318	-.249	1	
	Correlation								
lead	Pearson	-.226	-.179	.009	-.114	.246	-.432*	.273	1
	Correlation								
	Sig. (2-tailed)	.238	.354	.965	.555	.198	.019	.152	.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

For ease of reference, variable names and descriptions are summarized in appendix 1.

Bringing together the results of these three research efforts leads to a number of general findings about VC investors:

- 1) There is a high positive correlation between the belief that early-stage investing is a good way of building and maintaining the key stakeholder relationships that provide high-quality dealflow, and the belief that this early-stage investing is an effective way of demonstrating skill, particularly when leading the investments or when investing in companies that have been overlooked by other investors. Investors who curry dealflow from stakeholders do so by demonstrating that they achieve results with the deals they receive, and may conversely believe that if they do not demonstrate such results then their sources of dealflow might dry up.
- 2) There is a high negative correlation between the willingness to invest in markets of high information asymmetries (such as startups and firms with novel business models), and the efforts taken to broaden knowledge by involving others into a syndicate of investors. This supports the interpretation that the early-stage

markets are especially suited for VC investors with deep industry knowledge, who can invest without relying on the knowledge and expertise of others.

- 3) There is an additional negative correlation between these efforts to broaden knowledge, and the willingness of the investor to lead the syndicates that result. This suggests that investors form syndicates partly to access and benefit from necessary expertise of others. Investors who feel sufficiently confident to lead the syndicate are less likely to see this as a benefit, and therefore less likely to seek out a syndicate (although there are other reasons for forming syndicates, as discussed earlier).
- 4) There is a moderate positive correlation between general business experience and the specific VC investor experience level, which suggests that this broad business experience benefits their ability to perform as VC investors. Specifically, it makes them better able to assess the management capabilities of prospective entrepreneurs.

Of interest to note is the lack of significant correlations between the behavioural factors of chapter 4 and the belief factors of chapter 5. This suggests that the behavioural and experiential attributes alone will have little power in predicting the beliefs that a particular VC investor will hold regarding rationales for early-stage investing. Therefore a broader typology is required.

Proposed VC typology

The synthesis of results from the two quantitative studies of chapters 4 and 5, and the qualitative insights of chapter 6 support a typology of VC investors, based on their beliefs and behaviours regarding investing in early-stage markets. This typology reveals four categories of VC investors, characterized by heterogeneous beliefs and actions.

Confident Leaders are those VC investors who are highly skilled and experienced, and use this background to act with great independence and confidence in markets with high information asymmetries. They are characterized by:

- Higher tolerance for investing asymmetric markets, higher propensity to lead whatever syndicates they belong to, greater VC investment experience, stronger belief that early investing provides a means of avoiding competition.
- Making fewer efforts to broaden their knowledge base by involving others (e.g., less likely to form syndicates).
- Able to invest in early-stage markets, since they are recognized as good screeners.
- If they exploit this ability to invest in early-stage markets, they are likely doing so to exploit their screening skill and thereby avoid competition, or to secure rights to follow-on investments, or to signal their quality to various stakeholders (and thereby to get funding or improve the quality of their dealflow).

Cautious but Experienced are those VC investors who are skilled and experienced, but do not use this background to operate in markets with high information asymmetries, preferring instead to operate in less risky markets. They are characterized by:

- Greater industry experience and more post-secondary education.
- Lower tolerance for investing in asymmetric markets.
- More likely to invest in overlooked companies (i.e., companies that were previously rejected by other VC investors), a form of information asymmetry that their greater industry experience may mitigate.
- Less likely to participate in syndicates.
- Able to invest in early-stage markets, since they are good screeners (due to their greater industry experience), yet they are unlikely to do so.

Cautious Novices are those VC investors who have little experience or proven skills, and therefore act cautiously and avoid markets with high information asymmetries where possible. They are characterized by:

- Making greater efforts to broaden their narrow knowledge base by involving others (e.g., participating in syndicates).
- Less VC investment experience, less industry experience and post-secondary education, lower tolerance for investing in asymmetric markets, weaker beliefs that early investing is a means of avoiding competition.
- If they invest in early-stage markets, then they are there only as a signal (e.g., trying to prove themselves to their various stakeholders). They will likely move upmarket as soon as they gain more experience and reputation.

Followers are those VC investors who do not exhibit high screening skills, and therefore rely extensively on other VC investors to manage the risks of information asymmetries. They are characterized by:

- Lower propensity for syndicate leadership.
- Unlikely to invest in early-stage markets, since they are not particularly good screeners.

Discussion of Chapter 7 Results

It appears that entrepreneurs may not be fully aware of how they select their VC investors, and therefore what role may be played by the various signalling mechanisms that VC investors may choose to adopt. The difference in results reported for espoused importance and conjoint importance mirrors the findings of earlier research on VC investors. First, espoused criteria do not match actual in-use criteria, suggesting that entrepreneurs are equally poor at introspecting into their own decision processes as are their VC investor counterparts. Secondly, the promising line

of attribute-based decision research developed for the VC investor side of the market might be similarly developed for the entrepreneur side of the market.

The capital-sourcing decision is a complex one in which entrepreneurs desire to assess and integrate information about many criteria. As with many compensatory consumer decisions, entrepreneurs like to believe that they consider many criteria of relatively equal weight. Based on the espoused importance reported by entrepreneurs, it appears that they attempt to utilize a form of compensatory decision rule in which criteria are weighted equally (AVG_e), although espoused importance of valuation was particularly lower for entrepreneurs with self-assessed "expert" level of knowledge about VC financing. For these "expert" entrepreneurs, this lower importance may indicate recognition of the relatively increased importance of the other criteria, gained through practical experience with previous VC investment deals.

But in practice, a few criteria tend to dominate their decision making, and in ways that are not readily apparent to the entrepreneur decision-makers themselves. Espoused views notwithstanding, it appears that entrepreneurs seeking financing are primarily price-shoppers. Secondly they seek VC investors with whom they have good personal compatibility. It is likely that they view this relationship quality as a moderator of all other benefits that flow from the VC, such as value-added services for the present and follow-on investment for the future.

The conjoint analysis also reveals that entrepreneurs place low importance upon value-added services, and upon the skill and independence of prospective VC investors. This suggests that, in addition to being price shoppers, entrepreneurs are not much looking for "smart money", despite apparent efforts by VC investors to market themselves this way, and despite efforts by professionals who advise entrepreneurs to seek funding that is augmented extensively with value-added services. Instead, entrepreneurs are simply seeking money at a good price, from someone they can work with effectively.

These results may have practical value for VC investors trying to more successfully attract desirable entrepreneurs and improve their dealflow. The espoused importance results may give some perspective on factors to be considered in the initial stages of evaluation – investor attributes that can initially interest and attract an entrepreneur. But the conjoint importance results give the insight on what really matters as negotiations progress – the entrepreneur’s decision to accept or reject a term sheet will depend mostly on valuation and the quality of the personal relationship between the entrepreneur and the VC. Other factors will likely pale in importance.

These results may also have practical value for entrepreneurs seeking financing, and for VC investors seeking to provide finance. The discrepancies identified in this multi-method study should alert entrepreneurs to the potential for inaccurate introspection, and enable them to make explicit adjustments in their decision processes so as to achieve the criteria weightings they consciously desire.

Synthesis of Perspectives

The use of conjoint methods to uncover in-use decision criteria by entrepreneurs provides a novel perspective on the potential risk of adverse selection due to VC investor screening behaviours. Since the speed and ease of deal-making have been found to be less important to entrepreneurs, they can be assumed to contribute little to adverse selection risk. Conversely, personal compatibility has been found to be very important to entrepreneurs, and can therefore be assumed to play a large role in the risk of adverse selection during the screening process.

The low importance given to skill and independence of the investor is somewhat surprising, as these behaviours, being potential signals of VC investor quality, should attract high-quality entrepreneurs and repel low-quality entrepreneurs. They should matter to entrepreneurs. Venture capital investors displaying these attributes are better able to make accurate valuations of entrepreneurial businesses and therefore offer higher valuations for the best entrepreneurs. Yet the present results suggest that entrepreneurs in general place little importance on these signals. There are many possible reasons for this. The signal may be unnoticed or unrecognized by

entrepreneurs. Or it may be considered to be too noisy to have much value. Or it may be due to a presumption on the part of high-quality entrepreneurs that such skills have already been factored into the initially offered valuations. Or, for a more typical entrepreneur, this may reflect their expectation that such skills will not translate into better valuations for their firms. Finally, it may be that entrepreneurs are overconfident in their ability to negotiate attractive terms with any VC investor, and so high-quality entrepreneurs believe that they can persuade all VC investors to offer high valuations, and low-quality entrepreneurs believe that they can convince investors that they are high-quality.

This view highlights an interesting difference in the ways that entrepreneurs and VC investors view signalling to the other. Entrepreneurs are confident in their own abilities and typically believe they need little help from anyone else. As a result, they are not continuously engaged in signalling to impress others. And when the need for investment capital arises, they are therefore interested more in obtaining the cash than in access to services that they do not think they need. So, at that time, they engage in an episodic “salesmanship”. They attempt to sell the VC investor on the future potential of the firm, representing it as an excellent investment opportunity regardless whether it is actually. They know that the VC investor will understand and value such messages.

In contrast, VC investors operate in the market in a more or less continuous process of attracting and managing dealflow, with an occasional stop to negotiate an individual financing contract. Their participation in the market is ongoing, not episodic. And VC investors cannot assume that entrepreneurs are continuously watching for, and correctly interpreting, their signals. VC investors frequently attempt to convince entrepreneurs to pay less attention to valuations offered, and more attention to value-added services that the VC investor can provide (so called “smart money”) – a strategy that allows the VC investors to compete on attributes where they can differentiate themselves.

So the approach of VC investors is one of continuous signalling of competence and skill, in a manner observable to all. And the approach of entrepreneurs is one of delivering a sales pitch to a specifically targeted audience, at only selected times.


A still deeper synthesis of the different market participant perspectives may be obtained by examining the situation of the VC investors who are most active in markets with high information asymmetries, the Confident Leaders. This perspective affords clearer views into the fundamental questions around these market behaviours:

Who invests in early-stage markets? Early-stage investing is a viable strategy for Confident Leaders who have a higher tolerance for information asymmetries of all types, lower likelihood of participating in syndicates but higher propensity to lead whatever syndicates they belong to, greater VC investment experience, and stronger belief that early-stage investing provides a means of avoiding competition. Only investors with these characteristics are able to operate sustainably in this market. Other investors can operate here for short periods, while losing money, if they perceive it to be a necessary precursor towards moving into a later-stage, lower-risk market.

Why do they do so? They are likely doing so to exploit their exceptional screening skill, to make profitable investments despite the information asymmetries. This activity allows them to signal their quality to various stakeholders and thereby to get funding from principal investors or improve the quality of their dealflow (by attracting desirable entrepreneurs directly, by encouraging intermediaries to refer attractive opportunities to them, or by attracting other desirable VC investors for syndicated deals). For some, it also allows them to secure rights to follow-on investments, and provides them a means to avoid competition from more established, later-stage VC firms. But the significant benefit is the information it conveys to their stakeholders.

What do they do to achieve these objectives? In addition to actively operating in early-stage markets, these investors signal their skill in a variety of other ways. They behave in ways that communicate their confidence in their own abilities, such as

funding firms with particularly high information asymmetries (startups, novel business models, unproven entrepreneurs, and firms that have been rejected by other VC investors), and investing without the support of syndicate partners. They also act to communicate the confidence that others place in their abilities, such as being asked to lead those (few) syndicates in which they participate.



9. Conclusions

Having summarized and synthesized the findings of the individual research studies in the preceding chapters, an attempt can finally now be made to address the research questions posed in chapter 2 towards the overall thesis of this research.

Research questions

- 1) What role does screening play in mitigating information asymmetry in early-stage markets?

Screening helps VC investors mitigate their information asymmetries by forcing an exchange of private information. It allows them to avoid the costs of doing poor deals. But in so doing, it creates the potential for adverse selection to occur, since more thorough screening processes may negatively impact the entrepreneur's assessment of deal-making ease and speed, and personal compatibility. However, this risk could be itself mitigated by the signalling value of good screening, were entrepreneurs to recognize and correctly interpret these signals.

The present theoretical and empirical investigation suggests that VC investors are not homogeneous in their use of screening. They are heterogeneous with respect to eight newly identified factors: level of general business experience, tolerance of information asymmetries, desire to broaden their knowledge base, level of VC investment experience, propensity to lead syndicates, willingness to act independently of other VC investors, belief that skill demonstration acts to build/maintain stakeholder relationships, and belief that skill is demonstrated by the fraction of portfolio investments that are successful.

Asymmetry-mitigation strategies are dependent on the screening skill of the individual VC investor. Poor screeners tend to avoid operating in asymmetric markets, as do some good screeners. But many good screeners exploit their skill to mitigate the information asymmetries of these markets, and thereby operate successfully in them.

Generally, screening skill correlates with willingness to accept asymmetries and operate in markets characterized by high information asymmetries. But this correlation does not apply uniformly for all of the hypothesized measures of market information asymmetry, nor for all types of VC investors. Empirical support was found in the case of information asymmetries due to unknown and unrefereed entrepreneurs, startup firms, firms with novel or unproven business models, and firms that have been overlooked or rejected by other VC investors. But no empirical support was found for information asymmetries due to business expansions, investments in foreign jurisdictions, and unsyndicated investments.

2) Do VC investors use screening ability as a signal of quality for their various stakeholders? Does differential screening skill meet the requirements of an effective signal? What information value would such a signal convey?

Some VC investors with high screening ability use early-stage investing as a signal of their quality. This is an appropriate choice, as it meets the requirements of a potentially effective signal: it is easily observable, it conveys information about screening skill, the benefits of signalling exceed the costs for high-quality investors, and it is hard for low-quality investors to sustainably mimic.

Some VC investors do use their superior screening as a signal to stakeholders, with the objective to improve dealflow quality. In the case of entrepreneur stakeholders, investors expect it will attract high-quality entrepreneurs and repel poorer quality ones. In the case of professional advisors, they expect it will influence them to refer only high-quality entrepreneurs.

For high-quality VC investors (where "quality" assessment is in the eye of the market counterpart), the value of generating and transmitting this signal has been calculated from theory to lie in the replacement of bad projects with good, and thereby to depend on the expected future value of the good projects. For high-quality entrepreneurs, the value of receiving and interpreting this signal lies in the increased valuation they receive through an accurate screening evaluation by a high-quality VC investor. This

depends on the range of project values available from all entrepreneurs in the market (i.e., how much better the good entrepreneurs are), and on the differential screening accuracy of VC investors (i.e., how much more accurate the good VC investors are).

Empirical evidence suggests that some VC investors do attempt to signal by investing in early-stage markets. The ones who do so (the “Confident Leaders”) are characterized by a level of screening skill that allows them to operate without syndicate partners, but makes them desirable syndicate members and leaders in the eyes of other VC investors. Further, not all investors of this type choose to operate in early-stage markets; they enjoy a choice of viable strategies. On the other hand, the investors who do not share this skill level tend not attempt to convey these same signals – some choose not to (the cost of signalling may be prohibitive), and some simply are unable to manifest the signal.

Other signals of VC investor quality include obtaining high overall portfolio returns, acting independently (investing without syndication, and investing in firms overlooked or rejected by others), and having a great proportion of successful investments in their portfolios.

Other reasons for investing early include building and maintaining stakeholder relationships, avoiding competitors who are insufficiently skilled to operate sustainably in these markets, and securing a right of first refusal for later, more lucrative investment rounds for the successful firms originating in these markets.

3) Do entrepreneurs pay attention to the signal value of differential screening skill when seeking and evaluating potential VC investors? How important is this potential signal, relative to other selection criteria used by entrepreneurs?

Entrepreneurs apparently do not value this signal much, and do not use it to mitigate their own information asymmetries when choosing a VC investor. The demonstration of high screening skill on the part of prospective VC investors is one of the least-valued criteria entrepreneurs assess in choosing their sources of financing.

The empirical results suggest that entrepreneurs believe that they use many selection criteria, and that these criteria are valued about equally. Signals of investor skill and independence are included among these many criteria. But conjoint analysis of empirical data indicates that, in practice, entrepreneurs primarily rely on just two criteria, the valuation placed on their firms and the degree of personal compatibility they feel with the VC investor (which itself may be proxy for trust). The other criteria figure much less prominently in their choices. In particular, they place very little importance on the value-added services that the VC investor offers and on the level of skill and independence the VC investor demonstrates. Entrepreneurs do not value these signals of screening skill. They apparently do not seek "smart money".

Since entrepreneurs give little weight to the signals that VC investors provide about screening skill, these signals have little influence on the quality of direct dealflow that VC investors see. This lack of influence must therefore be compensated by increased efforts in screening and due diligence by the VC investor, to ensure that low-quality entrepreneurs are not inadvertently funded. Paradoxically this increased screening effort might be seen to increase the risk adverse selection, by making the deal-making experience less attractive for entrepreneurs. Fortunately, this research has shown that entrepreneurs also place a reduced importance on deal-making attributes as a selection criterion, and therefore that this risk is attenuated.

In summary, screening can be used to mitigate information asymmetries that exist due to the failure of the signalling regime. And this screening carries only minimal risk of increased adverse selection. Screening therefore is important, necessary, and beneficial for market participants. It can be criticized only for being less efficient than would be a workable signalling regime. Screening is costly (financially and temporally) for both the VC investor and the entrepreneur. And it does lead to some elevated risk of adverse selection. If entrepreneurs paid greater attention to quality signals from VC investors, and if they used the information in these signals to select a VC investor that was an appropriate match (i.e., only high-quality entrepreneurs would seek financing from highly-skilled investors), then screening efforts could be significantly reduced.

High-quality investors would know their dealflow was of high quality, and could trust in reduced screening. And low-quality investors would know their dealflow was of lower quality, and could raise their prices (offer reduced valuations) to compensate for the increased level of due diligence efforts these poorer deals would require.

Market model propositions

At the end of chapter 3, six moderation effects were proposed to occur as a result of a VC issuing a signal of “High” quality. These proposed effects are repeated here:

- 1)** Professionals will increase their referrals to the signalling investor.
- 2)** Professionals will decrease their referrals to the non-signalling investors.
- 3)** Institutional investors will increase their capital supply to the signalling investor.
- 4)** Institutional investors will decrease their capital supply to the non-signalling investors.
- 5)** High-quality entrepreneurs will increase their attempts to obtain capital from the signalling investor.
- 6)** Low-quality entrepreneurs will decrease their attempts to obtain capital from the signalling investor.

Of these proposed effects, only numbers 5 and 6 have been explored in the present research on entrepreneurs and VC investors. With respect to the VC investors, empirical evidence from the above studies suggests that many VC investors believe these moderation effects to be operational. These investors attempt to generate signals of high quality in order to benefit from these expected moderations – bringing more dealflow from professionals, easier access to capital from institutional investors, and better quality of entrepreneurs in their dealflow.

In contrast, the empirical evidence from entrepreneurs, which was expected to support effects 5 and 6, did not provide support. Entrepreneurs generally do not adapt their

capital sourcing behaviours in response to quality information signalled by VC investors. As a result, the quality of dealflow experienced by a VC investor is likely to be little affected by any attempts to signal their screening abilities.

Research Contributions

This research contributes to the extension of previous theoretical models of VC investor operations and screening by incorporating heterogeneity in screening skill and by concluding a range of strategic alternatives that skilled investors can pursue, which are not evident in previous models. In this area, specific novel contributions include:

1. Development of a theoretical model of screening in early-stage capital markets, which incorporates information asymmetries and signalling behaviours.
2. Confirmation that VC investors are not homogeneous with respect to screening skill, contrary to the assumptions of previous research.
3. Discovery of a range of investor rationales for participation in early-stage markets, including temporary strategies designed to afford subsequent migration to later-stage markets.
4. Determination of a range of strategic options that good screeners can adopt to exploit their skill.
5. Development of a typology of VC investors that reflects differential abilities and individual beliefs.
6. Expansion of the previous expectation-value model of VC investments to incorporate differential screening skills.
7. Suggestion that the previous expectation-value model of VC investments requires further expansion to account for investor costs and detection functions that vary with the quality of the entrepreneurial firm.

8. Support for the hypotheses that VC investors with high screening abilities are more likely than other VC investors to make investment deals with unknown or unREFERRED entrepreneurs, and in start-up companies, companies having unproven business models, or companies of other VC investors to have many prior rejections by other investors.
9. Evidence that superior screening skill is insufficient to overcome home bias and thereby encourage VC investors to invest in foreign jurisdictions.
10. Evidence that agency risk between principal investors and VC agents is manifest as non-economic objectives for the VC investors.

This research also contributes to an enhanced understanding of the role of signalling in financial markets with high information asymmetries, by developing a theoretical justification for the emergence of such signals, and by demonstrating their formation in early-stage capital markets. In this area, specific novel contributions include:

1. Discovery that investing in early-stage markets can function as a signal of investor screening skill, and that this signal is intentionally manifested by some VC investors.
2. Determination of an upper bound on the value of the signal, both to the VC investors and to entrepreneurs.
3. Identification of other potential signals of investor screening skill.
4. Evidence that the intention to demonstrate skill on the part of VC investors is unidimensional with respect to different stakeholders. VC investors do not decide to demonstrate skill to their institutional investors separately from their decision to demonstrate skill to their peers and to their other stakeholders. They intend to demonstrate to all or to none.

Finally, this research contributes to a novel perspective on how early-stage entrepreneurs, when viewed as consumers of financing, evaluate potential suppliers of

VC investment, and insight into the degree to which their own understanding of this is marred by poor introspection. In this area, specific novel contributions include:

1. Discovery that entrepreneurs are poor at introspecting into their investor choice decisions.
2. Determination of specific in-use criteria importance, and the relative weighting of the different criteria used by entrepreneurs when faced with VC financing choices.
3. Discovery that entrepreneurs are generally unaware of the information signalled by successful early-stage investing by VC investors.
4. Suggestion that, while many of the entrepreneurs who avoid VC financing may do so due to lack of need for large amounts of growth capital, some entrepreneurs with a need for capital might avoid VC financing due to inadvertent negative signals sent by VC investors.

Implications for future research

This research has resulted in a number of observations, the consequences of which produce inefficiencies in the early-stage capital markets:

- Entrepreneurs waste time and effort seeking capital from inappropriate sources.
- The clutter in the market due to poorly targeted entrepreneurs further wastes time and effort of investors seeking appropriate entrepreneurs.
- These inefficiencies exacerbate type II errors, in which bad projects are funded. This causes resources to be directed to low-value or unprofitable uses. This misallocation of resources represents a loss to society.
- These inefficiencies also exacerbate type I errors, in which good projects are not funded or are under funded. This causes opportunities for growth and value-creation to be missed – an additional social loss.

These problems suggest the need for better education of entrepreneurs and VC investors regarding the efficient allocation of capital to deserving projects. Establishing links from these observations to specific educational goals and strategies will require further research efforts.

The quantitative results presented in chapter 4 and supported by interpretation of the qualitative results of chapter 6, while together supportive of the theorized relationships regarding early-stage investing, can be improved and extended in several directions. First, a more extensive empirical study of more VC investors would provide a firmer basis for confirming the practice of the identified strategies, for testing the related hypotheses at higher significance levels, and for achieving redundancy in the qualitative interpretations and the exploration of meaning among VC investors. Next, the self-report challenges can be addressed through deeper analysis of individual VC portfolios using tighter definitions and more objective characterization of deal parameters. Also, the operationalization of screening ability may be further improved by including a rating of screening ability by peers within a local community of VC investors. This would provide an external assessment of the beliefs these other investors hold regarding the screening abilities of each respondent. Additionally, a replicative study with more data would facilitate the use of structural modeling to confirm the implied latent constructs for screening ability and asymmetry tolerance. Such an approach could also validate a measurement model that is based on the operational indicators used here. And the interpretative elements of this could be usefully supplemented by research more directed at the social constructionist dimensions: how VC investors conceptualize themselves, how they enact differentiated role identities, and whether/how these constructed identities correspond to the differences identified through the positivist perspective. Such a constructionist approach may also serve to provide a better understanding of the range of opinions these respondents exhibited with regard to competition among VC investors. Clearly, important social norms govern the compete/collaborate dynamic among VC investors and the mechanisms by which inexperienced VC investors enter the market, prove themselves, and become part of the “club” of collaborating/syndicating VC investors.

Further research on the emergence and structuration of these social dynamics could shed important new light on these questions.

In addition to these general validity improvements, the finding that VC investors move up-market and away from early-stage investing as they gain more experience raises several interesting follow-up questions about the value of such investing early in their careers. One such question worthy of investigation is whether this behaviour has some additional signalling value in the VC market, particularly among competitive peers and later-stage VC firms. Another, supported particularly from the qualitative interview data, is the extent to which career concerns and other forms of agency risk are present in the behaviour of individual VC investors and in the decision-making of VC firms.

Given the demonstrated importance of investor screening skill in supporting differential strategies and in communicating information that can resolve market asymmetries, a more substantive explication of the screening skill construct is perhaps warranted. And with this explication, an examination of the antecedents of screening skill could support the development of theory to explain why are some VC investors are such better screeners than are others. This research could provide a theoretical explanation and basis for the findings of previous empirical research into screening criteria and the relative effectiveness of attribute-based and boot-strapped models of screening.

These specific proposals are suggested as potentially fruitful next steps in further exploring differential VC investor screening abilities and their impact on VC investor strategies. It is hoped that such a finer and more granular understanding of the abilities, motivations and resulting strategies of VC investors will lead to more robust and comprehensive theory of early-stage capital markets.

The research of chapter 7, as a follow up to Smith's initial foray into this area (Smith 1999), represents a modest start to improving our understanding of the entrepreneur's side of the venture capital market. The best entrepreneurs have choices from where they will source any capital they may require. Developing a rich understanding of how

these choices are made has valuable implications both for practitioners (VC investors, entrepreneurs and the like) and for market theorists. As a first step, the present research necessarily leaves many questions remaining. One important question is the degree to which these improved conjoint importance figures more accurately reflect real-world financing decisions. With real-world financing decisions, the stakes for the entrepreneur are high and the pressures to maximize deal utility while minimizing deal-making costs are felt more acutely. It is unknown the degree to which these competing pressures may differentiate actual in-use importance from conjoint importance.

Another question worthy of further exploration is the kind of decision rule used to process the diverse criteria data that entrepreneurs obtain. The present study has assumed a simple compensatory approach, but the reality may be considerably more complex or subtle, especially for cases where entrepreneurs require some minimum threshold value for certain criteria. Moreover, psychological and cognitive factors of individual entrepreneurs may take on increased importance in the decision process as the level of uncertainty or ambiguity in criterion values increases (Kahn and Sarin 1988). A robust and multi-level model of entrepreneurial capital sourcing should integrate these individual dimensions with overall market characteristics.

The observation that signalling by the early-stage operations of VC investors has little effect on choice behaviour of entrepreneurs prompts additional questions of other potential signals of VC investor skill, and other actions that entrepreneurs may take to mitigate the information asymmetries that they face.

The results have also suggested a possible role for personal compatibility as a potential moderator of the flow of benefits between VC investor and entrepreneur. From the perspective of the entrepreneur, the compatibility of the relationship may moderate the extent to which the discretionary services and skills of the VC investor are made available. And from the perspective of the VC investor, this same compatibility may moderate the flow of private information about the firm, and thereby mitigate moral hazard. This further suggests that personal compatibility may be a proxy for trust in the relationship, which would benefit from confirmatory research.

The joint results of chapters 5 and 7, suggesting that the potential signalling mechanism of skilful early-stage screening is not being exploited, indicate a further line of follow-up research directed at understanding the relative advantages and deficiencies of various signalling regimes in the market. If the examined signalling mechanism is not being used, it may be due to constraints with the sender (the VC investor), constraints with the receiver (the entrepreneur), or constraints with the channel (e.g., limited capacity or excess noise). Alternatively, the need for this signal may be simply obviated by the use of another more effective or less costly signalling regime that has not yet been identified.

These joint results also suggest a potential line of research examining how the presence of information asymmetries influences the negotiation and design of investment contracts. Knowing that entrepreneurs place most importance on valuation and personal compatibility, theorizing will be needed to identify the optimal strategy for an investor to adequately resolve information asymmetries and maximize expected returns, without materially increasing the risk of adverse selection within the target population of entrepreneurs. Similarly, optimal negotiation and contracting strategies for entrepreneurs could be developed.

Finally, this research has investigated only a small subset of the information exchanges within the full market model of figure 3-9. Expansion or continuation of this line of research may be warranted in three dimensions: an investigation of other possible VC quality signals designed to influence entrepreneurs and dealflow, an investigation of other proposed effects of VC quality signals on other (non-entrepreneur) market participants, and an investigation of signals provided by other (non-VC) market participants. As an example, relatively little is known about the relationships, signals, and information exchange mechanisms between early-stage VC investors and later-stage VC investors.

Implications for practitioners

In addition to addressing the basic research questions, and posing a number of implications for future research directions, this research has yielded some insights of

potential value to practitioners operating in early-stage markets. A number of these insights are directed to current or potential VC investors.

First is the observation that since the access to VC financing is a high-risk, low-frequency purchase decision for most entrepreneurs, and since entrepreneurs may exhibit a number of path-dependent cognitive biases, there are a number of advantages for first mover VC investors (whether they be first in a particular market niche or first to offer early-stage financing in a newly emergent industry). First-mover investors can act to establish the reference standard by which entrepreneurs evaluate competitive financing sources; these VC investors have the opportunity to influence the criteria by which entrepreneurs will choose their investors in such a way as to beneficially influence the quality of their dealflow and to gain competitive advantage over other investors.

Second is the strategic advantage that can be gained by knowledge of the actual in-use criteria of entrepreneurs, and how these differ from the perceptions that entrepreneurs hold of themselves. In highly practical terms, this knowledge might suggest that, in early interactions with entrepreneurs, VC investors should aim to score acceptably on all espoused criteria. But as negotiations with these entrepreneurs progress, VC investors should evolve their focus towards enhancing their attractiveness on the two key criteria (valuation and personal compatibility) at the expense of their score on the others. "Give a good price, and be nice" can be a useful heuristic in keeping a desired entrepreneur at the negotiating table. And while she is kept there, the VC investor can be quite aggressive in structuring other aspects of transaction in the most favourable way: exceedingly thorough due diligence investigations, highly advantageous term sheet clauses (e.g., anti-dilution ratchets, liquidation preferences, work fees, performance-based vesting, double dips), and the limited provision of costly services only towards maximizing firm value (i.e., not towards private benefits for the entrepreneur).

Third is the recommendation that highly-skilled screeners should demand compensation for their value-added ability. This compensation can take two forms. In

the simplest case, these VC investors should invest independently to not dilute their returns across a syndicate. Alternatively, they can form syndicates to reap certain benefits (e.g., to establish deep pockets to fund later investment rounds), but should always lead these syndicates and should demand adequate compensation from the other syndicate members for so doing. Moreover, this recommendation holds equally whether a highly-skilled screener elects to use their skill to invest in markets with high information asymmetries (such as early-stage markets) or to invest in later-stage markets (at lower costs relative to other, less-skilled investors).

Fourth is the observation that investors who are highly-skilled screeners, and who wish to signal this ability to their many stakeholders (e.g., principal investors, professional advisors, entrepreneurs, potential syndicate partners, later-stage investors, prospective commercial partners), have a variety of signalling regimes to consider. Superior screening skill can be indicated by independence of investment actions, by the “hit ratio” proportion of successful investments in a portfolio, or by the overall portfolio return.

There are also a number of insights of practical value that are directed to entrepreneurs seeking capital. Primary of these is the guidance to seek capital from investors of corresponding screening skill. Entrepreneurs with extraordinarily good projects should seek out VC investors with extraordinarily good screening skill, so that the true value of these projects can be recognized and reflected in the offered valuation. Entrepreneurs with more typical or even somewhat poorer projects should seek out more average VC investors, so that they maintain the potential to have their projects initially overvalued. This recommendation must, of course, be tempered with the requirement that entrepreneurs balance these benefits with the corresponding search costs.

Those entrepreneurs seeking VC investors with high screening skills should therefore look for signals of this ability. But this search should be tempered with the knowledge that such signals can be very noisy, and that triangulation with multiple indicators can therefore be important. With respect to an investor’s history, an entrepreneur should

look for a long and sustainable presence in markets with high information asymmetries, such as continuous investment in early-stage firms or firms with novel and unproven business models. With respect to an investor's past portfolio results, entrepreneurs should look for high overall returns and a high number of "home runs" (being more than the typical 1-in-10 proportion). With respect to an investor's current investments, entrepreneurs should look for independence and self confidence (e.g., investing without syndicate partners, and investing in companies that were rejected by other VC investors), and for the well-placed confidence of other VC investors (i.e., leading the syndicates they join).

Finally, entrepreneurs who have attractive projects but have been rejected by other investors should specifically seek out VC investors with substantial experience in a related industry. The challenge for these entrepreneurs is to find a VC investor with enough relevant experience to trust their own independent judgement, but still having enough distance to avoid group-think and to see the entrepreneur and her project through fresh eyes.

Limitations of the Research

This research has been subject to many limitations, both theoretical and in the practical design and implementation. Some of these limitations are common and apply to all of the individual studies reported in the previous chapters.

For example, many of the item variables used in these studies represent latent psychological states of respondents, such as beliefs and attitudes. As such, they are subject to the limitations of self-reports (Podsakoff and Organ 1986). In particular, this raises the risk of artifactual covariance that is not mitigated by the validity checks conducted. This risk arises from the various common method biases that are inherent in using the same respondents to report on several variables (Podsakoff, MacKenzie et al. 2003). Although attempts have been made to minimize this threat to validity, the resulting data have not been triangulated through multi-trait, multi-method approaches.

Chapter 3 model

Although the model developed in this chapter represents an improvement over previous highly stylized and simplified models of early-stage capital markets, it still suffers from many limitations, constraints and simplifying assumptions of its own. Some of the more significant limitations include:

- Assumption of an undefined yet unidimensional and binary “quality” of early-stage VC investors and entrepreneurs.
- Assumption that the choices among market participants, based on quality assessments, are simple conjunctive consumer choices – there are no threshold values, interaction effects or other nonlinearities among the criteria used to assess quality – and that the conjunctive process is rational (despite the findings of chapter 6).
- Omission of noise and other competing signals in the information exchanges among participants.
- Omission of substitute sources of capital (e.g., “love” money, angel investors, bank debt) and their interactions with various model participants.
- Lack of time dimension or the process by which the information exchanges unfold in sequence, and any interactions or dependencies between elements of these processes or sequences of actions within the model framework.

Chapter 4 study

The empirical findings of this study are clearly limited in statistical significance due to the small sample size. The sample size has severely constrained the range of statistical analyses that may be appropriately applied, and has particularly precluded any hypothesis testing based on regression models. However, within those constraints, the sample appears to have reasonably good external validity and generalizability to the larger VC investor population.

This study has relied upon VC investors to self-assess the nature of their investment portfolios, making judgements on the extent to which they are “early-stage”, with “novel, unproven” business models and with unproven entrepreneurs. The ability of VC investors to accurately make such assessments can be questioned. One study of the specific criteria VC investors use to screen investments found VC investors to be relatively poor at introspection; this deficiency may also cloud their judgement of the nature of the companies and entrepreneurs in their portfolios. Moreover, some VC investors may have incentive to mischaracterize the nature of the deals they do, either overstating the risks they manage in order to enhance a reputation for skilful monitoring of investments, or understating the risks in order to enhance a reputation for prudence; this incentive may also introduce social desirability bias into the self-assessed data these VC investors provide.

Even if VC investors in this sample were accurate in introspection and free of social desirability bias, the potential exists for common rater bias in these results. However, a Harman's test of the exploratory factor analysis did not yield a single dominating factor in the unrotated solution, which provides support for the conclusion that common-rater bias is not a significant threat here.

Although this study demonstrated a connection between VC screening ability and the willingness of VC investors to participate in early-stage markets, it may be that this relationship is significant only to some individual components of a generic screening ability; screening ability may be a composite, multivariate construct. These “components” might include the evaluation of new investment opportunities and the initial decision to offer a term sheet, the creation of a syndicate to form the required amount of investment capital, and the investigation of subsequent information and the decision to complete the investment deal. Success in early-stage markets, or in other markets with high information asymmetries, might therefore be specifically due to skill at only one or a small subset of these components. Further research in this area should adopt additional independent measures, such as peer ratings of screening skill.

Variables omitted from the model may also have significant predictive value. In particular, it may be suggested that regional differences among VC investment practices may influence willingness to invest in asymmetric markets. Similarly, cyclical effects on asymmetric investing may exist and might only be uncovered through a longitudinal empirical approach.

One possible alternative explanation for the observed relationships was that the apparently good screeners are simply more risk-averse than other VC investors, and that this aversion accounts for their successful avoidance of bad investments. However, this alternative explanation appears somewhat unconvincing. Risk aversion in investors would be characterized by a reduction in false positives (making fewer investments that *ex post* prove unprofitable), but at the expense of increasing false negatives (also making fewer investments that *ex post* prove highly profitable). Therefore risk-averse investors are likely to make fewer investments overall and particularly fewer where they believe the information asymmetries are unfavourable and large. This is not the case with good screeners, where in contrast, they have the ability to reduce both false positives and false negatives, and thereby make more investments under conditions of apparent information asymmetry.

Chapter 5 study

The empirical findings of this study are clearly limited in statistical significance due to the small sample size. The sample size has severely constrained the range of statistical analyses that may be appropriately applied, and has particularly precluded any hypothesis testing based on regression models. However, within those constraints, the sample appears to have reasonably good external validity and generalizability to the larger VC investor population.

This study relied upon VC investors to self-report their beliefs regarding demonstration of ability and rationales for early-stage investments. This represents a threat to internal validity as self-reported data can be subject to common rater effects of a consistency motif or social desirability bias. The anonymity of the survey and the general absence of widespread lay theories of VC signalling may have served to mitigate this risk of

bias. Also, the data were obtained from a single source for all variables, which raises the potential for common method bias. The data were therefore examined via Harmon single-factor test, which did not yield a factor indicative of common method bias.

Chapter 6 study

Despite the grounded purposive sampling strategy employed, the empirical findings of this study are clearly limited due to the very small sample size. There is little assurance with such a small sample that redundancy in the expression of themes was achieved; other VC investors may have additional or contradictory beliefs about investing in early-stage markets, beliefs that have not been discovered in this research. External generalizability of the results is therefore limited by the representativeness of the respondents.

The non-anonymous nature of the face-to-face data collection process further exacerbates the risk of social desirability bias. Venture capital investors asked to interpret market behaviours may also be more prone to consistency bias and application of lay theories to *ex post* rationalize the observed actions of themselves and their peers.

Chapter 7 study

The empirical findings of this study are clearly limited in statistical significance due to the sample size. The sample size has severely constrained the range of statistical analyses that may be appropriately applied, and has particularly precluded any hypothesis testing based on regression models. However, within those constraints, the sample appears to have reasonably good external validity and generalizability to the larger population of capital-seeking entrepreneurs.

With respect to the sample of entrepreneurs, and despite efforts to enrol entrepreneurs from a wide range of businesses and with a wide range of experience, the sample is ultimately self-selected from the population that fell within the sample frame. As a result, extreme views may be overrepresented. The sample frame also excluded entrepreneurs (both successful and not) who have deliberately avoided

venture capital financial sources as part of their financing strategies. And the study design did not assess the “desirability” of the respondent entrepreneurs, from the perspective of potential VC investors. As such, it did not investigate whether the obtained results are specifically applicable to the most desirable entrepreneurs or are indicative of average tendencies among entrepreneurs of all qualities. It may yet be that only certain types of entrepreneurs do notice and value signals of VC investor quality, and that other types of entrepreneurs do not.

Moreover, the conjoint research technique, while providing much improved insight into actual capital buying decisions of entrepreneurs compared to previous research, is still limited as a measure of *intent* rather than actual behaviour. The reported “in-use” results should be corroborated against measures of real financing deals completed by entrepreneurs.

Overall limitations

An objective of this thesis has been to examine the role of screening by VC investors and its effects on the exchange on information in early-stage investment markets. And while some contributions towards this goal may have been achieved, the overall design of this project has introduced some limitations that should be addressed in future attempts to extend knowledge in this area.

First, of the six effects arising from a signal of VC investor quality in this market, proposed in chapter 3, only two were examined in any depth with this research – those pertaining to the entrepreneurial choice of capital sources. The effects of the signal on other market participants (professionals and institutional investors) remain unexamined in this research. More broadly, this focus also suggests the need to conduct similar research into the effects of other signals in the VC investor and entrepreneur dyad, and indeed the effects of signals in other dyads within the overall market model.

Within this narrow focus on one signal in the VC investor and entrepreneur dyad, this research is also limited by its static perspective. Much of the information exchange

within this market may occur over a time duration and through a process of evolution and change. For example, VC screening and entrepreneurial choice criteria are likely not simple static constructs, but rather evolve and change in response to actions of various market participants, to the interpretation of signals and the discovery of new information, and to actions taken in other market dyads. One potential illustration of this limitation might be the effect of the “certification” role played by professionals acting as intermediaries between entrepreneurs and VC investors. The signal value of this referral comes into effect before the VC investor begins to screen the entrepreneur (the professional in effect “pre-screens” the entrepreneur), and before the entrepreneur begins to choose the VC investor (the professional is also “referring” the VC investor to the entrepreneur). Clearly, there is an important and little-understood sequential process with interaction effects occurring within this area of the market model, and within the initial introduction between the VC investor and the entrepreneur.

The overall research design for this investigation featured the development of a theoretical model, extensions to related theories in the literature, quantitative empirical investigation of a small set of implications of these theory extensions, and qualitative confirmation of the interpretation of some results of these investigations. This design has the benefit of triangulating the phenomena from the perspectives of different market participants, and using different analytic methodologies. But it is far from an exhaustive or definitive examination of the topic. The proposed factor structures underlying the information exchanges should be confirmed with larger and more powerful datasets. The implicit causality of observed associations should be examined through quasi-experimental designs that investigate causality. The information economics underlying the examined signalling regime should be quantitatively explored and linked to the theoretical upper limits established in chapter 5. And, most importantly, the reasons for the failure of the proposed signalling regime should be explored further – some VC investors are using the early-stage markets to signal their screening skill and thereby influence entrepreneurial dealflow quality, but

entrepreneurs are not being influenced by this information. This disconnect represents a market inefficiency that has not been adequately explored in the present research.

Closing Remarks

As argued earlier, the effective operation of early-stage venture capital markets is an essential precursor to the development of many successful new firms and the various social benefits associated with their launch and growth: economic growth, job creation, regional development, efficient deployment of resources, exploitation of technological innovation, provision of new products and services, and funding of future research. When early-stage markets operate effectively, capital is directed to firms with the greatest potential for growth and the creation of these benefits. No other facet of capital markets has the same potential to provide positive leverage for the development of firms that enable benefits for society. Consequently, it is important to understand the unique challenges in these markets, and to gain insight into how market effectiveness can be enhanced.

But research into the operation of early-stage markets continues to lag that of other financial markets. To a large extent, this may be due to the practical difficulties associated with obtaining reliable data about early-stage investors and early-stage entrepreneurs. Unlike the case with later, more mature markets, with early-stage markets few large datasets exist and relatively little archival data can be tapped. Moreover, the collection of new primary data is difficult because the market participants are often challenged by liabilities of newness and the lack of internal capabilities to collect, analyze and report data on their own operations. This typically leads to the kinds of low response rates seen in the present research. As a result of this data scarcity, findings from new research into this market take on an added importance.

Through the present research, some small but meaningful steps have been achieved towards a more complete and robust understanding of the operations of this market. Primary of these is the finding that the market participants are not homogeneous, and therefore theories that assume homogeneity are significantly limited in their

explanatory power and generalizability. For example, contrary to earlier theoretical assumptions, VC investors have a wide range of abilities and attitudes towards this market, and that these lead to a range of differing strategies. Some VC investors deliberately avoid early-stage markets, or operate there only long enough to establish the credibility and network relationships needed to move into later markets. But other VC investors deliberately seek early-stage markets as a competitive strategy. This range of beliefs, strategies, and behaviours with respect to addressing the problem of information asymmetry has not been adequately reflected into current market theories. Future research into this area must continue to bear these differences in mind.

And, if the development of knowledge about investors in early-stage markets has lagged that of other financial markets, the situation with respect to knowledge about entrepreneurs is even worse. Very little is known about how early-stage entrepreneurs engage capital markets. The present research indicates that the process by which entrepreneurs select VC investors is very important to any complete understanding of how early-stage capital markets operate, and how attractive projects can be effectively matched to available funding. This research has confirmed a number of criteria that these entrepreneurs use when selecting funding sources, and has demonstrated that one proposed signalling regime is not very effective in conveying information from VC investor to entrepreneur. As a result, the information transfer mechanisms by which entrepreneur access and process information about VC investors is still relatively unknown. Much more research in this area is needed, particularly with the motivation to ensure that entrepreneurs with high-growth projects that are economically attractive and socially beneficial are able to access capital in an effective and efficient manner.

Appendix 1: Description of Key Variables

Measures of screening skill:

- YPSE – Number of years of post-secondary education for the respondent.
- YIET – Number of years of Industry experience in total, in any role and any industry.
- YFPI – Number of years of experience in the current investment fund's primary target Industries.
- YEET – Number of years experience as an entrepreneur in total, in any industry.
- YEPI – Number of years of entrepreneurial experiences in the primary target Industries of the current investment fund.
- YVC – Number of years of experience as a venture capital investor.
- YOI – Number of years of experience as some other type of Investor (banker, angel investor, etc).
- PLEAD – Percentage of investments in the current portfolio, for which the respondent acted as the leader of a syndicate.
- NARSECT – Breadth or narrowness of sectoral focus for the current investment fund. Calculated as a percentage of the following sectors in which the respondent actively invests: IT software, IT hardware, Biotechnology, Nanotechnology, Advanced energy technology, Other advanced technology, and non advanced-technology based.
- NARSTAGE – Breadth or narrowness of company-stage focus for the current investment fund. Calculated as a percentage of the following growth stages in which the respondent actively invests: Seed, A-round (start-up), B-round (high-

growth), C-round (expansion, pre-IPO), Public companies, Management buy-outs, Acquisitions, Turnarounds.

Measures of tolerance of information asymmetry:

- **PUNK** – Percentage of investments in the current portfolio where the entrepreneur was completely **unknown** to the respondent before the investment.
- **PSTAR** – Percentage of investments in the current portfolio that were **start-up** companies.
- **PEXPD** – Percentage of investments in the current portfolio that were **expansion** financings.
- **PNOV** – Percentage of investments in the current portfolio that had **novel** and unproven business models.
- **PFOR** – Percentage of investments in the current portfolio that were companies in a **foreign** jurisdiction.
- **PSYN** – Percentage of investments in the current portfolio that were **syndicated** with other investors.
- **NREJ** – Average number of prior **rejections** (by other investors) received by successful companies in the respondent's current portfolio.

Potential signals of VC screening skill:

- **ROI** – Overall portfolio return on investment.
- **OVER** – Investing in companies that have been **overlooked** by other VC investors.
- **EARLY** – Investing successfully in **early-stage** companies.
- **LEAD** – Acting as the **leader** of syndicates with other VC investors.
- **HITS** – Percentage of firms in the portfolio that were successful **"hits"** or "homeruns"

Potential reasons for investing in early-stage markets:

- **HIRET** – Expectation of earning high returns on these investments.
- **COMP** – Less competition from other VC investors.
- **SCRN** – Having a unique ability to screen/assess early-stage companies.
- **ROFR** – Securing a right of first refusal for subsequent investment rounds.
- **ABENT** – Demonstrating VC investor abilities to other entrepreneurs.
- **ABINV** – Demonstrating VC investor abilities to current/future investors in the fund(s).
- **ABPRO** – Demonstrating VC investor abilities to others (professionals, other VC investors, etc).
- **FLOW** – Maintaining relationships with sources of dealflow.

Selection criteria used by entrepreneurs in choosing VC investors:

- **VALN** – Valuation: what value the VC is placing on a company, to determine what portion of equity shares they would want in exchange for their money
- **T&C** – Restrictiveness of terms and conditions: how many other restrictions or limitations the VC would place on the company and its future financing rounds
- **SVCS** – Value-added services: advice, management services, network contacts and other helpful services the VC can provide
- **REP** – Reputation: how respected the VC fund is by outsiders
- **SKILL** – Skill and independence: demonstrated by sometimes investing in firms that are early-stage, or that have been rejected by other VCs
- **PERS** – Overall personal compatibility: whether the individual VC is compatible with you in a productive working relationship
- **DEAL** – Ease of deal-making: how quickly the VC makes decisions, and the effort that would be required to complete the deal

Factors identified through principal components analysis:

- **GENEXP** – general experience measurements of the screening variables
- **ASYM** – willingness of the investor to participate in markets characterized by high information asymmetries
- **BROAD** – effort by the investor to broaden their knowledge base by involving others in the evaluation
- **VCEXP** – specific VC investment experience level, including dealing with new entrepreneurs

- LEAD – syndicate leadership propensity, and the resulting unwillingness to invest in distant companies in foreign jurisdictions
- OTHEXP – experience as some other type of investor
- RELATION – belief that building and maintaining relationships and their associated future business opportunities is a good reason for early-stage investing
- INDEP – belief that skill can be demonstrated by the degree of independent action the VC investor displays, by investing early in companies overlooked by others, and by leading when involved in syndicated deals
- PICKWIN – belief that having high screening ability is a good reason for early-stage investing, and that such VC investors demonstrate this skill by having a high proportion of “hits” in their portfolio
- AVOID – belief that early investing is a means of avoiding competition, rather than a means of earning high returns
- RETURN – belief that skill can be demonstrated by portfolio return on investment

Appendix 2: Survey Instrument for Chapters 4 and 5

Primary Industry Sector(s) – check all that apply

- IT software
- IT hardware
- Biotechnology
- Nanotechnology
- Advanced energy technology
- Other advanced technology
- Not advanced technology based

Primary Investment Stage(s) – check all that apply

- Seed
- A-round (start-up)
- B-rounds (high-growth)
- C-rounds (expansion, pre-IPO)
- Public companies
- Management buy-outs
- Acquisitions

- Turnarounds

ABOUT YOU

The following questions are intended to quantify some of the background experience you bring to your current role as a VC. Please respond with information about yourself.

1. Years of post-secondary education ____

2. Years of industry experience (in any role):

- Total ____
- In your fund's primary industry sector(s) ____

3. Years of experience as an entrepreneur:

- Total ____
- In your fund's primary industry sector(s) ____

4. Years of experience as an investor:

- As a VC ____
- As another form of investor (e.g., banker) ____

5. Do you participate in syndicated deals? YES / NO

- If yes, what % of these deals did you lead? ____%

6. Of the following factors, please indicate (on a 1 to 5 scale) how effective you think each is in demonstrating/proving the skill a VC has in screening opportunities/deals.

(1 = not at all effective, 5 = very effective)

- Overall portfolio ROI: ____
- Investing in companies that other VCs overlook: ____
- Investing successfully in early-stage companies: ____

- Acting as lead in syndicates with other VCs: ____
- Hit ratio (% firms in portfolio that are very successful): ____

7. Of the following factors, please indicate (on a 1 to 5 scale) how important you think each is as a reason for a VC to make investments in early-stage companies.

(1 = not at all important, 5 = very important)

- High expected returns from the investments: ____
- Less competition from other VCs: ____
- VC has unique ability to screen/assess in the sector: ____
- Securing rights to future financing rounds: ____
- Demonstrates VC abilities to other entrepreneurs: ____
- Demonstrates VC abilities to current/future investors in the fund(s): ____
- Demonstrates VC abilities to others (professionals, other VCs, etc.): ____
- Maintaining relationships with sources of dealflow: ____

ABOUT YOUR PORTFOLIO / INVESTEES

The following questions are intended to characterize the extent to which you invest in early-stage deals (with very high initial uncertainties or unknowns). Please limit your response to those firms in which you had personal involvement in screening the firm, structuring the deal, or managing and monitoring the investment performance. Please respond with your estimates for the all the portfolio of firms you have been involved with (e.g., include the firms in multiple funds if you are involved with multiple funds).

8. Regarding the entrepreneurs/founders of your investee companies, please provide the following % breakdown (should sum to 100% total):

- % previously known to you (prior to making the current deal) ____%
- % unknown to you, but were referred by trusted advisors ____%
- % unknown to you and not referred by a trusted advisor ____%

9. Regarding your investee companies:

- % that were startup investments (seed or A-round funding) ____%
- Do you expect this % to rise, fall or remain constant over the next 5 yrs? ____
- % that were expansion investments ____%
- Do you expect this % to rise, fall or remain constant over the next 5 yrs? ____
- % that had novel or unproven business models (at time of funding) ____%
- Do you expect this % to rise, fall or remain constant over the next 5 yrs? ____
- % that are based in a foreign country ____%
- Do you expect this % to rise, fall or remain constant over the next 5 yrs? ____
- % that were syndicated with other investors ____%
- Do you expect this % to rise, fall or remain constant over the next 5 yrs? ____

10. Regarding your most successful investees (proven "home-runs" or having very high prospects for the future):

- Average number of prior rejections these firms received from other VCs, before successfully concluding a deal with you ____

Appendix 3: Survey Instrument for Chapter 7

Who should complete this survey?

You should be a senior finance executive (CEO, President, CFO, VP Finance) of a privately held company. You should have experience obtaining financing from venture capitalists.

For this survey, "venture capital" includes seed/angel equity investment, private equity (common or preferred shares), and debt that is convertible into equity at the option of the investor. It does not include financing obtained through a public stock market, nor non-convertible debt (such as bank credit).

If you do not fit the requirements of this survey, please feel free to pass it along to anyone else you may know (in your company, or in another company) who would fit these requirements. Thank you!

CONTEST: At the end of this survey you will have the opportunity to provide your email address and be entered into a draw for a Sierra Wireless Voq phone with professional accessories kit! Entering is optional and up to you. The prize will be awarded by random draw from the email addresses provided by survey participants.

VC FINANCING

First, we'd like to get your opinions about obtaining venture capital financing.

When making a choice among Venture Capital suppliers, how important are the following criteria in deciding which VC to get financing from?

Please rate each of these VC criteria:

The valuation they place on your firm.

Not at all important 1 2 3 4 5 6 7 Very important

The restrictiveness of terms and conditions they require.

Not at all important 1 2 3 4 5 6 7 Very important

The value-added services they provide, such as sitting on the Board, giving advice, management assistance, access to networks and contacts.

Not at all important 1 2 3 4 5 6 7 Very important

The reputation the VC firm has for knowledge and successful investing.

Not at all important 1 2 3 4 5 6 7 Very important

Their skill and independence in assessing the future potential of firms. For example, sometimes they invest in firms that are very early-stage, or that have been rejected by other VCs.

Not at all important 1 2 3 4 5 6 7 Very important

The overall personal compatibility between you and the individual VC investor. This includes whether you could have a productive working relationship.

Not at all important 1 2 3 4 5 6 7 Very important

The ease of deal-making with them. This includes the speed with which they make decisions, and the effort required by you to reach a deal.

Not at all important 1 2 3 4 5 6 7 Very important

Please describe any other criteria that are important to you when you choose among VCs. ____

How many venture capital firms do you think are currently active in your country?

- Less than 100
- 100 - 499
- 500 - 1000
- More than 1000

What do you think VCs look for most when deciding whether to invest? ____

VC SCENARIOS

Now we'd like to show you some VC financing scenarios to get your opinions about them. Imagine you are currently seeking VC financing for your firm. For each scenario that we show you, please tell us how likely you would be to accept the deal being offered.

Each scenario will be described with seven characteristics:

- Valuation - what value the VC is placing on your company, to determine what portion of equity shares they would want in exchange for their money.

- Restrictiveness of terms and conditions - how many other restrictions or limitations the VC would place on the company and its future financing rounds.
- Value-added services - the advice, management services, network contacts and other helpful services the VC can provide to you.
- Reputation - how respected the VC fund is by outsiders.
- Skill and independence - as demonstrated by sometimes investing in firms that are early-stage, or that have been rejected by other VCs.
- Overall personal compatibility - whether the individual VC is compatible with you in a productive working relationship.
- Ease of deal-making - how quickly the VC makes decisions, and the effort that would be required from you to complete the deal.

For these scenarios imagine that you have had a series of detailed discussions with a specific VC, they have completed their relatively extensive preliminary due diligence and you have negotiated back and forth over several weeks to finalize a term sheet that you must now either sign or not. Your company can certainly use the cash, but it is not desperate and you think there is a reasonable chance that you may be able to get an alternative VC to the table, although you have no idea if their terms will be any better than the one you currently have on the table. You've also had a chance to do some of your own due diligence on this VC to learn more about their reputation, and whether you think the valuation they have offered is above or below what you might expect from others.

VC Scenarios

Below are some scenarios describing potential VC financing offers. Please tell us how likely you would be to accept these offers. There are 12 scenarios to consider.

How likely would you be to accept this offer:

- Valuation: 33% lower than other VCs
- Terms and conditions: Very restrictive
- Value-added services: Many
- Reputation: Poor
- Skill and independence: Very low
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% lower than other VCs
- Terms and conditions: Very open
- Value-added services: Few
- Reputation: Excellent
- Skill and independence: Very high
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% lower than other VCs
- Terms and conditions: Very open
- Value-added services: Many
- Reputation: Excellent
- Skill and independence: Very low
- Overall personal compatibility: Poor compatibility
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% lower than other VCs
- Terms and conditions: Very restrictive
- Value-added services: Few
- Reputation: Poor
- Skill and independence: Very high
- Overall personal compatibility: Poor compatibility
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: Same as other VCs
- Terms and conditions: Very open
- Value-added services: Few
- Reputation: Poor
- Skill and independence: Very low
- Overall personal compatibility: Poor compatibility
- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: Same as other VCs
- Terms and conditions: Very restrictive
- Value-added services: Many
- Reputation: Excellent
- Skill and independence: Very high
- Overall personal compatibility: Poor compatibility

- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: Same as other VCs
- Terms and conditions: Very restrictive
- Value-added services: Few
- Reputation: Excellent
- Skill and independence: Very low
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: Same as other VCs
- Terms and conditions: Very open
- Value-added services: Many
- Reputation: Poor
- Skill and independence: Very high
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% higher than other VCs
- Terms and conditions: Very open
- Value-added services: Many
- Reputation: Excellent

- Skill and independence: Very high
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% higher than other VCs
- Terms and conditions: Very restrictive
- Value-added services: Few
- Reputation: Poor
- Skill and independence: Very high
- Overall personal compatibility: Poor compatibility
- Ease of deal-making: Easy

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% higher than other VCs
- Terms and conditions: Very restrictive
- Value-added services: Few
- Reputation: Excellent
- Skill and independence: Very high
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

How likely would you be to accept this offer:

- Valuation: 33% higher than other VCs
- Terms and conditions: Very open

- Value-added services: Few
- Reputation: Excellent
- Skill and independence: Very high
- Overall personal compatibility: Highly compatible
- Ease of deal-making: Very difficult

Not at all likely 1 2 3 4 5 6 7 Very likely

ABOUT YOU

We would like to get some information about your background and experience.

How many rounds of venture capital financing have you completed overall (for any company)?

- 0
- 1
- 2 or 3
- More than 3

Have you completed a venture capital financing round within the past 12 months?

- Yes
- No

What was the \$ amount of the most recent venture capital financing you obtained?

- Less than \$1 million
- \$1 million to \$10 million
- More than \$10 million

What is the total amount of venture capital you have obtained so far?

- Less than \$1 million
- \$1 million to \$10 million

- More than \$10 million

Have you ever tried to obtain venture capital financing but been unsuccessful?

- Yes
- No

In which country do you have the most experience obtaining venture capital financing?

- Canada
- USA
- UK
- Other

For which industry do you have the most experience in obtaining venture capital financing? (Please choose the closest match)

- Life sciences/biotechnology
- Information technology/telecom
- Other high-technology
- Manufacturing
- Distribution/wholesale
- Retail
- Services
- Other

The next 3 questions refer to the company at which you most recently attempted to obtain venture capital.

What lifecycle stage is the company in?

- Seed - developing initial concept and product
- Launch - seeking initial revenues
- Rapid growth - increasing capacity and revenues

- Expansion - increasing scale and breadth
- Maturity - optimizing profits despite slow growth

What are the approximate annual sales revenues of the company?

- Less than \$1 million
- \$1 million to \$10 million
- More than \$10 million

How fast are company sales growing, per year?

- Less than 20% per year
- 20% to 100% per year
- More than 100% per year

Finally, a few questions about yourself.

How many years of business experience do you have?

- Less than 5 years
- 5 to 10 years
- More than 10 years

How knowledgeable do you think you are about obtaining venture capital?

- Novice
- Average
- More than average
- Expert

Your gender

- Male
- Female

Your age

- younger than 20
- between 20 and 29
- between 30 and 39
- between 40 and 49
- 50 or older

Appendix 4: Detailed Statistical Analyses

Table A4-1: Normality tests, Chpt 4

	Kolmogorov-Smirnov(*)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ypse	.119	28	.200(**)	.963	28	.404
Yiet	.158	29	.061	.931	29	.059
Yfpi	.141	29	.147	.935	29	.073
Yeet	.251	29	.000	.786	29	.000
Yepi	.290	27	.000	.761	27	.000
Yvc	.157	29	.067	.829	29	.000
Yoi	.317	29	.000	.721	29	.000
Plead	.144	29	.126	.929	29	.052
Narsect	.173	29	.026	.928	29	.049
Narstage	.198	28	.006	.912	28	.022
Punk	.240	29	.000	.846	29	.001
Pstar	.150	29	.093	.885	29	.004
Pexpd	.147	29	.108	.883	29	.004
Pnov	.237	29	.000	.826	29	.000
Pfor	.308	29	.000	.614	29	.000
Psyn	.217	27	.002	.804	27	.000
Nrej	.204	21	.022	.809	21	.001

* Lilliefors Significance Correction

** This is a lower bound of the true significance.

Outliers removed

Table A4-2: Normality tests, Chpt 5

	Kolmogorov-Smirnov(*)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
roi	.426	29	.000	.601	29	.000
over	.193	29	.007	.876	29	.003
early	.287	29	.000	.820	29	.000
lead	.172	29	.027	.911	29	.018
hits	.420	29	.000	.625	29	.000
hiret	.490	29	.000	.475	29	.000
comp	.219	29	.001	.868	29	.002
scrn	.216	29	.001	.873	29	.002
rofr	.268	29	.000	.860	29	.001
abent	.185	29	.012	.889	29	.005
abinv	.176	29	.022	.893	29	.007
abpro	.223	29	.001	.851	29	.001
flow	.214	29	.002	.897	29	.008

* Lilliefors Significance Correction

Table A4-3: Anova of cluster #1

		Sum of Squares	df	Mean Square	F	Sig
relation	Between Groups	.674	1	.674	.071	.792
	Within Groups	257.420	27	9.534		
	Total	258.094	28			
indep	Between Groups	8.630	1	8.630	1.087	.306
	Within Groups	214.306	27	7.937		
	Total	222.936	28			
pickwin	Between Groups	.278	1	.278	.104	.750
	Within Groups	72.456	27	2.684		
	Total	72.734	28			
avoid	Between Groups	5.314	1	5.314	6.626	.016
	Within Groups	21.655	27	.802		
	Total	26.969	28			
return	Between Groups	5.388	1	5.388	2.512	.125
	Within Groups	57.912	27	2.145		
	Total	63.300	28			
genexp	Between Groups	2345.829	1	2345.829	4.196	.050
	Within Groups	15094.885	27	559.070		
	Total	17440.713	28			
asym	Between Groups	20672.274	1	20672.274	13.917	.001
	Within Groups	40105.346	27	1485.383		
	Total	60777.620	28			
broad	Between Groups	5847.047	1	5847.047	4.519	.043
	Within Groups	34931.897	27	1293.774		
	Total	40778.944	28			
vcexp	Between Groups	5409.348	1	5409.348	15.120	.001
	Within Groups	9659.791	27	357.770		
	Total	15069.138	28			
lead	Between Groups	136.308	1	136.308	.076	.785
	Within Groups	48706.725	27	1803.953		
	Total	48843.033	28			
othexp	Between Groups	53.809	1	53.809	.259	.615
	Within Groups	5607.390	27	207.681		
	Total	5661.199	28			

Table A4-4: Anova of cluster #2

		Sum of Squares	df	Mean Square	F	Sig.
Relation	Between Groups	7.734	1	7.734	.834	.369
	Within Groups	250.360	27	9.273		
	Total	258.094	28			
Indep	Between Groups	2.842	1	2.842	.349	.560
	Within Groups	220.094	27	8.152		
	Total	222.936	28			
Pickwin	Between Groups	1.436	1	1.436	.544	.467
	Within Groups	71.298	27	2.641		
	Total	72.734	28			
Avoid	Between Groups	1.223	1	1.223	1.282	.267
	Within Groups	25.746	27	.954		
	Total	26.969	28			
Return	Between Groups	.936	1	.936	.405	.530
	Within Groups	62.364	27	2.310		
	Total	63.300	28			
Genexp	Between Groups	2766.989	1	2766.989	5.091	.032
	Within Groups	14673.725	27	543.471		
	Total	17440.713	28			
Asym	Between Groups	17790.945	1	17790.945	11.175	.002
	Within Groups	42986.675	27	1592.099		
	Total	60777.620	28			
Broad	Between Groups	2798.803	1	2798.803	1.990	.170
	Within Groups	37980.141	27	1406.672		
	Total	40778.944	28			
Vcexp	Between Groups	317.049	1	317.049	.580	.453
	Within Groups	14752.089	27	546.374		
	Total	15069.138	28			
Lead	Between Groups	1370.791	1	1370.791	.780	.385
	Within Groups	47472.242	27	1758.231		
	Total	48843.033	28			
Othexp	Between Groups	1427.101	1	1427.101	9.100	.006
	Within Groups	4234.099	27	156.818		
	Total	5661.199	28			

Table A4-5: Anova of cluster #3

		Sum of Squares	df	Mean Square	F	Sig
Relation	Between Groups	.453	1	.453	.048	.829
	Within Groups	257.641	27	9.542		
	Total	258.094	28			
Indep	Between Groups	8.900	1	8.900	1.123	.299
	Within Groups	214.035	27	7.927		
	Total	222.936	28			
Pickwin	Between Groups	.445	1	.445	.166	.687
	Within Groups	72.290	27	2.677		
	Total	72.734	28			
Avoid	Between Groups	5.358	1	5.358	6.695	.015
	Within Groups	21.611	27	.800		
	Total	26.969	28			
Return	Between Groups	4.136	1	4.136	1.888	.181
	Within Groups	59.163	27	2.191		
	Total	63.300	28			
Genexp	Between Groups	1454.968	1	1454.968	2.457	.129
	Within Groups	15985.745	27	592.065		
	Total	17440.713	28			
Asym	Between Groups	23572.165	1	23572.165	17.106	.000
	Within Groups	37205.455	27	1377.980		
	Total	60777.620	28			
Broad	Between Groups	21134.151	1	21134.151	29.047	.000
	Within Groups	19644.793	27	727.585		
	Total	40778.944	28			
Vcexp	Between Groups	5312.265	1	5312.265	14.701	.001
	Within Groups	9756.873	27	361.366		
	Total	15069.138	28			
Lead	Between Groups	7667.866	1	7667.866	5.028	.033
	Within Groups	41175.167	27	1525.006		
	Total	48843.033	28			
Othexp	Between Groups	292.659	1	292.659	1.472	.236
	Within Groups	5368.541	27	198.835		
	Total	5661.199	28			

Table A4-6: Anova of cluster #4

		Sum of Squares	df	Mean Square	F	Slg
Relation	Between Groups	4.432	1	4.432	.472	.498
	Within Groups	253.662	27	9.395		
	Total	258.094	28			
Indep	Between Groups	1.467	1	1.467	.179	.676
	Within Groups	221.468	27	8.203		
	Total	222.936	28			
Pickwin	Between Groups	.869	1	.869	.327	.572
	Within Groups	71.865	27	2.662		
	Total	72.734	28			
Avoid	Between Groups	.661	1	.661	.678	.417
	Within Groups	26.308	27	.974		
	Total	26.969	28			
Return	Between Groups	.183	1	.183	.078	.782
	Within Groups	63.117	27	2.338		
	Total	63.300	28			
Genexp	Between Groups	834.591	1	834.591	1.357	.254
	Within Groups	16606.122	27	615.042		
	Total	17440.713	28			
Asym	Between Groups	7981.607	1	7981.607	4.082	.053
	Within Groups	52796.013	27	1955.408		
	Total	60777.620	28			
Broad	Between Groups	5119.328	1	5119.328	3.876	.059
	Within Groups	35659.616	27	1320.727		
	Total	40778.944	28			
Vcexp	Between Groups	277.403	1	277.403	.506	.483
	Within Groups	14791.736	27	547.842		
	Total	15069.138	28			
Lead	Between Groups	24086.990	1	24086.990	26.270	.000
	Within Groups	24756.043	27	916.890		
	Total	48843.033	28			
Othexp	Between Groups	230.541	1	230.541	1.146	.294
	Within Groups	5430.658	27	201.135		
	Total	5661.199	28			

Appendix 5: Concordance of Interview Themes

This table summarizes themes that emerged from interviews of six VC investors, and provides a concordance between respondents for each theme that was mentioned.

Chapter 4 Themes

Screeners try to find diamonds
GENEXP
ASYM
BROAD
VCEXP
LEAD

	Confident Leaders (2)	Cautious Novices (2)	Followers	Cautious but Experienced
		1 Instance		
	3 Instances	5 Instances		1 Instance
	3 Instances	1 Instance	1 Instance	3 Instances
		1 Instance		1 Instance
	1 Instance			
			1 Instance	

Chapter 5 Themes

Early investors want to lead
Early investors want ROFR
Demonstrating to unified audience
Demonstrate to get dealflow
Demonstrate to get/give ROFR
Independents mtn relns by giving ROI
Independence is a signal of skill
Picking winner % may be another signal
Getting funded is a signal
RELATION
INDEP
PICKWIN
AVOID
ROI

	1 Instance	1 Instance	
2 Instances	1 Instance	1 Instance	2 Instances
	1 Instance	1 Instance	
1 Instance	4 Instances	1 Instance	1 Instance
		2 Instances	
1 Instance	1 Instance		1 Instance
	1 Instance		
1 Instance	1 Instance	2 Instances	
	1 Instance		
1 Instance	1 Instance	1 Instance	1 Instance
	1 Instance		
2 Instances	1 Instance		
	3 Instances	1 Instance	
2 Instances	4 Instances	2 Instances	

Additional Rational Reasons

Early as part of portf diversification
Demonstrate to get funding
Demonstrate to get comm partners
Demonstrate to get invited to syndicates
Early since underfunded
Early to exploit operational skill
Faster ind/region

3 Instances	1 Instance		
1 Instance	3 Instances		2 Instances
1 Instance			
2 Instances	1 Instance	1 Instance	1 Instance
			1 Instance
	3 Instances		1 Instance
	1 Instance		

Additional Emotional Reasons

Early is fun
Go early for political reasons
Accomplish things with your buddies
Wanting to make a splash
Prove yourself to oldtimers
Pave the way for next job
Grab control to serve to buddies
Returning favours to buddies
Personal validation

1 Instance		1 Instance	1 Instance
		1 Instance	
2 Instances	1 Instance		
	1 Instance		
	1 Instance		1 Instance
		1 Instance	
		1 Instance	
		1 Instance	
			1 Instance

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