Extending the Resource-Based View to Explain Venture Capital Firm Networks' Contributions to IPO Performance: A Study of Human-Based Factors

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(ABSTRACT)

This study has theoretical, substantive, and methodological objectives following Brinberg and McGrath (1985). First, the resource-based view of the firm provides a context to support relationships determined from theory in Sociology, Finance and Entrepreneurshp. Using these interdisciplinary theories, the expected contributions of National Venture Capital Association (NVCA) member venture capital firm networks' human-based factors to the performance of initial public offerings are examined. Second, the substantive domain—venture capital—lacks articulation and quantification regarding the impact of venture capital firms on the start-up firms they support, which in this study is identified as IPO performance. Third, methodologically, the operationalization of organizational-related capital is proposed.

The independent variables (human-based factors) include reputational capital, cumulative experience, social capital, and organizational-related capital. Organizational-related capital is a construct representing a firm's strategy that incorporates preferences specific to the venture capital industry, namely financing stage preference, industry relatedness, and geographic proximity. Venture capital firm networks are assessed at the syndicate and constellation levels (within and between industries) and bounded by membership in the National Venture Capital Association. Abnormal IPO stock price performance (the dependent variable) is assessed as the new issue's stock price benchmarked to the NASDAQ index and compounded over 21-day periods for up to 126 consecutive days after offering. Control variables were gleaned from economic-based theories found in the finance literature. Positive relationships were hypothesized between the independent variables and the dependent variable.

Data constraints limited the number of observations examined, and the selection of IPOs investigated displayed little variance. Thus, explaining additional abnormal performance variance in IPOs backed by NVCA-member venture capital firms above and beyond that controlled for by economic-based theory was not fruitful.

Although this study's findings were not statistically significant, many insights were generated that may positively influence future research in this area. The quest to better understand venture capital firms' contributions to entrepreneurial firms and the impact they have on publicly traded stocks remains meaningful.

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LIST OF ABBREVIATIONS

CISC:	Collective-interest Social Capital
CRSP:	Center for Reseach in Securities Prices
NVCA:	National Venture Capital Association
ORC:	Organizational-related Capital
RBV:	Resource-based View (of the Firm)
SISC:	Self-interest Social Capital
VCF:	Venture Capital Firm

CHAPTER ONE: OVERVIEW

Introduction

This study investigates and attempts to explain how networks of venture capital firms contribute to the abnormal stock market performance of an entrepreneurial firm's initial public offering (IPO). Hypothesized relationships to explain this phenomenon are explored with an emphasis on human-based factors and are informed by theories of sociology, finance and entrepreneurship. These relationships are integrated and justified by the logic of the resource-based view (RBV) of the firm. The RBV, a strategic management perspective, is explicitly compatible with theory from other domains and it supports an emphasis on human-based factors to create sustainable competitive advantages.

Background

The substantive domain of this study focuses on IPOs backed by venture capital firms. An IPO is a private firm's first sale of common stock through the public capital market (otherwise known as a new issue).[1] Venture capitalists, who are often ex-serial entrepreneurs (*Red Herring Magazine*, November 1999, p. 106), have business expertise and other intangible factors that influence their decisions as to how to support and influence the entrepreneurial firms in which they buy stock. As a result of such activity, Lam (1991) says, "A successful venture capitalist is himself an entrepreneur." (p. 139) The image is a cycle of innovation within a certain segment of society—from highly commercial, innovative start-ups seeking venture financing for further development to VCF start-ups seeking to find and create new investments, particularly those that have "home run" potential. This segment drives much of the economic success experienced in our present day society.

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[1] The IPOs in this study may be pure primary offerings—"where only the company offers shares to the public," or mixed offerings—"where both the company and some existing shareholders offer shares to the public in the same offering," as defined by Prasad (1994, p. 25). Pure secondary offerings—where new shares only come from existing shareholders (Prasad, 1994)—are by nature never new issues. Anderson, Beard and Born (1995) explain that an IPO is:

> ... a private firm's accessing the public capital market through the sale of securities, whereby, the firm can raise monies more readily than by the retention of profits. . . . motivations for an IPO include the prestige of ownership of a public company or the desire of major shareholders to exit the company. (p. 1)

In this study, use of the term—entrepreneurial firm—identifies the firm that is offering its first IPO.

Traditionally, economic theory has driven explanations of IPO stock price performance. This study uses many social-based theories to explain IPO stock price performance. Venture capital firms' human-based factors such as reputational capital, cumulative experience resulting from experience, social capital, and organizational-related capital (ORC) are hypothesized to explain IPO stock price performance. Under the traditional version of the RBV, these scarce, intangible, immobile, non-substitutable factors can provide firms directly with competitive advantages that result in high performance. This study explores the impact of a network of VCFs' human-based factors on the IPO stock price performance of the entrepreneurial firms they back. It is the potential impact of a network of firms having an indirect relationship, and thereby viewed as a resource of the entrepreneurial firm, that extends the way in which the RBV has been previously applied.

Two or more VCFs that own equity in an entrepreneurial firm at the time it first goes public comprise a venture capital firm syndicate (a network). Depending on the strategy pursued by the VCF—one of close-by nurturing working with IPOs of related backgrounds, or one of "hands-off" support whereby funding is the main contribution—the firm may be said to have a certain type of ORC. In addition to differing ORC, the VCFs also have different types and amounts of social capital resulting from their relationships with other VCFs and professional service providers, as well as reputational capital, and differing amounts of experience. Reputational capital, cumulative experience, social capital, and organizational-related capital are the human-based factors of interest in explaining VCF syndicates' impact on IPO stock price performance. In this study, each syndicate is unique, although VCFs frequently support more than one entrepreneurial firm simultaneously. Explanations of IPO performance founded in the resource-base view would emphasize the characteristics of the entrepreneurial firm—its culture, size, product diversity, top management team, and other unique resources of the entity. However, in this study, an indirect network level relationship is examined—the impact of the VCF syndicate's human-based factors on IPO stock price performance. Venture capital firms are presumed to influence the entrepreneurial firms they support.

Purpose of the Study

The purpose of this study is to articulate and quantify the impact VCFs have on the entrepreneurial firms they support. Prior studies have confirmed that venture capital-backed IPOS outperform non-venture-backed IPOs, but phenomena more specific to this explanation have yet to be examined. If VCFs better understand how they influence IPOs, enhancements can be made to strengthen the venture capital industry's efficiency. It is hoped that the results of this study will help venture capitalists to better understand how they can add value to the firms they support. To this end, the study will frame theory from sociology, finance, and entrepreneurship under the RBV's perspective to explain IPO stock price performance.

Application

The application of this study rests in its ability to provide the beginning of a heuristic that should enable venture capitalists to better understand the human-based factors needed to enhance IPO performance. Venture capitalists who can better structure their resources and capabilities for effectiveness will provide greater benefit to the entrepreneurial firms they support. The more entrepreneurial firms will be able to benefit from venture capital support, the higher the returns VCFs will reap, enabling more funds to be available for emerging companies.

Research Questions

To achieve the foregoing purposes, the following six research questions will be investigated:

1. **Does the reputational capital of the constellation associate with IPO stock price performance?**
2. **Does the cumulative experience of the syndicate associate with IPO stock price performance?**
3. **Does the social capital of the syndicate associate with IPO stock price performance?**
4. **How is a venture capital firm's organizational-related capital constructed?**
5. **Does the composition of venture capital firm's organizational-related capital associate with IPO stock price performance?**

6. **Which human-based factors are associated with higher IPO stock price performance?**

By addressing these six questions, this study may show how an extension of the resource-based view of the firm to include a network level of analysis enables assessment of the relative worth of human-based factors in determining the performance outcome of an IPO. Human-based factors are identified, and ORC in particular is explored rigorously. The syndicate (at the network level of analysis) exemplifies an indirect relationship to IPO stock price performance, which extends the robustness of the RBV as well. As a result of this study, managers may be able to advise venture capitalists as to how to structure their firm and its networks with other firms to increase the public market value of the entrepreneurial firms in which they invest.

The hypotheses proposed in support of these questions appear in Chapter Two.

Assumptions

The key assumptions made in this study are as follows.

1. Venture capital firms' social networks are strong within the National Venture Capital Association (NVCA), as they have national meetings and established communication vehicles. Thus, intra-industry networks constrained by NVCA boundaries should serve as a realistic definition of the entire population for use in performing network analyses.
2. Social networks at the firm level assume that key personnel who construct the linkages between firms remain with the firms. Thus, low turnover between venture capitalists (general managers) is presumed and appears evident by examining names of key managers over the years in two different Venture Capital Directories.
3. Venture capital firms that emphasize IPOs are more prone to learn about entrepreneurial firms with IPO potential from others experienced in working with and hence recognizing IPO-driven firms.
4. Syndicates are loosely coordinated and their member firms work together for the betterment of the entrepreneurial firm in which they invest.
5. Prior research has found that venture-backed IPOs outperform non-venture-backed IPOs. However, the variance among already high-performing IPOs is assumed to be

enough to warrant explanation by the independent variables and control variables employed in this study.

6. IPO performance can be explained by strategies and actions of the firms involved. Many studies simply attribute IPO performance to fads and market sentiments at the time. Hence the jargon: "It's Probably Overpriced," and "Immediate Profit Opportunities" (Chervitz, 2000).

Overarching Framework and Theory

The overarching framework for this study is the resource-based view of the firm. The RBV purports that those unique resources able to provide a sustainable competitive advantage to a firm are valuable because of their inability to be duplicated by other firms via imitation (make) or purchase (buy). Because of the ambiguity surrounding intangible resources such as human-based factors, these types of intangible resources are rare, immobile, and thus specifically valuable to the firm to which they belong. Human-based factors are, therefore, more likely to be strategically relevant resources than are physical- or financial-based resources. Combinations of human-based factors that are found in VCF syndicates are unique to each IPO. Examination of IPO performance in light of each VCF syndicate's human-based factors should determine which of these resources are most valuable.

Financial theory is consulted for economic explanations of IPO performance. Abnormal performance—a description of how the new issue has performed in the aftermarket as benchmarked to the NASDAQ composite index—is observed in this study. Although IPOs notoriously underperform the broader market, non-benchmarked performance is an inappropriate measure for this study because it does not attempt to equalize performance from many different industries at different times.

Human-based factors are composed of reputational capital, cumulative experience, social capital, and ORC. Organizational-related capital is comprised of a VCF's strategy as manifested in its choices of which industries it chooses to invest in, the location of its offices in relation to its investments, and the stage of financing it prefers to provide. The theory supporting creation of ORC is derived from the strategic management literature and venture capital literature found mostly in entrepreneurship

journals. Organizational-capital is expected to be positively associated with IPO performance.

Reputational capital is based on certification theory—a phenomenon appearing in works of finance scholars. Certification theory attempts to explain the rationale for underpricing (the difference in the offering price—the price that investors who are allocated shares in an IPO must pay—and the opening price or first aftermarket price—the price at which the new stock begins tradings on the public market; see Chervitz, 2000). Certification theorists maintain that the reason a new issue may be highly underpriced (i.e., the spread between the stock's first day market trading price and its offering price) is because the professional firms servicing the new issue lack reputational capital. When the opening price is close to the offering price, the IPO is not highly underpriced, leading certification theorists to attribute professional service providers' reputation and experience as the cause. Reputational capital is a strategically relevant resource that is hypothesized to be positively associated with IPO performance.

Sociology theory, namely structural hole theory (Burt, 1992) and other theories of network benefits, provides support for social capital as a valuable, intangible, immobile, inimitable resource. The intra-industry and inter-industry networks of VCFs are expected to influence the selection of available entrepreneurial firms in need of venture capital support, as well as to impact the value VCFs add to the entrepreneurial firms they service. Certain types of network structures should provide advantages to VCFs that result in higher performing IPOs.

The accumulation of experience working in network relationships is a phenomenon studied by scholars focusing on alliance theory. The theory suggests that the greater the experience firms have working in networks, the better the constellation can focus on the external task at hand—successfully marketing and bringing IPOs to fruition—instead of learning how to work internally among themselves, taking energy away from the IPO.

Outline of this Study

Subsequent chapters address this study's theoretical justifications and hypotheses (Chapter Two), data and variable operationalizations (Chapter Three), statistical tests and results (Chapter Four), and discussions and conclusions (Chapter Five). Chapter Two

begins with a description of the dependent variable—performance—followed by the independent variables—social capital, ORC and reputation—and control variables. The data used to test the hypotheses as well as the operationalizations of independent and control variables are presented in Chapter Three. Chapter Four describes the databases used and each statistical procedure employed, as well as test results. A discussion of these results appears in Chapter Five, along with recommendations for future research and a conclusion. Appendices are referenced throughout and are found at the end of this document.

CHAPTER TWO: LITERATURE REVIEW

Organization of this Chapter

This chapter is divided into two sections. The first section provides an overview and rationale for using the RBV to inform the analysis of intangible assets—human-based factors, a category of strategically relevant resources—on performance. The second section addresses each variable studied—the dependent variable, independent variables, and control variables. Hypotheses are introduced where appropriate in the second section.

An Overview and Rationale for the RBV Framework

Empirical examination of the resource-based view of the firm (RBV; Barney, 1991; Wernerfelt, 1984) is not fully advanced (Mowery, Oxley, & Silverman, 1998; Porter, 1991), even though it is a central perspective in the field of business policy and strategy (Conner, 1991; Peteraf, 1993). In spite of its increased popularity over the past decade (Grant, 1998), rather than testing the RBV empirically (Helfat, 1994; Henderson & Cockburn, 1994; Miller & Shamsie, 1996; and Robbins & Wiersema, 1995; being exceptions), most of the literature has been focused on expanding and/or criticizing its concepts (Barney & Zajac, 1994; Black & Boal, 1994; Chi, 1994; Coff, 1997; Conner, 1991; Das & Teng, 2000; Dyer & Singh, 1998; Grant, 1991; Godfrey & Hill, 1995; Mahoney & Pandian, 1992; Peteraf, 1993; Porter, 1991; Reed & DeFillippi, 1990).

One way to enhance empirical examination of the RBV is to extend its level of analysis (Dyer & Singh, 1998; Molina, 1999) from individual firms to groups of firms. Another way is to extend the scope of what are considered to be relevant strategic resources (Conner, 1991; Miller & Shamsie, 1996; Wernerfelt, 1984, 1995). Using the phenomenon of initial public offerings (IPOs) which are supported by venture capital firm (VCF) syndicates, this study examines performance by extending the RBV to include the leveragability of interorganizational, human-based resources and capabilities (i.e., human-based factors[2]). Dynamic relational resources are used to extend the RBV's

[2] The word "factors" is specifically used here for three reasons. First, it implies that a factors market exists albeit imperfectly at times (c.f., Barney, 1986a, 1989) for human-based resources and capabilities (e.g., employee turnover). Second, it is meant to incorporate human-based "resources" (such as knowledge and experience) as well as human-based "capabilities" (such as skills and talents), reducing resources and capabilities into one word—"factors"—and eliminating the need for distinctions (c.f., Amit & Schoemaker, 1993; Grant, 1991; Porter, 1991; Rao, 1994). Third, human-based factors are not subject to the

level of analysis from the firm level to the network level. Also, by categorizing and defining some of the strategically relevant resources and capabilities as human-based factors, new measures may be developed to aid in quantifying important variables. As a result, this study's attempt to explain IPO performance may (1) extend the RBV's level of analysis; and (2) address some of the perspective's criticisms such as: (a) problems in identifying resources; (b) difficulties in understanding and comparing firm's resources and capabilities relative to competitors while simultaneously accounting for industry and environmental constraints (Conner, 1991); and (c) a lack of practical applications (Grant, 1991).

The Resource Based View of the Firm

Birger Wernerfelt (1984) was the first to coin the term "resource-based view," even though fundamental concepts used to identify this perspective appeared decades ago in the writings of Barnard (1938), Selznick (1957), Penrose (1959), Chandler (1962), and Rumelt (1974, 1984). These scholars, building upon Andrews (1971) and Ansoff (1965), argue that the coordination of human effort and ability to obtain, effectively employ and efficiently maintain valuable tangible and intangible resources serves as the foundation of the company's strategy and hence, its basis for achieving a competitive advantage. Barney and Zajac (1994) concur that the RBV is a logical extension of traditional strategy implementation, and note that the value of resources and capabilities is unable to be independently understood from the specific strategy a firm is pursuing. In this light, it is clear that identifying how to sustain a competitive advantage is the objective of the RBV (Barney, 1989, 1991). The basic tenets of the RBV state that a firm can obtain a sustainable competitive advantage by having strategically relevant resources and capabilities—those that are specific (Helfat, 1994), durable (Mahoney & Pandian, 1992), intangible, valuable, rare, and unable to be either imitated or substituted (Barney, 1991), and/or are untradable and immobile (Dierickx & Cool, 1989). Reed and DeFillippi (1990) purport that causal ambiguity—required to obtain a sustainable competitive advantage—identifies strategically relevant resources and capabilities as those that

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"tradability/immobility" debate (c.f., Chi, 1994). Human-based factors fit Barney's (1986a, 1989) argument that strategically relevant resources have imperfect factor markets, yet does not contradict Dierickx and Cool's (1989) belief that these resources must be immobile. After all, each person is unique

display tacitness, complexity, and specificity. In essence, the greater the value of strategically relevant resources and capabilities (e.g., factors), the greater the firm's likelihood of generating above-normal rates of return (e.g., increased rents). Strategically relevant factors obtain value in many ways. Customer importance (Mahoney & Pandian, 1992), as well as the firm's culture (Barney, 1986b), institutional context (Oliver, 1997) the role certain resources play in the environment at a given time (Porter, 1991), the uniqueness of the resource in relation to those possessed by competitors (Conner, 1991; Godfrey & Hill, 1995; Grant, 1998), and the firm's combination of resources and capabilities with its strategic orientation (Black & Boal, 1994) determine the value of its strategically relevant factors. Thus, these meaningful idiosyncratic combinations of scarce firm level assets, processes, skills, information, knowledge, networks, and other tangible and intangible resources and capabilities that are controlled by a firm (Porter, 1991) and believed to contribute significantly to sustained profitability (Castanias & Helfat, 1991) are the essence of firm heterogeneity and hence rent differentiation between firms. Each firm is a unique combination of inputs under the RBV—which is a fundamental difference, claims Conner (1991), from say, transaction cost theory (Williamson, 1975) which assumes that "…the same inputs can be used equally productively in a firm or market context." (p. 142) So, when strategically relevant factors exist in such a way that they are imperfectly tradable and enable heterogeneity to exist across firms, and *ex post* limits to competition are present along with *ex ante* limits, the firm can enjoy sustained above-normal returns (Peteraf, 1993). The economic rents resulting from these socially complex and "costly-to-copy attributes of the firm" serve as fundamental drivers of performance (Conner, 1991, p. 121).

Applying the RBV to the Network Level of Analysis

The key to the RBV is its ability to explain sustainable competitive advantage at the firm level. A sustainable competitive advantage results from employing difficult to observe strategically relevant factors (all else held constant). By nature, these factors are idiosyncratic. The explanatory power of the RBV, however, is limited if it focuses singularly on one unit of analysis, and/or restricts its definition of resources to include

(some more so than others, such as highly visible and powerful CEOs) and unable to be at more than one place at any time: thus making certain people immobile per se, but not necessarily untradable.

only that which an individual firm can own as the source of its rents. Dyer and Singh (1998), Gulati (1999), Lorenzoni and Lipparini (1999), and Das and Teng (2000) have moved the RBV from the firm level of analysis to the alliance level. The alliance level of analysis, however, can be extended toward a new dimension—the network level of analysis. Whereas alliances are contractually based, networks acknowledge a variety of relationship linkages. After briefly reviewing the studies applying the RBV to an alliance level of analysis, an overview of alliances will be presented highlighting distinctions between alliances and networks. The network-level of analysis, as applied in this study, is then presented in depth by focusing on syndicates and constellations.

A Review of RBV Studies Applied to an Alliance Level of Analysis.

Dyer and Singh (1998) derived a relational perspective of the RBV by proposing that idiosyncratic resources unique to firms' dyadic relationships are strategically relevant. In Dyer and Singh's (1998) model, networks of firms' sources of rent are collectively generated based on relation-specific investments that include the creation of interfirm knowledge-sharing routines, complementary resource endowments, and network barriers to imitation such as partner scarcity and resource indivisibility. Relation-specific investments can result in super-normal profit returns, especially when the partnering firms have compatible organizational systems, processes, and cultures (Dyer & Singh, 1998).

Gulati (1999) studied the role of network resources, such as the extent to which firms have access to information about potential partners, in determining alliance formation. Social factors, therefore, influence the extent to which firms participate in alliances because they provide informational advantages enabling firms to learn about new alliances opportunities with reliable partners—an important condition for future cooperation. Gulati (1999) also emphasizes the importance of having prior alliance experience in addition to social networks.

Lorenzoni and Lipparini (1999) found that organizations learn how to use alliances for the purposes of gaining and transferring knowledge. The RBV proved fruitful in their study as a way to understand knowledge-based competitive advantages. Lead firms in the Italian automatic packaging machine industry were observed to make serious efforts toward building idiosyncratic interfirm relationships, which influenced the

sustainability of these firms' competitive advantages (Lorenzoni & Lipparini, 1999). In accordance with Gulati (1998, 1999), Lorenzoni and Lipparini (1999) purport the alliance advantages accrue to firms who have had prior alliance experience (see also Chung, Singh, & Lee, 2000). Familiarity between organizations breeds trust and a community structure that influences the governance mechanisms used in future alliances. Through the use of less hierarchical structures in new alliances, lead firms may dynamically improve their core competencies by reconfiguring the competencies belonging to a set of partners (Lorenzoni & Lipparini, 1999). Lorenzoni and Lipparini (1999) conclude by identifying how these relational capabilities can result in a structure-reinforcing competence.

Das and Teng (2000) use the RBV to explain alliance formation, structural preferences and performance. Partner resource alignment is advanced by Das and Teng (2000) to include similarity/dissimilarity (e.g., the degree to which two partner firms contribute comparable types and amounts of resources), and utilization (e.g., performing/non-performing resources—the degree to which resources contributed by partners are utilized for achieving the goals of the alliance). Thus, a typology of inter-partner resource alignments emerges as a 2x2 matrix (supplementary/similar performing; complementary/dissimilar performing; surplus or slack resources/similar non-performing; and wasteful/dissimilar non-performing). Das and Teng (2000) note that collective strengths and competing interests influence alliance performance, as alliances produce both private and common benefits simultaneously, and use these interests to justify how supplementary, complementary and surplus alignment are all positively associated with alliance performance. Das and Teng (2000) make no distinction as to which type of alignment is preferred over another in a particular situation.

Overview of Alliances.

The relationships addressed in Dyer and Singh (1998), Gulati (1999), Lorenzoni and Lipparini (1999), and Das and Teng (2000) emphasize the strategically rich inter-firm resources resulting from formal alliance structures. Kale, Singh, and Perlmutter (2000) define formal alliances as purposeful strategic relationships between independent firms striving for mutual benefits by working together through exchange, sharing, co-development, and mutual dependence. Knoke (1999) defines alliances as "collaborative

arrangements involving two or more organizations that combine resources to pursue common or complementary objectives." (p. 24) Alliances are a vital determinant of interorganizational networks (Gulati, 1995; Gulati & Gargiulo, 1999). Alliances can take a variety of forms and may be motivated by a wide range of goals (Gulati, 1998). Strategic alliances (discussed in depth in Dussauge & Garrette, 1999) are the most empirically studied form of cooperation, and are denoted by various taxonomies (Child & Faulkner, 1998; Choi & Lee, 1997), including interorganizational relationships (Galaskiewicz, 1985; Oliver, 1990; Ring & Van de Ven, 1994), external linkages (Gilroy, 1993), strategic networks (Jarillo, 1988), dynamic networks (Miles & Snow, 1986), partner networks (Larson, 1991), strategic partnerships (Collins & Doorley, 1991), virtual networks (Cravens, Piercy, & Shipp, 1996; Nooteboom, 1999), hollow networks (Cravens, Piercy, & Shipp, 1996), coalitions (Ghemawat, Porter, & Rawlinson, 1986), consortia (Collins & Doorley, 1991; Gibson & Rogers, 1994; Kanter, 1989; Olk & Young, 1997), constellations (Jones, Hesterly, Fladmoe-Lindquist & Borgatti, 1998; Gomes-Casseres, 1996; Lorenzoni & Ornati, 1988; Shepard, 1991), and syndicates (Chung, Singh, & Lee, 2000; Lerner, 1994). Many of these alliance forms can be vertically or horizontally structured (Dussauge & Garrette, 1999; Garrette & Dussauge, 1995; Ghemawat, Porter, & Rawlinson, 1986), diagonally structured (Bronder & Pritzl, 1992), structured based on legal form (e.g., joint ventures, licenses, franchises, supply agreements, acquisitions, mergers, marketing alliances, limited partnerships, equity partnerships; c.f., Child & Faulkner, 1998; Lei & Slocum, 1991; The Conference Board, 1994; Troy, 1994; Nooteboom, 1999), and/or structured based on functionality (technological, operations, logistics, marketing, sales, and service). They can also be classified based on motives, such as upstream or downstream integrated, additive, capital investment reduction oriented, new market entry risk reduction oriented, oriented for technological change reasons, opportunistic oriented, stakeholder oriented, distribution oriented, or outsourcing-based (Collins & Doorley, 1991; Cravens, Piercy & Shipp, 1996; Garrette & Dussauge, 1995; Kanter, 1989; Lei & Slocum, 1991; Pucik, 1988). None of these taxonomies, forms, or classifications of alliances are mutually exclusive, although Faulkner (1995) attempts to remedy mutual exclusivity problems by classifying alliances by scope, number of partners, and legal type of entity.

Distinctions between Alliances and Networks.

Multiple meanings exist for the same word choices (c.f., Lorenzoni & Ornati (1988): use of the word constellation), and subtle differences between word choices are evident among the myriad of alliance taxonomies, forms, and classifications. The words network and alliance are often used interchangeably. Even reasons for their existence are in disagreement. According to Johanson and Mattsson (1991), for instance, alliances, but not networks, can materialize for transaction cost purposes. Jones, Hesterly and Borgatti (1997), on the other hand, show how the network form of governance is a response to conditions described by transaction cost theory. The idea that a network relies more on trust (Larson, 1992), and alliances rely more on governance structures (c.f., Nooteboom, 1999) as the basis for reciprocal activity is inconsistently addressed in the literature.

Thus, to distinguish networks from alliances in this study, because venture capital syndicates and constellations are networks not alliances per se, reliance is placed on the work of Child and Faulkner (1998). Child and Faulkner (1998) identify networks as clearly implying close but non-exclusive relationships, whereas alliances are the creation of a joint enterprise over a limited domain. As Child and Faulkner (1998) explain further:

> Networks generally exist for reasons stemming from resource-dependency theory—that is, one network member provides one function, which is complementary to and synergistic with the differing contribution of other members of the network. Although costs enter into the calculus of who to admit and persevere with as network members, the existence of the network, and the loose bonding implied by it, emphasize autonomy and choice, in contrast to the more deterministic governance structure and stable static equilibrium applied to alliance theory by transaction-cost theorists. (p. 113)

Networks arise to reduce uncertainty, provide flexibility, capacity, speed, access to resources and skills not owned by a company, and are especially geared for information attainment (Child & Faulkner, 1998). Two extreme networks classifications have been noted: dominated and stable, or equal-partner and dynamic (Child & Faulkner, 1998; Snow, Miles, & Coleman, 1992).

This study focuses on IPO constellations and venture capital firm syndicates—*dynamic networks*. Assumably, syndicate and constellation members lack dependency on each other's resources. However, the entrepreneurial firm places great dependency on

syndicate and constellation members' pooled resources. Indirectly, IPO constellation and VCF syndicate members cooperate among themselves toward the shared goal of making the entrepreneurial firm as successful as possible, particularly in the effort toward taking it public. Thus, constellations and VCF syndicates are regarded as equal-partner networks since they involve a number of firms working together in variable configurations on a variety of projects that results in the development of close relationships with each other (Child & Faulkner, 1998). Constellations and syndicates represent a type of informal cooperation among firms, which may be defined by Lorange and Roos (1992) as voluntary arrangements between firms to pool resources for the achievement of shared strategic goals. Equal-partner networks, such as IPO constellations and VCF syndicates are opposite to strategic alliances when placed on a continuum ranging from markets and independence to hierarchies and integration, respectively (Child & Faulkner, 1998).

The Network Level of Analysis: A Focus on Syndicates and Constellations.

Syndicates are networks of professional firms from the same industry working toward a common project-based goal. A syndicate of VCFs, for instance, would be an ad hoc team focusing on a single temporary project—developing the entrepreneurial firm[3]—and dissolving after the project reaches fruition—the IPO. A VCF that originates the deal will often spread the risk of an investment among several VCFs by syndicating it (Lerner, 1994a). Syndication provides second opinions on the investment, aids in monitoring the company's performance, and spreads idiosyncratic investment risk reducing potentially negative impacts (Lerner, 1994a). Tybejee and Bruno (1984b) claim that:

> … Syndication is becoming more prevalent as venture capital firms seek to diversify their portfolios over a larger number of deals. Syndication offers the capability of adding investments to the portfolio without adding to the administrative burden, the bulk of which is borne by the lead investor. (p. 1056)

Syndicates do not have formal *relationships between partner* firms, as in a strategic alliance, but display communication *linkages among member* firms in the form of dynamic networks. The contractual link in a syndicate is between each individual syndicate member and the entrepreneurial firm.

Previous studies applying an alliance-level of analysis to the RBV (particularly the model by Dyer and Singh, 1998) have been criticized by Molina (1999) for not considering "… the existence of competitive relations side by side with relations of cooperation within the units formed by the network." (p. 185) In a VCF syndicate, VCFs may compete with each other, even though they share a common goal—to eventually take a company public. Because the VCFs do not contract governance between them, nor do they formally agree to depend on each other, the competitive behavior in a syndicate might be more intense than presumed in a formal strategic alliance. However, cooperative exchanges are still likely to occur, since joint action might be beneficial to the development of the entrepreneurial firm. Thus, syndicates are not entirely competitive, and the network-level of analysis incorporates both cooperative and competitive relationships.

Constellations are another type of dynamic network consisting of professional firms from multiple industries working on the same project-based goal. Lorenzoni and Ornati (1988) use the term constellation to define a cooperative structure between a firm and other external organizations—a "supportive quasi-infrastructural collective." (p. 41) In this study, Jones, Hesterly, Fladmoe-Lindquist and Borgatti's (1998) definition ofa constellation is used. They define a constellation as:

> ... a group of firms that interact directly and reciprocally to coordinate their efforts for a complex service or product during a finite period of time, which may last from several weeks to several years. Constellations may be thought of as interfirm project teams formed from specialists whose combined expertise extends beyond the boundaries of one particular firm or even one profession. (p. 398)

Thus, a constellation is the coordinated efforts of the VCF syndicate and other service providers (auditing firm, law firms, and investment banking firm or syndicate) who work together to take a company public. Taking a company public is a complex and customized service that involves a great deal of risk and uncertainty for clients. An IPO project has a finite duration, ends when an IPO is either placed successfully or dropped, and can be achieved only with collaborated services from a group of firms. The emphasis

[3] The company going public is the entrepreneurial firm. The entrepreneurial firm issues common stock to the public (i.e., "the issuer"). The adjective "entrepreneurial" is used to more precisely acknowledge the sample of firms going public in this study. Typically, these issuers are start-ups or entrepreneurial firms.

on group-work is important when defining a constellation (Van de Ven, 1976) and makes each member dependent on the others to carry the project to fruition, increasing frequency of communication (Van de Ven & Walker, 1984). Stronger communication linkages foster interactions and the building of relation-specific assets, enhancing constellation members' attachments with each other.[4] The VCF(s), auditing firm, law firm(s) and investment banking firm(s) that join together to help an entrepreneurial firm go public are all members of the IPO constellation. (An essay regarding the stability of venture capital firm constellations is offered in Appendix A.) Both syndicates and constellations are formal networks (Birley, 1985), catering to entrepreneurs (Dubini & Aldrich, 1991) that stress working relationships, not casual relationships such as friendships, acquaintances, or co-workers from an individual's past place of employment.

Dynamic Capabilities.

The temporal aspect of syndicates and constellations means that membership will change for each IPO. Each entrepreneurial firm is unique, and the timing and availability of entrepreneurial firms that warrant venture financing are often unpredictable. Thus, not only are constellation configurations likely to be different for each entrepreneurial firm, but VCFs will compete for high-potential entrepreneurial firms and then be expected to cooperate with their rivals, once syndicated. A model is needed that accounts for these changes.

The RBV is traditionally a static model in that is said to work best when applied to stable environments where few variables and combinations exist (Porter, 1991). Previous applications of the RBV at the alliance level of analysis also have assumed environmental stability. A special case of the RBV, however, known as the "dynamic capabilities" approach (Coff, 2000) applies to environments of rapid change (Teece, Pisano, & Shuen, 1997). Venture capital firm syndicates and IPO constellations are dynamic networks, enabling firms to capitalize upon their unique strategically relevant

[4] It takes anywhere from 3 months to a year (average is 4 months) to go public once the decision is made (Ritter, 1984a). During this time, constellation members, venture capitalists on the board of directors, and the entrepreneurial firm's executive team are together for frequent and intense periods (Malone, 1991). Formal network relations result due to the great fervor and zeal of the team's experience with the IPO process. Such an experience is likely to increase the likelihood that relationships fostered during the going public process will grow over time.

factors as well as to leverage their relation-specific investments for each entrepreneurial firm they support.[5]

Dynamic capabilities are firms' individual abilities to constantly reconfigure resources to respond to specific needs, which presumably lead to series of short-term competitive advantages, enabling sustainability under tumultuous conditions (Teece, Pisano, & Shuen, 1997). Dynamic capabilities have been presented as firm-specific qualities. However, here, they are considered to be network-specific qualities. For example, VCFs can capitalize upon their strategically relevant factors and can leverage relation-specific investments as members of multiple syndicates and constellations simultaneously and over time. Being able to leverage resources dynamically equates to unique synergies. Each constellation should enable cumulative experience to exist in a way that benefits the entrepreneurial firm receiving support.

To expand on the application of dynamic networks requires addressing the sources and sustainability of rents under such conditions. The extension of the RBV to the network level complicates firms' sources of rents because sensitization need not only occur at the firm- and dyad-level, but also at the network level. Firms should not only focus on developing their own strategically relevant factors (physical, human, technological, financial, and intangible resources and capabilities), but also on creating valuable relation-specific investments, in addition to knowing how to create cumulative experience. To create cumulative experience in dynamic equal-partner networks requires that firms understand their resources, the proportion of their resources that are synergistic with other firms, and how these resources create cumulative experience. Thus, a strategically relevant factor can be viewed as a unique firm contribution, a complementary factor, or both. Rents then become sustainable to the extent that: (1) firms know which strategically relevant factors to foster that are complementary and which ones to foster that are unique to them; and (2) firms have the knowledge, skill, and time to seek network partners and know when to bring these linkages together. As pointed out by Dyer and Singh (1998), it is an ominous task for firms to be able to have the alliance experience, search and evaluation capability, and access to timely

[5] Capitalization implies ownership, whereas leveraging means that the firm does not have to own the resource or capability to use it.

information about potential partners in order to be able to accomplish uniquely synergistic complementarities, especially when firms' resources and capabilities coevolve and change over time.

Applying the RBV to inform the analysis of dynamic networks translates into the need for industry-wide coordination given the philosophy that win-win outcomes exist when fit is achieved. Because of scarcity, competition, and growth, however, within-project re-configuration must be considered if dynamic networks are to be used effectively. The likelihood of being able to re-configure VCF syndicates once support has been contracted to an entrepreneurial firm is low for reasons surrounding equity ownership (Lerner, 1994). IPO constellations have a greater likelihood of re-configuration during the IPO process because they are constructed using service contracts rather than stock ownership. To the extent that synergies are important to the performance of VCF syndicates, and VCFs know what factors to emphasize in achieving cumulative experience, then the RBV could be used successfully to increase IPO performance by making "fit" the primary criterion for network membership. Thus, membership considerations may change as a result of furthering understanding and application of the RBV to a dynamic network level.

To reiterate, the purpose of summarizing the RBV literature above is to empasize the importance of the RBV as a framework offering a perspective under which to rationalize and organize the paper logically. This study is not attempting to test the RBV as a theory. Although the RBV, as traditionally purported, attempts to explain the performance of a firm resulting from that firm's unique and valuable resources and capabilities, as previously discussed, this study focuses on performance at the network-level. Venture capital firm syndicates and constellations are the networks under observation, because IPO performance is more easily attributed to a syndicate or constellation than to individual VCFs.[6] This difference between the firm-level and the network-level pursued in this study, is an extension that serves only to allow the RBV framework to guide the selection of relevant strategic resources used to explain IPO performance.

[6] It is not necessary to allocate credit for the performance of individual participating firms, and unknowns surrounding additional returns from venture capital firms' non-public investments are not an issue.

Recategorizing and Revising Measures for Strategically Relevant Resources: Human-Based Factors as Relative Measures

The idea of classifying strategically relevant resources into a category defined as "human-based factors" is unique to this study. Human-based factors are resources and capabilities that are rare, valuable, non-substitutable, intangible, specific, causally ambiguous, and difficult to imitate characteristics (Barney, 1991; Reed & DeFillippi, 1990; Grant, 1998). Reputational capital, cumulative experience, corporate social capital, and traditional human capital embedded in ORC comprise human-based factors. In essence, a human-based factor is any intangible quality that is humanly derived. A secondary market typically exists for human-based factors, but it is imperfect as mobility is highly restricted and there is high internal cost associated with developing firm-specific human capital.

In addition to re-categorizing strategically relevant resources, this study uses unique measures to identify each of the human-based factors examined. Use of theory from the finance literature to proxy reputational capital, the constraint measure to operationalize social capital, and the attempt to create a composite measure for ORC is different from how strategic management scholars have previously operationalized these variables.

Lastly, Conner (1991) suggests that when the RBV perspective is used, attention should be given not only to how resources are identified, but also to the importance of relativeness: how they are compared between firms (or in this case, between syndicates). Relativeness is enhanced because all firms in the population at the time of each IPO are included in either the computation of the variable (as in the case of social capital), and/or in the study so as to provide a complete comparison between all firms involved. Understanding what human-based factors are, in what context they are identified, and how they are to be measured is important to framing this study under the RBV perspective.

In more detail, human-based factors capitalize upon and leverage people's skills, knowledge, status, and connections, to achieve cumulative experience that is valuable. "People," claim Prahalad and Hamel (1990), "are the company's most precious asset as they have the skills that embody core competencies." (p. 87). Human-based factors result

from re-categorizing many resources and capabilities that have been proposed at different levels of analysis (c.f., classifications used by Barney, 1986b, 1991; Coff, 2000; Dyer & Singh, 1998; Godfrey & Hill, 1995; Grant, 1998; Helfat, 1994; Lorenzoni & Lipparini, 1999; Mahoney & Pandian, 1992; Ranft & Ziethaml, 2000). Miller and Shamsie (1996) provide a simple classification of strategically relevant resources into two broad categories: property-based resources and knowledge-based resources. Although human resources are usually classified as a property-based resource (Das & Teng, 2000), this paper considers human-based factors to be more in line with Miller's and Shamsie's (1996) knowledge-based resources. Human-based factors include knowledge and skills to facilitate cumulative experience, enable asset interconnectedness, deepen the desire to share knowledge, increase partner-specific absorptive capacity, create incentives to be transparent and reciprocal, promote organizational complementarity, align transactions with governance structures, and provide monitoring in the form of self-enforcing safeguards—all of which contribute to relational rents (Dyer & Singh, 1998). Human-based factors also enable alliance coordinators to be more understanding of "self and others," to articulate this understanding, and to configure linkages to take advantage of certain "others" to create project-specific synergies. The essential quality found in these categories of resources and capabilities is the human component.

The human capital component of human-based factors is more than the traditional labeling of "what people know" in terms of a person's capabilities—what one can do on one's own merits. Human capital is defined as an individual's knowledge, skills, expertise, level of educational attainment, age, talent, behavior, job tenure, experience, reasoning, decision-making abilities, and even personality (Becker, 1964; Boxman, De Graaf, & Flap, 1991; Davenport, 1999; Farjoun, 1994; Gimeno, Folta, Cooper, & Woo, 1997; Grant, 1998; Meyerson, 1994). Such individual-level phenomenon can be extrapolated to the firm level (Cohen & Levinthal, 1990; Pennings, Lee, & Witteloostuijn, 1998). On a firm level, human capital may be aggregated into organizational capabilities that are valuable, unique, and able to be used strategically to give the firm a competitive advantage (Lepak & Snell, 1999). Thus, organizational capabilities such as workforce management (Pfeffer, 1994), routines (Nelson & Winter, 1982), absorptive capacity (Cohen & Levinthal, 1990), and even reputation (Fombrun &

Shanley, 1990; Rao, 1994) are encompassed into human-based factors. Many skills and competencies manifested at the firm level, notes Oliver (1997) are "… not vested in single individuals, but reside instead within the collective skill set of many employees." (p. 707) In this light, this study will focus on human capital (hereafter referred to as organizational-related capital; ORC) at the firm level.

In addition to "what people know and can do," and how this knowledge and skill translates into ORC, human-based factors also include "who people know." It is through the human connection that social capital is derived. Social capital, like human capital, can be at the individual level, or at the firm level. In this study, social capital is measured at the firm level.

The last human-based factor to be addressed is reputational capital. Reputational capital is a firm level phenomenon. The firm's reputation rests upon the quality of its human capital, ORC and social capital. In the case of VCFs, value is added to new issues when a VCF can attract reputable others to the constellation who can certify the new issue (Megginson & Weiss, 1991). Certification is a way of providing investors with signals of reduced risk (Megginson & Weiss, 1991). Since firms of high status are attracted to other firms of high status (c.f., the theory of homophily; Chung, Singh, & Lee, 2000), attributing reputational effects to a single firm or type of firm is problematic (c.f., Balvers, McDonald, & Miller, 1988; Beatty & Ritter, 1986; Carter, Dark, & Singh, 1998; Carter & Manaster, 1990; Datar, Feltham, & Hughes, 1991; Firth & Liau-Tan, 1998; Holland & Horton, 1993; Johnson & Miller, 1988; Titman & Trueman, 1986). To the extent certification exists and has resulted in reduced underpricing, IPO performance is expected to be higher (Carter, Dark, & Singh, 1998). Reputational capital, therefore, is an IPO-level phenomenon and manifests itself at the network-level of analysis.

Human-based factors are the lifeblood of VCFs with financial resources following a close second. Without people and a reputation, VCFs could not successfully raise the funds necessary for investments. Venture capital firms are not rich in physical or technological capital compared to their reliance on human-based factors and financial resources. Financial resources lack qualities of causal ambiguity, inimitability, immobility, and scarcity compared to human-based factors. Thus, human-based factors are of utmost importance to VCFs in the sense that they contribute more toward firm

heterogeneity than financial resources. The ability to gain financial resources in the first place is a function of human-based factors.

In terms of their synergistic qualities and unique firm level benefits, human-based factors are multifaceted. People create organizations, run organizations, build organizations into images, and change organizations. People decide when, and how to share what knowledge, engage in reciprocal activities, govern themselves and hence, practice self-reinforcement. People also determine how to gather, evaluate and synthesize information in order to understand their competitors, communicate strategically, and create relationships that foster certain linkages. Thus, it is difficult to distinguish between firm-specific and complementary human-based factors. In a network, complementary factors can create valuable synergies. The extent to which ORC, corporate social capital, and reputational capital are both firm-specific (not cumulative experience-enhancing) and complementary (cumulative experience-stimulating) depends upon how they are used and in what situation. To help construct the context in which human-based factors are examined in this study, Conner's (1991) suggestions are followed once more—industry and/or environmental constraints are controlled.

Industry and Environmental Controls

Traditional explanations of IPO stock price performance are controlled for in this study. Controls such as IPO deal size (Booth & Smith, 1986; Carter, Dark, & Singh, 1998; Carter & Manaster, 1990; Logue, 1973; Megginson & Weiss, 1991), percentage insider shares (Allen & Faulhaber, 1989; Grinblatt & Huang, 1989; Welch, 1989), and a hot issue market index (Li & Berta, 1999; Stuart, Hoang, & Hybels, 1999) are used because they may reflect industry differences and environmental conditions. The hot ussue index reflects the economic environment at the time of an IPO as defined by investor sentiments. The number of shares that are offered may be an indication of new stock demand in that industry. And, the percentage of insider shares held before IPO may serve as a signal from the new issue's management to spur public confidence. Deal size and percentage insider shares may also be within certin industry norms, as some may expect applying institutional theory.

A model of the variables and their levels used in this study, prefacing the text that will discuss this model in next section of Chapter Two, appears in Figure 1.

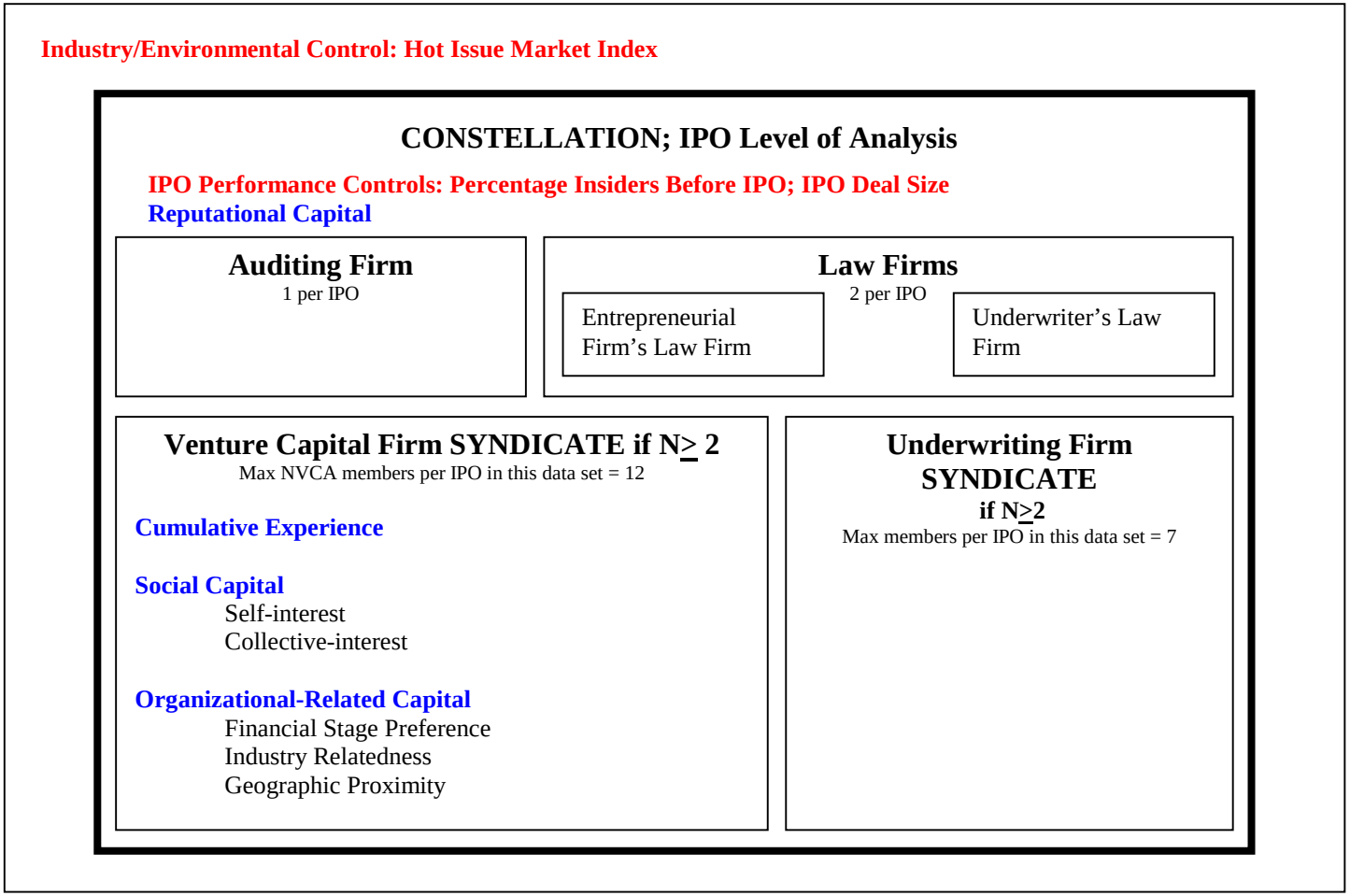

Figure 1: Representation of Levels and Variables

Human-based factors are shown in blue; Control Variables are shown in red

Definitions of Variables

Each variable will now be discussed in depth, beginning with the dependent variable, followed by the independent variables and then the controls. The hypothesized relationships are presented within the context of their relevant variables.

Dependent Variable: Abnormal IPO Stock Price Performance

A buy and hold strategy is used to identify IPO performance, whereby abnormal returns (benchmarked to the NASDAQ value-weighted composite index and adjusted for stock dividends) are compounded daily for each month, where a month is defined as a 21-day trading period, following the offering date up to month six in accordance with Ritter (1991). This measure can reflect performance of a supporting VCF, VCF syndicate members, and other stockholders of the entrepreneurial firm, as well as serving as an indicator of the entrepreneurial firm's value (Dyer & Singh, 1999; Welbourne & Andrews, 1996; Welbourne & Cyr, 1999). IPOs are the primary indicator of a VCF's success, since venture-backed companies that go public yield the highest return for venture capital investments (Gompers, 1994; Schilit, 1991). Black and Gilson (1999) claim that "U.S. venture capital funds earn a average of 60% annual return on investment in IPO exits, as compared to 15% in acquisition exits." (p. 45) Thus, the aftermarket performance of an IPO can be used to indicate the performance of the entrepreneurial firm going public as well as the venture capitalists backing that firm.

A VCF is typically a formal, professionally managed, private, independent organization with an established pool of other people's money that it invests as equity capital in private entrepreneurial firms (Fried & Hisrich, 1995; Gifford, 1997; Gompers & Lerner, 1996; Schilit, 1991; Steiner & Greenwood, 1995). By professionally managing a pool of capital invested in equity-linked securities of private firms, venture capitalists capitalize upon the unknown future in terms of high risk-high return options (Gompers & Lerner, 1996; Liles, 1977; Sahlman, 1990). They, therefore, act as intermediaries between investors and investments while adding value by aiding in the efficiency of matching entrepreneurs and sources of capital, making investment decisions superior to decisions individual investors could make singly, and providing non-financial assistance (Gupta & Sapienza, 1988). Gompers (1994) and Gompers and Lerner (1996) describe venture capitalists as:

> … active investors. They monitor the progress of firms, sit on boards of directors, and mete out financing based on attainment of milestones. Venture capitalists retain the right to appoint key managers and remove members of the entrepreneurial team. In addition, venture capitalists provide entrepreneurs with access to consultants, investment bankers, and lawyers. (p. 5 and 465, respectively)

W. D. Campbell, in a report to Senator Lloyd Bentsen (US GAO, 1982), describes the venture capitalist as follows:

> Venture capitalists seek out new technology, entrepreneurial talent, and management resources and combine them for new business opportunities that have significant market growth potential. They are faced with hundreds of difficult technical and judmental decisions, any of which can translate into millions of dollars gained or lost for their investors. Venture capitalists must know myriad laws and regulations on such topics as tax, securities, and incorporation, and must be able to sense a valid market niche and to find, judge, and acquire needed management talent. They must also be able to raise millions of dollars quickly. Finally, they must be able to orchestrate all these activities so that the venture-backed company achieves its public market or upward merger goal within a planed timetable. (p. 5)

Venture capitalists, as defined in this study, are therefore members of formal VCFs. They are not wealthy businesspeople or professionals who provide their personal funds to help finance to new ventures (i.e., "angels" belonging to the informal risk capital market).

Obviously, the greater the returns made on a venture capital fund's investments, the easier it is to raise money for subsequent funding opportunities in entrepreneurial companies, keeping the VCF in business (Freeman, 1999; Podolny & Castellucci, 1999). In fact, both Black and Gilson (1999), and Gompers (1994) found a high correlation between IPO activity level and new capital contributions to venture capital funds. Since "venture capital firms are major shareholders prior to the IPO and retain significant portions of their holdings after the offer," concluded Megginson and Weiss (1991, p. 880), using IPO performance as an indicator of venture capital syndicate's goals and performance measure is fitting. In fact, Megginson and Weiss (1991) claim that "a majority of venture capitalists do not sell *any* of their holdings at the offer date." (p. 901) Massey (1995) concurs that venture capitalists who sell out at the time of IPO demonstrate a lack of faith in the company, and are advised, therefore, to hold at least part of their stock ownership after IPO. Black and Gilson (1999) present different

statistics, claiming that "Three years after the IPO, only 12% of lead venture capitalists retain 5% or more of the portfolio company's shares." (p. 43) Freeman (1999) confers that venture capitalists often wait until the entrepreneurial firm offers a secondary offering to liquidate their holdings. Venture capitalists' goals most often include taking companies public (Barry, 1994; Black & Gilson, 1999; Freeman, 1999; Lam, 1991; Norton, 1993; Robinson, 1987; Young & Zaima, 1988), as they are evaluated on their ability to generate high returns for their limited partners (Podolny & Castellucci, 1999). Barry, Muscarella, Peavy, and Vetsuypens (1990) claim that an IPO is the most popular way to conclude a venture capital investment. Bruno and Tyebjee (1985) found, also, that high-technology entrepreneurs' preferred source of financing for the long-term is to go public. An IPO is the preferred exit mechanism, by successful entrepreneurs, of harvesting a growing and profitable business (Black & Gilson, 1999; Prasad, Vozikis, Bruton, & Merikas, 1995). Since both venture capitalists and entrepreneurs are said to target "going public," the IPO goal is most likely to be reached by venture-backed companies. Massey (1995) claims that, "The real reason for many new issues is to realize a value and provide an exit for these venture capital firms." (p. 3) Venture capitalists who do not take their companies public are severely constrained in realizing gains from their investments (Huntsman & Hoban, 1980; Tyebjee & Bruno, 1984b), especially the elite VCFs that have high status (good reputations) and high expectations from investors (Black & Gilson, 1999; Freeman, 1999). Lerner (1994) reinforces the importance of going public when he says: "Venture capitalists, who specialize in providing funds to privately held firms, generate the bulk of their profits from firms that go public." (p. 293) Not only is the ability of venture capitalists to exit through an IPO critical to the existence of a vibrant venture capital market (Black & Gilson, 1999), but venture-backed IPOs outperform non-venture-backed IPOs (Brav & Gompers, 1997). Venture-backed IPOs make a significant impact on the economy (Anderson, Beard, & Born, 1995; US GAO, 1982). Thus, since an IPO is the investment of choice for the majority of VCFs, IPO stock price performance is not only a way of measuring the entrepreneurial firm's success, but also reflects the success of the VCFs backing the newly public entrepreneurial firm. In this study, when IPO performance is examined, the VCF syndicate is the unit of analysis and therefore, the focus of performance.

Independent Variables: Human-Based Factors

Human-based factors comprise reputational capital, cumulative experience, social capital, and ORC, albeit at different levels of analysis: that of the VCF firm, the VCF syndicate, and the constellation level. These levels of analysis are addressed in Figure 1 shown previously.

Reputational Capital

Finance scholars have relied on certification theory and signaling hypotheses to show how reputational capital is used to guarantee quality and hence can explain underpricing and/or IPO performance (Balvers, McDonald, & Miller, 1988; Beatty & Ritter, 1986; Booth & Smith, 1986; Carter, Dark, & Singh, 1998; Carter & Manaster, 1990; Firth & Liau-Tan, 1998; Holland & Horton, 1993; Titman & Trueman, 1986). The greater the amount of certification, the higher the expressed benefits of reputational capital as it affects the new issue, and the lower the underpricing of the new issue. In particular, the higher the reputations of VCFs (Megginson & Weiss, 1991), underwriters (Balvers, McDonald, & Miller, 1988; Beatty & Ritter, 1986; Carter, Dark, & Singh, 1998; Carter & Manaster, 1990; Johnson & Miller, 1988), and auditors (Balvers, McDonald, & Miller, 1988; Beatty, 1989; Datar, Feltham, & Hughes, 1991; Firth & Liau-Tan, 1998; Holland & Horton, 1993; Titman & Trueman, 1986), who contractually support the entrepreneurial firm going public, the less the IPO is underpriced. The less a new issue is underpriced, the better its aftermarket performance, for stocks associated with more prestigious professional service providers (Carter, Dark, & Singh, 1998). Thus, we arrive at the essence of certification theory: professional service providers are employed to certify that issue price is consistent with insider information (Booth & Smith, 1986), and therefore to protect their reputation, professional service providers choose to market IPOs that exhibit lower risk (Johnson & Miller, 1988) and as a result, these IPOs have relatively higher valuation (Firth & Liau-Tan, 1998) and better long-term aftermarket performance expectations (Carter, Dark, & Singh, 1998; Carter & Manaster, 1990).

From a social network perspective, association with prestigious “others” is status-enhancing (Stuart, 1999), so certification includes the implicit transfer of status between parties in an association (Stuart, Hoang, & Hybels, 1999). The theory of homophily is

embedded in the theory of certification. The extent to which reputational status affects perceptions of quality is directly tied to the present amount of uncertainty (Podolny, 1994; Podolny, Stuart, & Hannan, 1996; Shrum & Wuthnow, 1988; Stuart, Hoang, & Hybels; 1999). Associations with high status signal uncertainty reduction to outsiders, thus creating a cumulative, reinforcing advantage (Podolny & Feldman, 1997). Therefore, when an emerging company is striving to obtain legitimacy amid various information asymmetries, uncertainties and risks, gaining a prominent affiliate or affiliates to certify is a commonly practiced and powerful strategy.

Megginson and Weiss (1991) determined that VCFs do not certify directly, but their presence attracts underwriting firms and auditing firms of higher reputations to the IPOs they support. "The certification provided by venture capitalists," say Megginson and Weiss (1991), "will be both a partial substitute for and a complement to the certification provided by prestigious auditors and investment bankers." (p. 880) Balvers, McDonald, and Miller (1988) found that prestigious auditors associate with prestigious investment bankers. Thus, the attribution of reputational capital to any individual constellation member is problematic, making reputational capital a constellation-level variable.

Underpricing is a deliberate act (Muscarella & Vetsuypens, 1989), which means it is able to serve as a proxy for constellation-level reputational capital. Although on average, all new issues, even the most successful, contain some underpricing (Chalk & Peavy, 1990; Ibbotson, 1975; Welch, 1992)[7], and this certain level of underpricing is needed to insure against potential legal liabilities against investment bankers (Tinic, 1988) and achieve equilibrium which is considered necessary to the process (Muscarella & Vetsuypens, 1989), investment bankers, who assume the largest portion of the

[7] In this study, all IPOs are firm commitment offerings. As defined by Aggarwal and Rivoli (1991), a firm-commitment offering occurs when:

> the investment bank underwrites the issue and the proceeds are guaranteed. The risk of undersubscription in firm-commitment offerings is therefore borne by the investment bank rather than by the issuing firm. The underwriter for a firm-commitment offering performs four potential functions: origination and management, risk-bearing if the issue is not well received, distribution, and aftermarket price support. (p. 353)

In a firm-commitment offering, the offering proceeds are guaranteed by the underwriter as soon as the contract becomes effective (Jones, Cohen, & Coppola, 1992). The underwriter, therefore, assumes all risk for unsold securities (Ibbotson, 1975). Ibbotson, Sindelar and Ritter (1988) note that, "In firm commitment offerings, the underwriter has the incentive to set a relatively low price to ensure that the entire issue sells at the predetermined price." (p. 42) Thus, all issues are expected to be underpriced in this study.

responsibility for selling the new issue to potential investors, do not choose to grossly mis-price a new issue relative to other new issues because such an act may tarnish their reputation (Beatty & Ritter, 1986). Underpricing and uncertainty surrounding the new issue are directly correlated (Miller & Reilly, 1987). Johnson and Miller (1988) replicated five previous studies showing the association between prestige and underpricing and found that once initial returns are adjusted for risk, however, this association disappears. Investment bankers enforce the equilibrium between ex ante uncertainty and underpricing due to their reputational capital being at stake (Beatty & Ritter, 1986). The higher the prestige of the underwriter, the less risky the offering (Carter & Manaster, 1992). There is a fine line between the deliberate act of underpricing as a way to communicate riskiness of the new issue to potential new investors, whereby prestigious firms enhance their reputation by presenting truthful signals; and high status firms only choosing to work with the least risky new issues. Either way, the risk surrounding new issues have ramifications for those firms that are responsible for bringing the new issue to market for the first time. Underpricing helps to alleviate some of the ex ante uncertainties while impacting firms' reputations. Low underpricing reflects high reputational capital by constellation members. Reputational capital is hypothesized to be positively associated with IPO stock price performance.

> **Hypothesis 1**: *The higher the reputational capital of the constellation, the higher the IPO's stock price performance.*

Cumulative Experience

Cumulative experience is the benefit of exchange expressed as the sum of the whole being greater than the sum of the parts. When firms have experience working together, they develop communication efficiencies that enable them to better understand each other and exchange effectively. Experience working with other firms provides a more precise view of the kinds of member and resource combinations that allow interorganizational networks to generate supernormal returns (Dyer & Singh, 1998). The greater the firm's level of experience working with VCF syndicate-backed IPOs, the more likely the firm will be in a synergistic relationship. Thus, cumulative experience should be positively related to IPO performance, leading to the second hypothesis.

Hypothesis 2: *The higher the syndicate's cumulative experience, the higher the IPO's stock price performance.*

Social Capital

Corporate social capital, state Leenders and Gabbay (1999), refers to "*the set of resources, tangible or virtual, that accrue to a corporate player through the player's social relationships, facilitating the attainment of goals*." (p. 483) Many authors strongly associate corporate social capital with network structures (Baker, 1990; Burt, 1992). For the purposes of this study, social capital is identified using interorganizational linkages that are highly likely to provide a firm with opportunities and benefits. Firm level social capital can result from these interfirm networks (Walker, Kogut, & Shan, 1997). Linkages are relationships between firms, which comprise shared experiences of venture capital syndicates, as well as the shared experiences of constellations working together to take a company public (i.e., the intense period of activity between the registration date for an IPO and the IPO offering date; see Malone, 1991).[8] These relationships between firms are the source of unique yet intangible resources that would not be generated in the absence of the relationship (Uzzi & Gillespie, 1999). The benefits of social capital are a function of how these relationships are structured.

The value inherent in long-term relationships makes social capital a unique organizational resource that is difficult to appropriate and imperfectly tradable (Araujo & Easton, 1999; Pennings & Lee, 1999). Thus, claim Pennings and Lee (1999): "… social capital fits Barney's (1991) criteria of the *resource*-based-view of the firm." (p. 59) Social capital and performance have a direct relationship. However, it is more than the "amount" of social capital that matters, it is the kind, as well.

There are two recognized, mutually exclusive "types" of network structures (Meyerson, 1994):

(1) Those that provide benefits by exploiting information advantages. This structure is characterized by an individualist orientation whereby the ego emphasizes exploiting "gaps" by keeping alters apart and taking advantage of

[8] The importance of network relationships in the venture capital industry is very much reflected by this venture capitalist's comment: "If there was an office fire, all I need to save is my Roladex—then I could stay in business." Many venture capitalists' echoed this remark in a random sampling of phone calls.

the disconnection by playing them against each other, creating novel information and opportunities (e.g., Baker & Obstfeld's (1999) disunion strategy; Burt's (1992) structural holes theory, the absence of ties, and *tertius gaudens* strategy; Granovetter's (1973) weak ties and bridge ties; and Meyerson's (1994) information-oriented networks);

(2) Those that provide benefits by mobilizing mutual interests. These networks are characterized by a collective orientation whereby the ego emphasizes sharing, trusting, and exchanging by closing the "gap" and bringing alters together, encouraging coordination and cooperation by creating cohesive groups, but resulting in less novel opportunities and information (e.g., Burt's (1992) redundancy concept; Baker & Obstfeld's (1999) social cohesiveness and union strategy; Coleman's (1988) "closure"; Granovetter's (1973) strong ties; and Meyerson's (1994) mobilization-oriented networks).

The former type—informational benefit social capital—is found where networks are sparse, relationships come and go as needed, and diversity abounds. Informational benefit social capital focuses on the self-interest of the parties involved (Burt, 1992). For convenience, this type of social capital will be referred to from here on as "self-interest-social capital" or SISC. Mobilization benefit social capital—is indicative of small, close-knit networks that tend to display both clear role expectations and cognitive dissonance, therefore becoming exclusively self-sufficient, increasingly isolated, restraining, highly-conforming, loyal, and trust-based (Meyerson, 1994; Podolny & Baron, 1997). In essence, dense networks promote sharing and open networks promote access to advantaged positions (Lin, 1999). Mobilization benefit social capital, in contrast to SISC, has a collective focus. Collective-interest social capital (CISC) will be used to reference social capital enabling mobilization benefits to accrue to members of the network.

For some situations, given a certain culture in a certain environmental context, one type of social capital may be preferred to another (Coleman, 1994; Meyerson, 1994). Podolny and Baron (1997) say that the preferred type of network for a given situation "… depends significantly on the *content* of the social tie involved." (p. 674) There are situations in which structural holes provide social capital, yet in other situations structural holes may result in social liabilities (Leenders & Gabbay, 1999).

In addition to recognizing two types of social capital/network structures, this study also differentiates between network structures. One network is present among VCFs who support the same entrepreneurial firm (e.g., a venture capital *syndicate*).[9] Another network exists among all professional service providers that support the process and outcome of an initial public offering (e.g., a *constellation* per Jones, Hesterly, Fladmoe-Lindquist, & Borgatti (1998)). A constellation in this study includes the underwriter or syndicate of underwriting firms, an auditing firm, a VCF or syndicate, and law firms that are associated with the new issue. Venture capital syndicates are used to create intra-industry linkages for VCFs, and constellations are the basis for VCFs' inter-industry linkages.

Two different types of social capital (SISC and CISC), and two different network structures (syndicates which are intra-industry based and constellations which are inter-industry based) have different benefits when combined. Figure 2 provides an overview of which type of social capital will be hypothesized as most and least beneficial. Although all combinations of the above may exist (intra-industry SISC, intra-industry CISC, inter-industry SISC, and inter-industry CISC), the next two sections focus on intra-industry SISC and inter-industry CISC because these combinations are theoretically deemed to be of the most value to IPO performance.

[9] Syndication is a powerful strategy because it offers benefits of diversification to venture capital firms that specialize, and serves to ameliorate opportunistic behavior resulting from informational asymmetries by insuring that the ownership percentage of the "original" venture capital firms stay constant in later financing rounds (Lerner, 1994b). Syndication enables the sharing of risk between venture capital firms while maximizing the amount of venture capital accessible to the investment firm (Fried & Hisrich, 1994). Syndicates are also formed so that venture capital firms can share knowledge and resources in a more trusting environment (Steier & Greenwood, 1995), enabling venture capitalists to have better control over more investment firms than they would otherwise possibly be able to service (Lerner, 1994b). Syndication, however, may be more effective in appearance than in fact, as Steier and Greenwood (1995) build a case suggesting that venture capitalists spend more time establishing collaborative activity (scheduling to work together) than managing collaborative relationships (improving the quality of interactions). Bygrave (1987) describes these networks between venture capital Syndicates, and points out in Bygrave (1988) that Syndication or co-investing as it is otherwise called, is a function of the degree of uncertainty facing the venture capital firm. Fiet (1995b) points out that formal networks are relied upon most when market risk uncertainty is greatest.

	Information Benefit (Self-interest; SISC)	Mobilization Benefit (Collective-interest; CISC)
Intra-Industry (Syndicates)	*Proposed as second in value*	*Not theorized here*
Inter-Industry (Constellations)	***Not theorized here***	*Proposed as most valuable*

Figure 2: Type of Social Capital by Type of Interorganizational Network

Self-interest Social Capital (SISC).

Burt's (1992) theory of structural holes helps identify firms having high structural autonomy among other firms (i.e., SISC). Structurally autonomous firms—those able to exploit vacant positions between non-redundant contacts in their network of relationships—are privy to entrepreneurial opportunities for information access, timing, referrals, and control (Burt, 1992). Information access, timing, and referrals are a way of honoring interpersonal debt by fostering trust within a large, diverse network (Burt, 1992), and help to reduce bounds to rationality, provide early warnings and signals, and confer legitimacy. Specifically, VCFs high in structural holes will be able to gain expedient knowledge of upcoming deals and new technologies, as well as be able to better perform market intelligence to judge investment potential; attributes of particular interest when working with entrepreneurial markets. In such markets known for imperfect competition and information inefficiencies, and/or when dealing with abstract products whose quality is difficult to articulate and whose output is highly coupled with reputation (e.g., IPOs), self-interest social capital (SISC) is most likely to generate increasing performance (Pennings & Lee, 1999; Burt, 1992). Securing productive relationships and the benefits of these relationships, therefore, becomes the essence of competition (Burt, 1992).

In the market for venture capital, instrumental actions are carried out so that resources not presently possessed may be sought and obtained. Therefore, open networks that are filled with bridges and non-redundancies provide the advantage (Lin, 1999). The

venture capitalist screens for resources—entrepreneurial companies to invest in—and in so doing serves as a broker between investors and entrepreneurial companies needing financial capital (Freeman, 1999). Venture capital firms compete to gain brokering privileges via information benefits by using their networks to "… engage in active 'outreach' and 'bird-dogging efforts'," say Timmons and Bygrave (1986, p. 162). Venture capital firms are highly competitive because the future performance of the firm is heavily dependent upon their past choices (Freeman, 1999). In a competitive environment, where VCFs vie for access to good deals in which to invest, having referrals and control becomes very valuable. Access to timely quality information not only helps venture capitalists select future deals, but enables them to find co-investors with whom to syndicate (Tyebjee & Bruno, 1984a). Referrals from other venture capitalists are the primary way entrepreneurial companies get chosen to receive venture funding (Roberts, 1991; Tankersley, 1991). Providing networking access to entrepreneurs in terms of contacts with other VCFs and professionals is a highly valued role of venture capitalists (Amit, Glosten, & Muller, 1990a; Fried & Hisrich, 1995; Sadtler, 1993; Sapienza, Manigart, & Vermeir, 1996). Fried and Hisrich (1994) indicate that venture capitalists rely on control benefits from their networks when generating investment proposals. Fiet (1995b) addresses how venture capitalists rely on other venture capitalists as informants. Venture capital firms vying for structural advantages within their industry benefit from building superior networks. Venture capital firms with superior network connections, in fact, were shown by Freeman's (1999) impatient hypothesis to be associated with entrepreneurial firms that were likely to go public. As Freeman (1999) puts it:

> The high quality social structure that the VC [venture capitalist] has built, thus yields social capital for the starting company. Of course, the superior deal flow that these more prominent VCs [venture capitalists] see allows them to pick the most promising ventures. (p. 478)

A VCF's pattern of structural holes, therefore, may be configured to provide it with information benefits (e.g., access, timing and referrals) within the venture capital industry. The better the configuration, the greater the benefits enabling VCFs to make superior investment choices. A wise investment choice has a higher likelihood of success

on the open market than a poor investment choice. The following hypothesis reflects this belief.

> **Hypothesis 3a**: *The higher a venture capital firm's intra-industry SISC, the higher the IPO's stock price performance.*

From this point forward, unless otherwise noted, SISC is presumed to be at the intra-industry level.

Collective-interest Social Capital (CISC).

Collective-interest social capital (CISC) is characterized by redundant network structures. Redundant network structures provide relatively no information benefits (i.e., access, timing, or referrals) because everyone has access to the same information at about the same time (Burt, 1992). When populations are symbiotic, as in the case of the variety of professional service firms helping an entrepreneurial firm go through the IPO process, complementarity leads to a cooperative focus. Cooperation is also enhanced by homophilic relationships (c.f., Cable & Shane, 1997) and closed, dense networks (Raub & Weesie, 1990; Granovetter, 1985). Constellation members are likely to value quality of work through group cumulative experience and well-defined performance expectations, both of which are attributes of dense networks (Podolny & Baron, 1997). When a closed network exists, trustworthiness is created (Coleman, 1988) as are normative expectations (Podolny & Baron, 1997), which facilitate efficient transacting within a redundant network. The group is then able to maintain itself and reproduce both their collective capital (Lin, 1999) and collaborative capital (Smith-Doerr, Owen-Smith, Koput, & Powell, 1999). When relationships include expressive actions carried out for the purpose of preserving or maintaining resources, then dense networks have an advantage (Lin, 1999).

CISC enhances "buy-in" (Podolny & Baron, 1997)—an essential element sought by entrepreneurial teams who seek to coordinate their first public offering. Collective-interest networks also have an advantage when problems of market uncertainty need to be overcome (Podolny, 1994). Firms will engage in relationships with other firms with whom they have previously dealt with, and they will pursue status-based homophilic relationships as a way to deal with commodities having difficult to discern value and no comparability (Podolny, 1994). Pricing and marketing initial public stock offerings is a

task that requires dealing with market, timing, and valuation uncertainties. Thus, given that professional service firms specialize,[10] choice of constellation membership would be limited for a given IPO. Adding the uncertainty of pricing and marketing an IPO, and the motivation for firms to work with others firms of their same status[11], dense, redundant groups are likely to result. The benefits of having a dense, redundant network include trust, understanding, shared values and fewer conflicts—qualities that enable the constellation members to focus not among themselves and on their relationships, but on helping the entrepreneurial firm effectively price and market its first public stock offering.

When VCFs network with underwriting firms, auditing firms, and law firms on an entrepreneurial firm's "going public" process, the mobilization benefits of these inter-industry networks are most important in determining the performance of a new stock issue. If factions existed, or constellations could not operate as a collective, then the entrepreneurial firm would suffer. Over time, the reputations of professional service firms that could not work well together would decline, since entrepreneurs do not want to pay for a dysfunctional constellation. Therefore, VCFs' inter-industry network structures impact IPO performance the most when they emphasize collective benefits.

> **Hypothesis 3b**: *The higher a venture capital firm's inter-industry CISC, the higher the IPO's stock price performance.*

From this point forward, unless otherwise noted, CISC is presumed to be at the inter-industry level.

If asked the question: "Which type of VCFs' social capital is most influential in explaining IPO stock price performance," the hypothesized answer would be that CISC explains greater variance in IPO stock price performance than SISC. The rationale is based on the work of Amit, Glosten and Muller (1990a) as follows.

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[10] Investment banking firms specialize (Eccles & Crane, 1988), as do law firms, auditing firms, and venture capital firms.

[11] See for instance, Kilduff & Krackhardt (1994) who found that friends of high status individuals tended to be of high status themselves. Or, Black and Gilson (1999) who acknowledge that it is the "venture capitalist's reputation [that] helps to attract a high quality underwriter for an IPO of the portfolio company's stock." (p. 40)

Since getting venture capital is a highly competitive process, riddled with stringent screening and selection procedures, one would think that only the firms with the highest potential and quality receive venture capital support. However, Amit, Glosten and Muller (1990a) argue that "…venture-backed firms are founded by entrepreneurs who are not the most capable ones." (p. 110) The most capable entrepreneurs find the venture capitalists' price to be too high. The least capable entrepreneurs cannot convince venture capitalists to support them. Thus, if:

(1) the "middle-quality" firms are the ones most likely to be supported by venture capitalists (Amit, Glosten & Muller; 1990a);

(2) high quality non-venture-backed firms are as likely to go public as venture-backed firms;

(3) venture-backed firms outperform non-venture-backed firms (Brav & Gompers, 1997; Brophy, 1988; Megginson & Weiss; 1991; Williams, 1997);

then VCFs are presumed to contribute significantly to IPO performance beyond the quality of the firm going public. The contribution made by venture capitalists should add more value to IPO performance than the benefits of having privileged information used in choosing the best entrepreneurial firms in which to invest (given that this definition of "best" refers to a relative standing among "middle-quality" firms). CISC compared to SISC, therefore, is presumed to explain more of the variance in IPO stock price performance. Contributions of the constellation toward the process and outcome of going public characterize CISC. SISC leads to advantages in investment choice. Since choice is hypothesized to be less influential in explaining IPO stock price performance than contribution, CISC is prioritized over SISC.

> **Hypothesis 3c**: *IPO stock price performance is better explained by venture capital firm CISC than by venture capital firm SISC.*

Organizational-related Capital (ORC)

One of the ways in which organizational-related capital is made manifest is through prior strategic choices. "Skills and routines emerge because of learning over time," claims Porter (1991), and "this learning is a reflection of past strategy choices which have defined how activities are configured." (p. 109) Thus, choices have shaped the firm and provide a foundation upon which future decisions are made (c.f., path

dependencies discussed by Teece, Pisano, and Shuen (1997), and routines discussed by Nelson and Winter (1982)). Managers, for instance, use their skills at the individual level to craft strategies at the firm level (Thompson & Strickland, 1998). Strategies, as they are implemented, bring a certain unique focus or emphasis to the firm. It is this focus that enables some firms to have a greater ability to deal with new information compared to other firms (Cohen & Levinthal, 1990).

Venture capitalists constantly deal with new information as they attempt to judge the value of emerging technological developments and entrepreneurial companies. Yet, venture capitalists' judgement heuristics are quite often far from scientific (see Appendix B for a discussion of venture capital deal evaluation literature). Causal ambiguity (Reed & DeFillippi, 1990) may be an appropriate way to explain the competitive advantage some VCFs have over others. Causal ambiguity incorporates tacitness (the implicit and noncodifiable accumulation of skills that results from learning by doing), complexity (a result of having a large number of interdependent skills and assets), and specificity (transaction-specific skills and assets that are utilized in the production processes and provision of services for particular customers) in a way that creates barriers to imitation, which leads to a sustainable competitive advantage (Reed & DeFillipi, 1990). Thus, reliance on prior knowledge and experience that is tacit, complex and specific is crucial to making wise investment decisions.

A firm's business strategy is a way of aggregating firm knowledge into a measure of skill that includes not only technical capabilities but tacit understandings as well. Strategy, over time, builds a type of history that impacts how and if future information is recognized, evaluated, and acted upon. This skill of being able to recognize, evaluate, and act upon certain phenomena better than other firms can, in a way that adds value, is an essential, intangible resource. Hence, ORC as reflected in a firm's strategy fits within the parameters emphasized by the RBV.

Venture Capital Firm Strategies.

A VCF is a professional service firm. Professional service firms, according to Nayyar (1992), and Noling and Blumenthal (1985), perform best when practicing a focused strategy. A focused strategy provides specialized skills to accumulate within the firm such as specific industry-based knowledge, experience, and network associations

based on working within a narrow niche (Hannan & Freeman, 1977). Disagreement exists in the venture capital literature as to the value of pursuing a focused strategy for VCFs. Some say the venture capital industry in general moves toward greater specialization, by geographic location, by industry, and by stage of development (Schilit, 1991; Bygrave, 1987), yet others believe that the once homogeneous venture capital industry is rapidly dividing into several strategic groups (Robinson, 1987).

Areas in which VCFs strategically focus comprise ORC. In general, there are three popular areas in which VCFs focus: through the choices of industries in which they invest (Fried & Hisrich, 1995; Gupta & Sapienza, 1988, 1992; Norton & Tenenbaum, 1993a; Sandberg & Hofer, 1987; Tyebjee & Bruno, 1984a, 1984b), financing stage preferences (Gorman & Sahlman, 1989; Gupta & Sapienza, 1988, 1992; Norton & Tenenbaum, 1993a; Tyebjee & Bruno, 1984a, 1984b), and geographic proximity to the entrepreneurial firms in which they invest (Gupta & Sapienza, 1988, 1992; Tyebjee & Bruno, 1984b).[12] Only two sets of authors—Gupta and Sapienza (1988, 1992), and Norton and Tenenbaum (1993a)—have empirically investigated how VCFs focus, although numerous studies have examined these three variables separately and in combinations. Ideally, a VCF's three areas of focus—financing stage preference, industry relatedness, and geographic proximity—should be able to be grouped as to create a single firm level variable called ORC.

Financing Stage Preference, Industry Relatedness, and Geographic Proximity.

Financing stage preference, industry relatedness, and geographic proximity share relationships with each other, as demonstrated by Gupta and Sapienza (1992) and Norton and Tenenbaum (1993a). Using data from *Pratt's 1987 directory of Venture Capital Sources*, Gupta and Sapienza (1992) found that VCFs preferring early stage financing tended to invest in firms from related industries, and they tended to locate close to these entrepreneurial firms. Small VCFs were more likely to prefer early stage financing and

[12] Other ways in addition to these three that enable venture capital firms to achieve a focused strategy include specializing by entrepreneurial firm size (Fried & Hisrich, 1995), number of number of man-days[12] spent in managerial or technical assistance roles (Robinson, 1987), the way they focus their staffing needs and fundraising efforts (Schilit, 1991), and in terms of the amount and type of involvement they contribute to their investments (Gorman & Sahlman, 1989; MacMillan, Kulow, & Kyoylian, 1989; Sapienza, 1992).

larger VCFs tended to prefer late stage financing (Gupta & Sapienza, 1988, 1992). These findings led Gupta and Sapienza (1992) to conclude that "… venture capitalists regard the active provision of managerial/technical assistance to the portfolio companies as an essential part of their roles and is contrary to the notion that venture capitalists are passive investors." (p. 302) Venture capital firms' foci comprise a strategy as to how they best add value to their investments. This study was limited, however, in that it focused on intended rather than actual investment strategies, and the hypothesized relations were not examined in the context of any performance measures (Gupta and Sapienza, 1988). In their 1992 rendition of the 1988 article, a third limitation arose: their data did not conform to assumptions of the statistical tests utilized, nor did it display high variability. Gupta and Sapienza (1992) called for future research to "… examine the longitudinal impact of current VCF characteristics on the future pattern of their actual investment behavior." (p. 360) This study meets that call.

Norton and Tenenbaum (1993a) examined specialization versus diversification as a venture capital investment strategy purposefully designed to manage portfolio risk. They found results confirming previous findings that VCFs preferring early stage financing, particularly seed financing, were less diversified in terms of industry. Venture capital firms in Norton and Tenenbaum's (1993a) study specialized by focusing on a single financing stage or several "connected' stages. Norton and Tenenbaum (1993a) concluded that VCFs pursue minimal diversification across financing stages and industries. Degree of focus, again, was deemed an important aspect of these firms' strategies.

Both of these studies empirically investigating the focus of VCFs were based on a total of 267 observations collected over a decade ago. Replication studies are needed to confirm these relationships using observations based on actual data. Do relationships found in the past between areas of VCF focus—namely financing stage preference, industry, and geography—hold true today? Do industry and/or geographic preferences (as examined in prior studies) equate to actual choices made by venture capitalists? What

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Although not yet confirmed, specialization by deal size and syndication partners is expected to increase (Dean & Giglierano, 1990).

are the outcomes when variables are measured differently from those computed for previous studies?

The relationships between areas of VCF specialization found in the past are proposed here to remain as previously shown. Namely, VCFs with higher industry focus prefer earlier financing; VCFs with higher geographic focus prefer earlier financing; and VCFs with higher industry focus will have higher geographic focus. These proposed relationships indicate the type of focus that can be used to identify the VCF's strategy, and hence its type and amount of ORC. The more a VCF prefers involvement in early stage financing, the greater its specialization by industry and geography. The more a VCF prefers late stage financing, the less it will specialize by industry and geography. By re-testing these relationships, a foundation may be built for strategic grouping.

> **Hypothesis 4a**: *Venture capital firms that focus on working with highly related industries prefer earlier financing.*
>
> **Hypothesis 4b**: *Venture capital firms that focus on locating within a close geographic proximity to the entrepreneurial firms they support prefer earlier financing.*
>
> **Hypothesis 4c**: *Venture capital firms that focus on working with highly related industries will locate within a close geographic proximity to the entrepreneurial firms they support.*

Strategic Groups within the Venture Capital Industry.

Most research concerning types of VCF specialization favors two generic groups of firms. One group follows the focused strategy of pursuing investments in related industries within close geographic proximity as a function of their preference for early stage financing. The other group follows a more diversified strategy in terms of investing in less related industries over a broader geographic scope due to their emphasis on late stage financing. Scholars have not yet explored VCFs' strategic groups, although literature exists supporting the two extreme groups—early-focused and late-diversified.

Strategic group research is consistent with the resource-based view of the firm (Mahoney & Pandian, 1992). Using the RBV perspective, Chaterjee and Wernerfelt (1991) found that intangible and financial resources were the dominant factors in explaining diversification type. Basically, Chaterjee and Wernerfelt (1991) purported that an overabundance of intangible resources leads to related diversification and an

overabundance of financial resources leads to unrelated diversification for high performing firms. Although there are exceptions, VCFs tend to emphasize offering professional services (a focus based on intangible resources) to less developed entrepreneurial firms or large sums of equity funding (a focus based on financial resources) to more developed entrepreneurial firms. In line with Chaterjee and Wernerfelt's (1991) findings, VCFs preferring early stage financing are more likely to pursue a strategy of related diversification or greater focus than those preferring late stage financing typically associated with a broad diversity of investments. This emphasis on narrowness or breadth of focus (related versus unrelated diversification) is thought to be the result of two types of risk (internal-based and external-based), which differ in amounts during the two different stages of investment (early and late, respectively). Early-stage investments require VCFs to deal with high amounts of internal-based risk and lower amounts of external-based risk. Late-stage investments are associated with high amounts of external-based risk and lower amounts of internal-based risk. In accordance with Chaterjee and Wernerfelt (1991), a professional service emphasis with a focus of utilizing intangible resources, and an equity funding emphasis with a concentration on meeting the investment needs of a greater diversity of entrepreneurial firms applies to the classification of a VCF's strategy. The basic rationale, therefore, as to why financing stage, industry relatedness, and geographic specialization form two strategic groups of VCFs is based on the VCF's resource emphasis, which is a function of the amount and type of risk they prefer to address.

$$\text{Strategic Groups} = f\{\text{resource-emphasis}\}$$

Venture capital firms have different risk preferences, and as a result prefer to offer equity funding at different stages of an entrepreneurial firm's development. Risk varies by financing stage (Carter & Van Auken, 1994; Gupta & Sapienza, 1988; Ruhnka & Young, 1991; Tybejee and Bruno (1984: VC investment activity)).[13] For example, Ruhnka and Young (1991) found that early stage investments contained a higher amount

[13] It is important to note here that there are different types of risk, each having a different meaning for different investors. Fiet (1995a), for example, determined that angel investors are more worried about agency risk (hazards involving monitoring and control), whereas venture capitalists are more worried about market risk. Some venture capital firms may be more apt at controlling certain kinds of risks, and/or have greater aversions to certain types of risk than other venture capitalists (Fiet, 1995a).

of risk than late stage investments (see also Freeman, 1999; Podolny & Castellucci, 1999). The reason that early stage investments are more risky is that when entrepreneurial firms are young, it is more difficult to assess their future growth potential and ability to go public. Thus, early financing assumes more risk and time (Freeman, 1999). As a result, escalating commitment is often high for early stage venture capitalists, since illiquidity creates dependence once they have committed to an entrepreneurial company (Freeman, 1999). These venture capital firms have difficulty rationing whether or not to cut their investment and stop funding if the entrepreneurial company's performance level is not being met (c.f., Steier & Greenwood, 1995). The inclination is often to hold on to the investment and continue funding it in hope that performance improves. Because of their support of the company in its pre-mature state (when stock prices were lower), early stage investors are also likely to earn high rates of return with higher uncertainty, whereas late stage financing is associated with more certain, yet lower, returns (Ruhnka & Young, 1991). One reason for the difference in amount of risk between stages is due to the amount of historical information available about the entrepreneurial firm (Fried & Hisrich, 1994). Gupta and Sapienza (1988) claim that earlier stage ventures are more risky than late stage ventures because they have:

> … fewer resolved demand uncertainties, fewer resolved technological uncertainties (in both product and process design), fewer resolved resource uncertainties (in areas such as availability of skilled personnel, raw materials, and channels of distribution), and fewer resolved management uncertainties (in areas such as the leadership capabilities of the founder, compatibility and balance within the top management team, etc.) (p. 350)

Early stage investments are subject to many internal risks, such as the inability to institute and maintain formalized management policies under rapid growth conditions (Ruhnka & Young, 1987; 1991). Internal risks include poor management, an excessive burn rate for funds, or a lack of internal financial controls (Ruhnka & Young, 1987; 1991). External-based risks are most influential in determining the future of late stage investments—after the entrepreneurial firm has begun to make a profit and is struggling to obtain a viable competitive advantage. External-based risks include technical obsolescence, increased number of competitors and new entrants, weakened demand, and change in market attractiveness (Fiet, 1995a). External-based risks may result in: (1) the inability of the

firm going public to increase or hold market share; (2) the termination of a planned IPO; and/or (3) the inability of the firm to retain key personnel during its transition from private to public (Ruhnka & Young; 1991). In essence, the type of risk the VCF wishes to pursue is dependent upon the resources it has to deal with these risks. Venture capital firms emphasizing intangible resources may be better able to reduce internal-based risks associated with their investment firms. Resource allocations determine the VCF's financing stage preference.

Because early stage investments are in entrepreneurial firms typically wrought with internal-based risks, venture capitalists emphasize monitoring and offering management assistance to help overcome these risks (Barry, Muscarella, Peavy, & Vetsuypens, 1990; Carter & Van Auken, 1994; Gompers, 1995; Gorman & Sahlman, 1989; Rosenstein, Bruno, Bygrave, & Taylor, 1993; Sapienza, 1992; Sapienza & Amason, 1993).[14] Venture capitalists involved in early stage financing give high priority to providing professional services to the entrepreneurial firms they serve. The delivery of quality professional services depends upon the venture capitalist having related experience where similar expertise is used and refined (Nayyar, 1992; Noling & Blumenthal, 1985). To build this kind of expertise, VCFs focus on investments of a particular technology or industry (Barry, 1994; Bygrave, 1987; Tyebjee & Bruno, 1984b). Industry focus enables venture capitalists to become familiar with certain technologies, distribution channels, and target markets (Sandberg & Hofer, 1987). Such knowledge also makes it possible for early stage venture capitalists to have the expertise needed to choose new deals wisely (Sadtler, 1993). Early-stage investments demand specialization in related industries whereby technologies overlap, skills and capabilities are transferable, and efficiencies can be maintained. Such expertise enables the venture capitalist to tacitly understand the intricacies of their investment firm's internal operations, increasing the probability of adding add value to their portfolios.

Geographic focus provides valuable expertise as well. The VCFs that were observed by Lerner (1995) were located within 60 miles of their investment firms. Local

[14] Oversight and professional services are likely to be of greater value for firms displaying greater information asymmetries (Gompers, 1995), and may explain why less able entrepreneurs choose to involve venture capitalists more than entrepreneurs who have already developed profitable ventures (Amit, Glosten, & Muller, 1990a).

or regional expertise may be used to help assess the viability of the business or marketing plan, foster certain networks (Wetzel, 1987), and increase the likelihood of richer, more accurate communication (Daft & Lengel, 1986) between venture capitalists and the entrepreneurial team.[15] Tyebjee and Bruno (1984; model of VC activity) capture the value of being close to one's networks by saying:

> Though most venture capital companies do not actively pursue a policy of restricting their investment activity to a specific geographic boundary, their portfolios often exhibit this specialization because of a tendency of entrepreneurs to search for capital close to their venture's home where their banking, legal, and accountancy contacts are strongest. (p. 1057)

Proximity to the VCF's headquarters is beneficial, and is assumed to be associated with serving a narrow geographic region. Venture capital firms providing equity funding to investments farther away from their headquarters are likely to be involved in a greater variety of geographic distances from their headquarters. This broader, more diversified scope would render more investment opportunities within late stage VCF's range, but decrease the venture capitalists' ability to provide intense services to their investment firms. Serving a focused geographic area enables firms offering early stage venture capital to increase the intensity of their professional services. By specializing in related industries and a geographic proximity close to the VCF's headquarters, venture capitalists are better able to add value to their investments (Sapienza & Timmons, 1989). Strategic focus helps these venture capitalists understand the intricacies of specific operations, gain the practice needed to more successfully reduce internal-based risks, and better evaluate embryonic, risky ventures in need of initial resources.

Late stage investments require large sums of funding (Freear & Wetzel, 1990; Sahlman, 1990), as the entrepreneurial firm is now making a profit and desires to grow. Pursuing a multitude of lower risk investments carrying moderately high returns is a steadfast way to accumulate large sums of funding. This is because late stage investments compared with early stage investments are more prone to liquidity (have higher cash out potential) and may come with financing by early stage VCFs adding

[15] Accuracy of meaning is overwhelmingly important in emerging industries where uncertainties abound, new terms are being created, and understanding recent technological and managerial breakthroughs are crucial to the firm's performance. See also Sapienza (1992) who claims that the more communication, the greater the venture capitalist adds value.

credibility to the deal. Early stage deals are more difficult to evaluate and therefore, "good" early stage deals would appear to be scarcer than the availability of "good" late stage deals. Early stage VCFs would be potentially more likely to be involved in multiple funding rounds as the entrepreneurial firm develops compared to late stage VCFs. As a result, accumulation of total capital available for investment is able to increase because of greater security surrounding late stage VCF's investments.

To summarize, although VCFs pursuing late stage financing emphasize providing money versus offering professional services, they still attempt to minimize external-based risk by using their diversity of experiences to advise and counsel entrepreneurs, adding value to their investments. The arguments presented here suggest that relationships between areas of VCF focus are important. Thus, ORC should be able to be created by aligning industry relatedness, geographic proximity, and financial stage preference. Organizational-related capital should be able to identify firms at two extremes: early-focused and late-diversified.

Organizational-related Capital and IPO Stock Price Performance.

Venture capital firms belonging to the early-focused strategic group are willing to assume greater uncertainty and as a result have higher potential payoffs when the entrepreneurial firms they invest in go public (Stuart, Hoang, & Hybels, 1999; Podolny & Castellucci, 1999). As an attempt to reduce the uncertainty associated with the entrepreneurial firms they support, venture capitalists attempt to shape these firms by helping them obtain good supplier networks, distribution channels, management advice, board of director leadership, and benchmarks to guide them. Early-focused venture capitalists are potentially quite influential in shaping the entrepreneurial firms they support to develop qualities that will make these investment firms successful throughout these firms' growth years. The expertise the VCF brings to its investments, as well as the access to information provided by network connections is hypothesized to be valuable to the entrepreneurial firm. The impact of early-focused ORC on the entrepreneurial firm going public is projected to be greater than the impact of the late-diversified ORC, due to time the VCF spends with the entrepreneurial team in a guiding role. Late-diversified VCFs focus on funding, but not necessarily shaping the entrepreneurial firms. To compare the two types of ORC implicitly means syndicate-backed IPOs are surmised to

be better performers than non-syndicate venture-backed IPOs. Of the non-syndicate venture-backed IPOs, those sponsored by early-focused VCFs should outperform those sponsored by late-diversified firms. Of course, having the support of both an early-focused VCF as well as a late-diversified VCF should impact IPO performance more than one type of ORC over another, given all else is held equal, such as the quality of human capital employed.

> **Hypothesis 5a**: *The greater the range of organizational-related capital in the syndicate, the higher IPO stock price performance.*
>
> **Hypothesis 5b**: *The greater the diversity of organizational-related capital in the syndicate, the higher IPO stock price performance.*
>
> **Hypothesis 5c**: *IPO stock price performance is better explained by the range of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.*
>
> **Hypothesis 5d**: *IPO stock price performance is better explained by the diversity of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.*
>
> **Hypothesis 5e**: *For non-syndicated venture-backed IPOs, IPO stock price performance is best explained by early-focused type organizational capital.*

Exploratory Relationships

Exploratory testing will be performed to determine the relative contributions of syndicates' reputational capital, cumulative experience, social capital, and ORC toward explaining IPO stock price performance. The comparison of VCFs' social capital to ORC in terms of the ability of each to explain IPO stock price performance can rely on past research. Social capital should explain IPO stock price performance better than ORC. The rational relies on Cohen and Levinthal (1990), whereby the critical knowledge that a firm needs to gain supernormal rents is not simply technical and substantive, but knowledge indicative of having social capital. Many other scholars (Boxman, De Graaf & Flap, 1991; Coleman, 1988, 1990; Meyerson, 1994; Pennings & Lee, 1999; Rubio, 1997) agree that social capital is needed to generate a return on human capital. "Social capital," says Burt (1992) "is the final arbiter of success." (p. 9) Social capital is what enables the firm to create innovative solutions, novel associations and productive linkages (Cohen & Levinthal, 1990). As Pennings and Lee (1999) put it: "Social capital

allows the firms to leverage their human capital thus extracting more quasi rent from that asset." (p. 59) Thus, since ORC is closest in definition to human capital as used in this study, social capital is expected to contribute more to the explanation of IPO stock price performance than ORC.

> **Hypothesis 6**: *IPO stock price performance is better explained by social capital than by organizational-related capital.*

Control Variables

Hot Issue Market Index

Hot issue markets are defined by periods in which IPO's first month aftermarket performance is abnormally high (Ibbotson & Jaffe, 1975; Ritter, 1984a). Aggarwal and Rivoli (1990) attribute IPO performance to overvaluation or fads in early aftermarket trading. Rajan and Servaes (1997) attribute overoptimism to analysts' forecasts surrounding underpriced IPOs. Shiller (1990) surveyed IPO investors and determined that contrary to what rational expectations models portray, investors think there are fads, so "hot issue" markets may be a product of investor sentiment. Ibbotson, Sindelar, and Ritter (1988; 1994) explain how rational explanations for the existence of hot issue markets are problematic.

Controlling for industry popularity was first done by Logue (1973), who used a market ebullience measure to indicate the investment community's appetite for new and/or speculative issues. Logue (1973) found a significant, positive relationship between market ebullience and stock price performance. Stuart, Hoang and Hybels (1999) note the importance of controlling for hot and cold markets. They used Lerner's (1994) index to do so, and their findings were strongly affected by inclusion of this control variable. Hansen and Lee (1996) found that reputable investment banks time the offerings of IPOs they support to coincide with industry peaks in the short-term, concluding that this is consistent with the overreaction scenario of the going public process. "IPOs are timed to exploit investor overvaluation of IPO firms, " claim Hansen and Lee (1996, p. 24). Li and Berta (1999) used two hot issue market control variables in their study and found that neither was highly correlated with size of the IPO (measured as gross proceeds), or with status of the lead or co-lead underwriter. In general, though, the hotter the new issue, the higher expected IPO performance.

Percentage of Insider Shares Before the IPO

Many scholars examine the effect of insider's holdings on firm valuation (Allen & Faulhaber, 1989; Grinblatt & Huang, 1989; Welch, 1989) and on certification effects (Firth & Liau-Tan, 1998), as well as control for the effect of insider shares on stock price performance (Carter, Dark & Singh, 1998; Carter & Manaster, 1990; Hensler, Rutherford & Springer, 1997). A lack of change in insider shares is often viewed as a signal of confidence in the newly public firm. As Hensler, Rutherford and Springer (1997) add:

> The percentage of insider ownership serves as a "certification" that managerial decisions will coincide with outside shareholder interests. The greater the retained ownership is, the less severe the agency problem, leading to decisions that are closely aligned with the survival of the firm. (p. 97)

A high percentage of entrepreneurial ownership signals that most of these stockholders' wealth is invested in the new company which means they are confident in their IPO, thus increasing the value of the firm (Downes & Heinkel, 1982; Leland & Pyle; 1977; Massey, 1995). Hensler, Rutherford and Springer (1997) indeed found that percentage of insider ownership, IPO activity level, initial return, age and size of the IPO is associated with increased survival time, whereas market level at the offering date and number of risk characteristics are associated with shorter length of trading time. Firth & Liau-Tan (1998) claim that Leland and Pyle's (1977) claims—that entrepreneurs' willingness to invest serves as a signal of the true quality of their own projects—have mixed empirical support. Datar, Feltham and Hughes (1991) claim that the amount of insider holdings is a manipulative signaling device that auditors can advise firms to use as a way of communicating private information about the new issue. Titman and Trueman (1986) found that high quality auditors are a signal in addition to insider holdings and the presence of one does not discount the need for the other. Feltham, Hughes and Simunic (1991) add that even if audited reports and auditor choice are used to communicate private information about the entrepreneurial firm about to go public, the contribution by retained ownership still plays a vital role in communicating information. The statement by Megginson and Weiss (1991) that "…insiders [through share ownership] have everything to gain and very little to lose from signaling falsely at the time of an IPO" (p. 881) reflects the belief that insiders may hold their shares even if they do not believe the quality of the company is particularly high. However, some scholars disagree. Ritter

(1984b) does not find evidence of signaling. Others claim that signaling via a large percentage of insider shares can be harmful to the firm. Firth and Liau-Tan (1998), for example, state that "Very high retained ownership [i.e., percentage of insider shares] may imply an illiquid market for the shares and hence deflate the firm's stock valuation." (p. 146) They rely on the work of Morck, Shleifer, and Vishny (1988) to support this statement. Also, other signals, such as capital expenditure plans (Trueman, 1986) may substitute for the retained ownership signal, causing mixed results (Firth & Liau-Tan, 1998). Whatever variance is explained by signals from inside shareholders' ownership percentages, it appears to be a variable that should be accounted for and hence serves as a control in this study.

IPO Deal Size

IPO deal size is often used to contro for small-firm effects (Booth & Smith, 1986; Carter, Dark, & Singh, 1998; Carter & Manaster, 1990; Chung, Singh, & Lee, 2000; Logue, 1973; Megginson & Weiss, 1991). Ibbotson, Sidelar, and Ritter (1994) found a small-firm effect whereby the IPOs of smaller, younger companies are more likely to underperform. Booth and Smith (1986) use the log of issue size as a control variable, and found that larger issues of bonds were more likely to be certified. Carter, Dark, and Singh (1998) use gross proceeds deflated using the annual inflation rate, and expressed as a natural log. Carter and Manaster (1990) use the natural logarithm of gross proceeds for the new issue before adjusting for inflation. Logue (1973) claims that the total dollar value of the offering is a surrogate for firm size and strength, and found a significant negative relationship between size and performance. Megginson and Weiss (1991) controlled for amount offered as their size variable. Brav and Gompers (1997) found the IPO firm size is an important determinant of relative returns, as small firms are more likely to underperform. In accordance with these scholars, the total proceeds of the IPO used to proxy deal size should be directly associated with IPO performance.

Chapter Summary

The RBV was reviewed and elaborated upon in the first section of this Chapter. The second section provided definitions for each of the variables examined in this study and the theoretical rationales for the relationships to be tested. Operational definitions for these variables are provided in Chapter Three.

CHAPTER THREE: DATA GATHERING, VARIABLE OPERATIONALIZATIONS, AND AN OVERVIEW OF THE METHODS

Data

The data for this study were gathered from various archival sources and concatenated. Two databases were created—IPO_DATA and VCF_DATA. Each of these databases is described in detail in Chapter Four. Here, data gathering and decision rules for database creation are addressed.

Information pertaining to U. S. common stock initial public offerings (IPOs) of U.S. firms with an offer date of January 1, 1995 through December 31, 1998 was obtained from Securities Data Company, Inc. (SDC). Unit issues were excluded, as were all financial issuers (SIC codes 6000-6999), spin-offs, privatizations, foreign tranches, and American Depository Receipts/American Depository Shares. All offerings were made through a firm commitment underwriting arrangement. The number of IPOs within these parameters totaled 1,612. By year, there were 394 IPOs during 1995, 595 during 1996, 396 during 1997, and 227 during 1998.

SDC provided specific information pertaining to these IPOs such as the issuer's descriptive information, as well as the names of the issuer's professional service providers: the auditing firm; the issuer's law firm; the lead underwriting firm (manager); and the manager's law firm. As in any study employing network analysis, a boundary on the population of relationships examined must be well defined. Of the 8,376 unique professional service provider – IPO combinations that exist for the data observed, names for only eight professional service providers could not be identified. These eight firms comprise five law firms and three accounting firms. This tiny percentage of missing data was not interpreted to pose a significant bias on computations of inter-industry network structures. Because many underwriting and auditing firms merged under the timeframe studied, data was obtained from SDC for use in identifying these combinations of firms. If a firm merged with another firm in the database, computations were made using the pre-merged firm's data before the merger, and both the target and acquirer firm's data combined, after the merger.

Data pertaining to the aftermarket stock prices of the IPOs under study were obtained from the Center for Research in Securities Prices (CRSP). Missing stock price

performance data from CRSP were computed using Dow Jones & Company's Historical Pricing Reports. References such as EDGAR On-Line, Hoover's On-Line, Investment Dealers Digest, and IPO Data Systems, Inc. (http://www.ipodata.com)were used to fill in missing IPO data and resolve discrepancies between information sources.

Data obtained from Venture Economics Investor Services (a division of SDC and the National Venture Capital Association's contracted data provider) as well as VentureOne's *IPO Reports* (1995-1998) were used to determine which IPOs were venture-backed. Any discrepancies in information were brought to the publishers' attention and remedied or clarified with the respected source(s) on a case-by-case basis. Over the period examined, 593 IPOs were identified as being venture-backed. On a year-by-year basis, 170 (43%) of the IPOs during 1995 were venture-backed, as were 233 (40%) of the 1996 IPOs, 123 (31%) of the 1997 IPOs, and 67 (30%) of the 1998 IPOs. This averages to almost 37% of all IPOs selected.

VentureOne's *IPO Reports* (published for 1995, 1996, 1997 and 1998 as well as a custom data run for additional 1998 information) were used to identify exactly which firms supplied venture funding to which IPOs. Since names of venture funding providers are often similar (especially after abbreviation) and/or may appear numerous ways for the same company, direct assistance was gleaned from a VentureOne analyst to help resolve nomenclature differences. When resolution could not be achieved, venture firms having similar names were contacted directly by phone and/or e-mail to clarify who was associated with each IPO. Data discrepancies the resolution of such discrepancies are discussed in greater depth in Appendix C.

Galante's Venture Capital and Private Equity Directory (1996-1999), and *Pratt's Guide to Venture Capital Sources* (1996-1999) were used to characterize these firms providing venture capital. Data were gathered from both *Galante's* and *Pratt's*, which are published annually the year following information collection.[16] *Galante's* data were preferred over *Pratt's* data because of accessibility and completeness: *Galante's* has greater fund detail compared to *Pratt's* sources. When *Galante's* data were unavailable

[16] *Galante's* will gather data from July through December of 2000 for example to create its year 2001 Directory. Firms not listed in a *Galante's* directory may have exited the industry or are too small for consideration or choose not to be listed in the directory. Venture capital firms do not pay for inclusion in a *Galante's* directory. They are contacted and asked to provide updated information only.

in a subsequent year, *Pratt's* data were used. If *Pratt's* data were unavailable for a subsequent year, then *Galante's* data were used for the year closest to the date information was sought. If *Galante's* data were unavailable for the year closest to the date information was sought then *Pratt's* data were used for the closest year. Appendix D provides a comparison of *Pratt's* and *Galante's* information. The remaining 169 IPO/firm combinations had missing data not obtainable from *Pratt's* or *Galante's* sources. A custom report was then purchased from VentureOne, satisfying some of the missing data, and consultations with industry experts, analysts, and venture capitalists by phone resulted in satisfying data for almost all variables on all but 50 firms of the 447 identified. Thus, relatively little if any data were able to be located for approximately 4% or 74 of the 1,783 IPO/venture capital provider combinations.

The firms providing venture funding to the IPOs, as identified by VentureOne, vary widely in terms of "types of firms" based on data gleaned primarily from *Galante's* and *Pratt's* sources. In other words, not all firms providing venture backing are traditional VCFs. In fact, the majority of firms are classified in multiple ways, such as private VCF and Small Business Investment Company (SBIC), or merchant banking, advisory, and SBIC, or private investment firm and banking, advisory, and/or private VCF. Firms are either solely or partially classified as private, quasi-public or public U.S. VCFs, venture capital subsidiaries, SBICs, banks (either merchant or investment banks), or as advisory firms, corporations, university based entities, private investment firms, insurance companies, and/or foreign based firms of various types. Thus, to enhance generalizability and remove potential noise from the study, a select group of firms providing venture capital as identified in the previous procedures were chosen for examination. After discussions with industry experts, it was determined that firms identified in this study as having provided venture funding to IPOs that are also members of the National Venture Capital Association (NVCA) would be selected as comprising the venture capital industry (also for purposes of computing intra-industry networks). Aside from networking based on past working relationships with each other, NVCA members socialize and share information at annual NVCA conferences, and through membership communications. The "group effect" from being involved in such a professional affiliation does not discount the theory proposed in this study that SISC is

more important from an intra-industry point of view than CISC. NVCA membership is screened, with criteria as follows: members must be entities comprised of full-time professionals having raised at least $5 million to invest in companies, have solid references, and capital currently under management qualifying them as "traditional" venture capital firms (VCFs). NVCA membership excludes firms with foreign headquarters, angel capitalists, limited partners and those classified as "other" or "unknown" from this study. NCVA membership was determined from the March 11, 2000 NVCA membership list per the website www.nvca.com. Two VCFs—Sequoia and Draper Fisher Jurvetson—both of whom meet NVCA requirements were added to the NVCA membership selection per a discussion with John S. Taylor, Director of Research for NVCA. Firms identified by VentureOne supporting the IPOs examined in this study who were also members of the NVCA as listed the NVCA website were therefore selected to represent the venture capital industry (N=1,130 firm/IPO combinations (63% of 1,783), or 157 firms (33%) out of a total of 447 in the database). The NVCA members as of March 2000 that funded IPOs between 1/1/95 and 12/31/98 (N=1,130) are described and listed in Chapter Four.

Variable Operationalizations

All operationalizations are summarized in Table 1 and described in subsequent sections.

Table 1: Variable Operationalizations					
Variable name	**Variable type**	**Meaning**	**Range, units, & level of analysis**	**Algorithm**	**Hypotheses**
DV: **Abnormal IPO stock price performance** **IPOPERF**	Ratio	High = performance above the market index. Low = sub-par performance.	-∞ to +∞ percentage IPO Level	$IPOPERF_{i,t} = \left\{\left[\prod_{\tau=T_0}^{T_t}(1+R_{i,\tau})\right]\right\} - \left\{\left[\prod_{\tau=T_0}^{T_t}(1+R_{m,\tau})\right]\right\}$	1, 2, 3a, 3b, 3c, 5a, 5b, 5c, 5d, 5e, 6
IV: **Reputational Capital** **REPCAP**	Ratio	High = high reputational capital. Low = underpricing was high and thus certification (i.e., the benefit of reputational capital) was low.	-∞ to +∞ percentage IPO Level	$REPCAP_i = UND_i * -1$ Where, $UND_i = (p_{i,FTD} - op_i)/op_i$	1
IV: **Cumulative Experience** **CE**	Ratio	High = high amount of cumulative experience. Low = little, if any, cumulative experience.	0 to +∞ # IPOs IPO Level	The cumulative experience of all VCFs in the syndicate. Experience is the number of IPOs up to the past 25 months that each VCF has worked on including the present IPO.	2
IV: **Social Capital** **SISC** **CISC**	Interval	High = redundant network (collective-interest social capital is high; self-interest social capital is low). Low = non-redundant network (SISC is high; CISC is low).	0 to +∞ redundancy VCF Level	UCINET version 5.1.0.1 (Borgatti, Everett, & Freeman, 1999). Redundancy is operationalized using Burt's (1992) aggregate constraint formula.	3a, 3b, 3c, 6

Table 1: Variable Operationalizations, continued					
Variable name	**Variable type**	**Meaning**	**Range, units, & level of analysis**	**Algorithm**	**Hypotheses**
IV: **Organizational-related capital** **ORC**	Interval	High = late-diversified industry -far away VCF. Corresponds with high scores on FSP, IR and GP. Low = VCF has an early (FSP), related industry (IR) & close by (GP) focus.	-∞ to +∞ factor score VCF Level	Factor Score attributed to standardized FSP, IR and GP, if applicable. (If factor score cannot be created – i.e., more than one component exists – then use FSP to represent ORC.)	5a, 5b, 5c, 5d, 5e, 6
IV: **Financing Stage Preference** **FSP**	Interval	High = firm prefers late stage financing. Low = firm prefers early stage financing.	0 to 1 proportion VCF Level	$FSP = \frac{\left(\frac{7N_L}{3}\right)}{\left[\left(\frac{7N_E}{4}\right)+\left(\frac{7N_L}{3}\right)\right]}$	4a, 4b
IV: **Industry Relatedness** **IR**	Interval	High = VCF prefers to invest in firms from many different industries. Low = VCF prefers to focus in firms of related industries.	0 to 5 weighted average VCF Level	$PI(i,j) = \sum_{k=1}^{n_i}\sum_{l=1}^{n_j} w_{k:n_i} w_{l:n_j} P(sic[i,k], sic[j,l])$ $CP(m,T) = \sum_{i<j, i,j \in S_{m,T}} \frac{PI(i,j)}{\#S_{m,T}(\#S_{m,T}-1)/2}$ See Caves, Porter, & Spence (1980)	4a, 4c
IV: **Geographic Proximity** **GP**	Ratio	High = VCF locates far away from its investments. Low = VCF locates close to its investments.	0 to ∞ # statute miles VCF Level	Bridger Systems' ZIPFind Deluxe 3.0 software program	4b, 4c

Table 1: Variable Operationalizations, continued					
Variable name	**Variable type**	**Meaning**	**Range, units, & level of analysis**	**Algorithm**	**Hypotheses**
CONTROL: **IPO Deal Size**	Ratio	High = deal was large. Low = deal was small.	0 to ∞ millions of dollars IPO Level	Total Proceeds from the new issue.	1, 2, 3a, 3b, 3c, 5a, 5b, 5c, 5d, 5e, 6
CONTROL: **Percentage of Insider Shares before the IPO**	Ratio	High = insiders hold a large percentage of the IPO's stock. Low = insiders hold a low percentage of the IPO's stock.	0 to ∞ percentage IPO Level	The number of shares held by insiders divided by the total number of shares in the entrepreneurial firm before going public.	1, 2, 3a, 3b, 3c, 5a, 5b, 5c, 5d, 5e, 6
CONTROL: **Hot Issue Market Index**	Interval	High = the issue is hot. Low = cold issue market.	-∞ to +∞ proportion IPO Level	$HotIssueMarketIndex = (OP - AP) / AP$ $Averageprice(AP) = (Hi + Lo) / 2$	1, 2, 3a, 3b, 3c, 5a, 5b, 5c, 5d, 5e, 6

Dependent Variable: Abnormal IPO Stock Price Performance

The dependent variable in this study is IPO stock price performance using a buy and hold investment strategy. A brief summary of the IPO stock price performance literature is presented in Appendix E for supplemental purposes. Venture capital firms holding public stock in their investment companies determine the price of this stock using the aftermarket price at the close of the first day (per discussions with venture capitalists by phone during April, 2000). Thus, buying at the first aftermarket price and selling at the end of each month realistically translates into how venture capitalists may gauge their return on investment. Ritter's (1991) method of computing IPO stock price returns incorporates the day of the first reported aftermarket price, which typically is the close of day price on the first day of trading, as part of the first 21-trading-day period. For IPOs in which the initial return period is greater than one day (i.e., CRSP data are not available), the month one period is truncated accordingly (e.g., if CRSP data is not available until day 6 after the offering date, month 1 consists of event days 7-22). If data is missing for over six of the first days the new issue exists in the aftermarket after its offer date, then the month one trading period is not computed. Compounded daily returns are calculated for one to six "months" in accordance with Ritter (1991), who defines a months as a successive 21-trading-day period. The buy and hold strategy for six months would be exemplified as such:

"month" one: buy at first aftermarket price and sell at end of day 22.

"month" two: buy at first aftermarket price and sell at end of day 43.

"month" three: buy at first aftermarket price and sell at end of day 64.

Repeat three more times, ending on days 85, 106, and 127.

For IPOs that are delisted before their one-year anniversary, the aftermarket period is truncated, and the last month buy and hold ends with CRSP's last listing. Chalk and Peavy (1990) found that individual daily returns were meaningful when cumulated over several trading days. In particular, some firms performed especially well during days two though 50 (roughly the first three "months").

The returns computed for this study are benchmarked to the NASDAQ value-weighted composite index (Ritter, 1991; Brav & Gompers, 1997), so that only abnormal returns are identified as IPO stock price performance. Ritter (1991) and Chopra,

Lakonishok, and Ritter (1992) state that the measurement of abnormal performance over long horizons is very sensitive to the performance benchmark used. Chalk and Peavy (1990), and Chopra, Lakonishok, and Ritter (1992) recommend adjusting for benchmark size (i.e., using the average of all firms as a benchmark for small stocks is not as good as using the small stock average index). In other words, market value at offering should be considered because returns differ systematically across market capitalization groups (Chalk & Peavy, 1990). Benchmarking according to these deciles, however, is difficult and currently beyond the scope of this study. By controlling for IPO deal size in the tests, it is hoped that the "noise" in abnormal performance resulting from insensitive benchmarking will be removed accordingly.

Each model tested in this study is observed separately using the dependent variable for month one, two, three, etc. up to a month six buy and hold strategy, enabling identification of the extent to which the independent variables have an effect on the dependent variable. The longitudinal nature of the dependent variable can determine the "halo" effect (see Stuart, Hoang, & Hybels, 1999). The halo effect of high status others dissipates as the IPO matures and the certifying firms become disassociated with the entrepreneurial firm. Over time, the merits of the entrepreneurial firm have to support the quality investors expect without reliance on associations with syndicates and constellations. Knowing the extent of time over which the independent variables explain IPO stock price performance after the offering of the new issue increases the sensitivity of the study because endurance of the hypothesized performance relationships are addressed.

$$IPOPERF_{i,t} = \left\{\left[\prod_{\tau=T0}^{Tt}(1+R_{i,\tau})\right]\right\} - \left\{\left[\prod_{\tau=T0}^{Tt}(1+R_{\mathrm{m},\tau})\right]\right\}$$

Where:

$IPOPERF_{i,t}$ is the abnormal stock price performance of the new issue, i, from the offerdate to the end of month t

i is the index of stocks

t is the index of months from month 1 to 6, where a month is a successive 21-trading-day period following Ritter (1991)

τ (tau) is the index of days

T_o is the first aftermarket return day in CRSP

T_t is the last day of month *t* (i.e., days 22, 43, 64, 85, 106, 127)

$R_{i,\tau}$ = *defined by RET() in the CRSP tapes* = $(P_{i,\tau} - P_{i,\tau-1} + f_{i,\tau} + DIV_{i,\tau})/ P_{i,\tau-1}$

$f_{i,\tau}$ = *price adjustment factor for stock i*

$R_{m,\tau}$ = $(\text{NASDAQIndex}_{i,\tau} - \text{NASDAQIndex}_{i,\tau-1})/ \text{NASDAQIndex}_{i,\tau-1}$

P = stock price

DIV = stock dividend

Independent Variables: Human-Based Factors

Human-based factors include reputational capital, cumulative experience, social capital and ORC. These variables, discussed below, will be factor analyzed and the resulting factor score, if applicable, will determine the value of human-based factors. A high human-based factor value means many high quality human-based factors are present. A low value means the quality of human-based factors is low.

Reputational Capital

All new issues are typically underpriced to some extent. However, severe underpricing has been associated with less prestigious underwriters and auditing firms supporting the new issue. Relying on this logic, underpricing in this study serves as a proxy for constellation-level reputational capital. Underpricing is the observed stock price return from the offer price to the first aftermarket price (Balvers, McDonald, & Miller, 1988; Beatty & Ritter, 1986; Booth & Smith, 1986; Mauer & Senbet, 1992; McDonald & Fisher, 1972; Muscarella & Vetsuypens, 1989; Prasad, Vozikis, Bruton, & Merikas, 1995; Young & Zaima, 1988). Underpricing is measured as the proportional change in price from the initial offering to the first market bid as reported within the first five trading days (Balvers, McDonald, & Miller, 1988; Young & Zaima, 1988). The concept of underpricing is expressed mathematically as follows:

$$UND_i = (P_{i,FTD} - op_i)/op_i$$

Where:

UND_i is the amount of underpricing on the new issue, *i*

$P_{i,\,FTD}$ is the price of stock *i* on the first aftermarket trading date

op is the offering price of stock *i*

Underpricing is not benchmarked, following Beatty and Ritter (1986), and the results of Muscarella and Vetsuypens (1989) who found that raw versus market adjusted returns based on the offer price to the end of the trading day were not significantly different. In order to adjust the values of this measure, whereby a low value of *REPCAP* means that underpricing was high and therefore certification was not present, and whereby a high value of *REPCAP* means that underpricing was low indicating positive effects from certification, the product of multiplying by negative one is used.

$$REPCAP_i = UND_i * (-1)$$

Cumulative Experience

Cumulative experience is operationalized as the sum of all syndicated VCF's experiece. Experience is quantified as the number of IPOs up to the past 25 months that each VCF has worked on including the present IPO. The 25-month timeperiod was chosen so that this variable was operationalized in a way that was consistent with the operationalization of industry relatedness and geographic proximity. It is also the maximum timeperiod available prior to each IPO given the data constraints.

The 25-month period is computed not by day, but by month. For example, a VCF currently working on an IPO with a June 3, 1998 offering date will have this IPO as well as all others it worked on since June 1, 1996 included in its experience score. Likewise, a VCF currently working on an IPO with a June 30, 1998 offering date will have this IPO as well as all others it worked on since June 1, 1996 included in its experience score. Thus, up to 25 months is not day-specific, but month-specific.

Social Capital

Social capital is computed using UCINET version 5.1.0.1 (Borgatti, Everett, & Freeman, 1999). Based on the ego network-structural holes algorithm (Burt, 1992; see Chapter Two), redundancy is computed for each VCF's network including the present IPO under consideration and all relationships with other VCFs and/or other service providers (auditing firms, underwriting firms, and law firms) over the past 25 months. Redundancy is operationalized using Burt's (1992) aggregate constraint formula.

Aggregate constraint identifies each VCF's overall constraint within its network, such that each firm's lack of structural holes within a cross section of other firms is

observed. Aggregate constraint identifies which firms are the least and which are the most constrained within the sample, as opposed to using dyadic constraint, which from a more micro-orientation identifies which firms are constraining other firms.

The direct relationships between VCFs with other VCFs (intra-industry) and with other service providers (inter-industry) are identified using an algorithm developed in visual basic to create an "edgelist" (see Borgatti, Everett, & Freeman, 1999) used for square, 1-mode matrices. This list is imported into UCINET software whereby structural measures of social capital are then computed on both direct and indirect relationships as of the date of the IPO under consideration. For example, IPOs occurring during January 1997 were on the following days of the month: the first, twenty-first, twenty-eighth, and thirtieth. Using a database that included all venture capital activity from 1-1-95 through 1-30-97 (up to 25 months), an edgelist was created for each of the above mentioned dates. Measures of constraint were then computed for each firm supplying venture capital to an IPO as of each of these dates. This process was repeated for all unique IPO-dates between January 1997 and December 1998 using respective databases (i.e., 2-1-95 through 2-29-97 for February 1997 IPOs; … 12-1-96 through 12-31-98 for December 1998 activity, etc.). Intra-industry social capital is computed using only the relationships through working together on the same IPOs of NVCA VCFs with other NVCA VCFs. Inter-industry social capital is computed using the relationships of NVCA VCFs working together on the same IPOs with auditing firms, underwriting firms, and law firms. The strength of each relationship is computed as experience—the number of IPOs the firm dyads have worked on together over the time period under examination. High values of Burt's (1992) constraint value mean that the network is redundant (collective-interest social capital is high; self-interest social capital is low). Low values mean the network is non-redundant (SISC is high; CISC is low).

Organizational-related Capital

Organizational-related capital is presumed to be able to be composed of financing stage preference, industry relatedness, and geographic proximity. These variables, discussed below, will be factor analyzed and the resulting factor score will determine the value of ORC.

Financing Stage Preference.

Venture capital firms often differentiate themselves by specializing in the timing of when they fund entrepreneurial firms (Carter & Van Auken, 1994; Lam, 1991). A brief synopsis of the stages, as described by Houlihan Valuation Advisors (1998), is as follows:

> With regard to financing rounds, seed is the initial equity funding by a venture capital investor. For the round to be defined as seed, the amount raised cannot exceed $2 million, the company has to have been in business for less than 2 years (it cannot be significantly into product development or shipping) and the development stage must be startup; otherwise it is considered a first round. Because not all companies' initial financing meets these requirements, first round includes some startups. First, second, and third rounds follow chronological order and legal documents may refer to the securities issued as Series A Preferred Stock, Series B Preferred Stock, etc. A mezzanine round is usually the last venture round prior to a public offering and typically closes within 12 to 24 months prior to an IPO. (p. 335)

Venture capital financing stages basically correspond to the entrepreneurial firm's developmental stages (Runhka & Young, 1987), and more precisely comprise seven commonly delineated stages of venture financing as identified by Schilit (1991), *Pratt's Guide* (1991), and *Galante's Venture Capital and Private Equity Directory* (1996, pp. 41-43; 1997, pp. 61-63):

Early-stage Financing, including:

1. **Seed Financing**—a small amount of capital used to prove a viable business concept, build a management team, and/or prepare a business plan.

2. **Research and Development Financing**—a tax advantaged partnership to finance product development.

3. **Start-up Financing**—capital provided to young companies ready to do business (those typically in the organizational stage or less than one year old) that are completing product development and initial marketing.

4. **First-stage Financing**—funds used to initiate full-scale manufacturing and sales.

Expansion Financing or Late Stage Financing[17], including:

[17] During late stage financing, venture capitalists focus on harvesting the investment by increasing its liquidity (Lerner, 1994a).

5. **Second-stage Financing**—capital provided to growing companies that typically have yet to show a profit, but display much potential and desire initial expansion.

6. **Third-stage or Mezzanine Financing**—capital provided for major expansion, preferably secured by companies breaking even or showing a profit. [Some authors refer to mezzanine financing as bridge financing (Cattanach & Sweeney, 1995; Schilit, 1991; Sahlman, 1990). However, Remey (1991) refers to mezzanine financing as a type of instrument "that is 'in between' senior-debt financing and common stock," not a stage preference per se. (p. 77)] [18]

7. **Bridge Financing** (otherwise known as **Fourth-stage Financing**; Tyebjee & Bruno, 1984b)—capital provided within 6 months to one year of when a company plans to go public, and structured so as to be repaid from IPO proceeds. Bridge financing may also be acquired to restructure major stockholder positions before the firm goes public.[19] Note that standardization does not exist regarding the definitions of bridge and mezzanine financing.[20]

Venture capital firms participate in other types of financing in addition to the stages addressed above. *Galante's* tracked only the above seven options during 1996/1997, and began to track up to seventeen options in 1998. Only the first seven stages (shown above) apply to IPO liquidation and are used in this study.[21]

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[18] "In a Leveraged or Management Buyout, this is a layer of subordinated debt financing that is below the senior debt but above the equity," according to *Galante's* (1996, p. 42; 1997, 62; 1998, p. 46). In this definition, mezzanine financing is defined as bridge financing following Cattanach's and Sweeney's (1995), Schilit's (1991), and Sahlman's (1990) interpretation. Also, Remey's (1991) and Stromberg's (1998) definitions apply whereby mezzanine financing is a type of instrument that is combines senior-debt financing and common stock: it is in-between senior-debt and equity. Mezzanine financing is not a stage preference (Remey, 1991; Stromberg, 1998). Mezzanine financing is targeted toward growth purposes such as acquisition or recapitalizations (Stromberg, 1998).

[19] This definition of Bridge financing indicates that bridge financing is not necessarily associated with an initial public offering, but it usually is.

[20] "In a Leveraged or Management Buyout, this is a layer of subordinated debt financing that is below the senior debt but above the equity," according to *Galante's* (1996, p. 42; 1997, 62; 1998, p. 46). In this definition, mezzanine financing is defined as bridge financing following Cattanach's and Sweeney's (1995), Schilit's (1991), and Sahlman's (1990) interpretation. Also, Remey's (1991) and Stromberg's (1998) definitions apply whereby mezzanine financing is a type of instrument that is combines senior-debt financing and common stock: it is in-between senior-debt and equity. Mezzanine financing is not a stage preference (Remey, 1991; Stromberg, 1998). Mezzanine financing is targeted toward growth purposes such as acquisition or recapitalizations (Stromberg, 1998).

[21] The ten unused "funding stage preference options" added in the 1998 *Galante's Directory* are: Consolidation, Acquisition, Leveraged Buyout, Management Buyout, Recapitalization, Special Situations, Bankruptcy, Distressed Debt, Franchise Funding and Privitizations. (p. 46) These were omitted from this

Acquisition or Buyout Financing—capital provided to finance the acquisition of another company, or to enable managers to buyout product lines or businesses that are a part of another company. Two types of buyouts are differentiated by venture capitalists: leveraged buyouts, and management buyouts.

Other Financing—includes recapitalizations, special situation financing, franchise funding, consolidation funding, control-block purchases, minority buyouts, financing private placements of public corporations, and secondary purchases.

Many different venture capital funds, started at various times with various amounts of capital under management, may be formed under one organization or firm. It is important to note that financing stage preference may differ within VCFs according to the specific fund. Often the venture capital organization's name is very similar to its fund name(s), but such is not always the case. Whereas VCFs usually have financing stage preferences listed in with their identifying information, venture capital funds also have labels classifying them as having an emphasis in: early-stage venture capital, multi-stage venture capital, late-stage venture capital, buyouts and acquisitions, industry focused, diversified private equity, fund of funds, 3rd party mezzanine, captive mezzanine, expansion and growth oriented funds, global private equity, post venture funds, LP Secondaries, restructuring and distressed debt focused. Most VCFs have more than one fund, and hence participate in more than one funding type and stage preference. Database discrepancies between fund names and firm names were resolved via communications with venture capitalists and VentureOne personnel.

Financing stage preference is computed based on the work of Gupta and Sapienza (1992). Financing stage preference by Gupta and Sapienza (1992) using the algorithm below considers four early stages (seed, R&D, start-up and first stage) and five late stages (second stage, third stage/mezzanine, bridge, acquisition, and leveraged buy-out):

> Early FSP = $N_E > N_L$, and the only late stage considered was second stage or none.
>
> Late FSP = $N_L > N_E$, and the only early stage considered was first stage or none.

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study because they are in no way associated with leading up to or obtaining an IPO, even though other studies have used many of these ten remaining categories in their operationalization of financial stage preference. Stages and definitions for the first seven preferences identified above are the same in this 1998 source.

All other VCFs were classified as investing in both early and late stages.

Where:

FSP is the financing stage preference of the VCF.

N_E is the number of early stages in which the firm preferred to invest capital.

N_L is the number of late stages in which the firm preferred to invest capital.

The algorithm used to measure FSP in this study is a slight alteration of the above mentioned formula considering proportions, and appears below:

$$FSP = \frac{\left(\frac{7N_L}{3}\right)}{\left[\left(\frac{7N_E}{4}\right)+\left(\frac{7N_L}{3}\right)\right]}$$

Early stage financing, in this study, is defined consistently with Gupta and Sapienza (1992) as financing stages 1 though 4 (R&D, Seed, Start-up, and First Stage). Late stage is re-defined in this study to include only stages 5 through 7 (Second Stage, Mezzanine, Bridge). Acquisition, buyout and other financing options were omitted from this study because they are not associated with exit via IPO. Scores range from zero to one. Low scores indicate preferences for early stage financing and higher scores indicate preferences for later stage financing.[22]

Financing stage preference was found to be a relatively stable variable. Of the 139 VCFs in the sample comprising 419 unique VCF/IPO combinations, only 18 (13%) of the VCFs switched FSP during their IPO activity. The mean amount of the switch was .16 units (ranging from .03 to .47 units) on a scale from 0 to 1. Six firms switched from late to early FSP, 9 switched from early to late FSP, and 3 switched from early to late to early or vice versa. Observation indicates that in most cases, switching is attributed to differences in data sources not changes in firm's strategies.

Industry Relatedness.

[22] Actually four FSP measures were computed. The first was Gupta's and Sapienza's (1992) measure exactly as reported. The second FSP measure was Gupta's and Sapienza's (1992) measure without acquisition, and leveraged buy-out included in the formula. The third measure was a grouping measure whereby firms preferring only seed, R&D, start-up, and/or first stage financing no other stage were coded as "1." Those preferring only first, second, mezzanine and/or bridge were coded "2." Those preferring only mezzanine, bridge, LBO, MBO, acquisitions, and/or "other" were coded as "3."

Industry relatedness describes the non-sequential connections of the industries of the firms with which VCFs worked. The algorithm presented in this section is to be repeated for each IPO a VCF has supported up through the previous 25 months, including the present IPO. The measurement of industry relatedness used in this study is adapted from a weighted diversification measure used by Caves, Porter, and Spence (1980). Modification was necessary because the SDC data provided only product line information (as described by four-digit Standard Industrial Classification (SIC) codes of the company going public) without corresponding sales or production figures for individual product lines of the entrepreneurial firms. The formula written by Caves, Porter, and Spence (1980) uses sales data to weight each SIC code. Therefore, without sales data, an artificial weighting system was established. The artificial weighting system assumed that the primary SIC code was responsible for 50% of sales if more than one SIC code was identified with the firm. Weights were distributed edqually among the remaining SIC codes (those excluding the primary SIC code) using the other 50%.

The algorithm used to compute industry relatedness (*IR*) contains a Proximity Index (*PI*) that is additive over all IPO's on which the player has worked (i.e., the Cumulative Proximity Index: *CP*). This algorithm is described in two steps.

1. The Proximity Index (*PI*) between IPO's i and j based on their associated industries' Standard Industrial Classification codes (*sic*) is computed using the following equation:

$$PI(i,j) = \sum_{k=1}^{n_i} \sum_{l=1}^{n_j} w_{m:n_i} w_{l:n_j} P(sic[i,k], sic[j,l])$$

Where:

n_i is the number of industries associated with i^{th} IPO

n_j is the number of industries associated with j^{th} IPO

sic[*i*,*k*] a 4-digit code for the k^{th} industry associated with i^{th} IPO

$w_{m:n}$ is the weight associated with k-th industry for an IPO with total number of n industries

Weights are computed as follows:

$$\text{if } m=1 \text{ then } w_{m:n} = \frac{1}{2} \quad \text{else } w_{m:n} = \frac{1}{2(n-1)}$$

P(*A*, *B*) is the proximity measure between two industries based on their 4-digit *sic* codes *A* and *B*

P(*A*, *B*) equals:

1 when all 4 digits match

2 when only the first 3 digits match

3 when only the first 2 digits match

4 when only first digit matches

5 when the first digit does not match

(lower numbers represent the same or related industries, whereas higher numbers represent greater diversification)

2. The Cumulative Proximity Index (*CP*) for IPO's that have been supported by player *m* as of date *T* is computed as follows:

Let *m(IPO)* denote the set of IPO's that have been supported by player *m*. Also let $S_{m,T} = \{\omega : \omega \in m(IPO), T(\omega) \le T\}$ be the subset of IPO's that has been supported by player *m* as of date *T*, and $\#S_{m,T}$ is the number of IPO's in this set. Define:

$$CP(m,T) = \sum_{i<j, i,j \in S_{m,T}} \frac{PI(i,j)}{\#S_{m,T}(\#S_{m,T}-1)/2}$$

where the summation is carried across all IPO's $i < j$, that have been supported by player *m*, such that their offering date *T*() was not later than given date *T*. Higher values of *IR* indicate that the VCF invests in unrelated industries. Low values indicate that the VCF invests in related industries. Because of the emphasis in this study to the core competencies that accrue from participating in related activities, this measure was chosen over a simple preference measure as used by previous scholars.[23]

[23] For example, Gupta and Sapienza (1992) measured industry diversification by counting the number of different industries venture capital firms reported in which they were willing to accept investments (responses ranged from 1 to 71). The fourth measure is the proportional computation presented here for use in the study. The proportional computation distinctly divides between first stage as an early preference and second stage as a late preference. The other three measures do not draw this clear of a distinction between early and late financing stage preference. The mean FSP score using the proportional computation has a much lower standard deviation than the other measures, and is slightly less than the median, meaning early stage financing is favored and the distribution is slightly skewed to the left. The other three measures have a mean score exceeding the median, resulting in skewness to the right in favor of late stage financing. Pearson's Product Moment two-tailed correlation between all four measures were significant at the $\rho \le .01$ level. The proportional measure was chosen for this study because of its explanatory power.

Geographic Proximity.

Geographic proximity is a simple mean of the distances between the headquarters of the entrepreneurial firms backed by a VCF up through the previous 25 months including the present IPO, and the VCF's location closest to each of these headquarters at the time of IPO. This location might be either the VCF's headquarters, or a branch office. For instance, if the firm/IPO under consideration is associated with an offer date of 12/31/97, then all IPOs that VCF has worked on including this one since 12/01/95 are considered when computing the mean minimum distance. The great circle distance in statute miles between the two locations was measured by inputting zip codes into Bridger Systems' ZIPFind Deluxe 3.0 software program. When zip codes were not identifiable by the software (N=44), the pair of zip codes in which a problem was detected was individually entered into the computational software located at http://zipfind.net/. The website-based computation provided the distance using the closest zip code available to the unidentifiable one. This objective measure is favored over Gupta and Sapienza's (1988) measure of geographic diversity, which was based on VCFs' expressed preferences to invest (1) only locally; (2) within one region; (3) within multiple regions; (4) regional followed by a national preference; and (5) national or no preference stated.

Control Variables

Hot Issue Market Index

Correspondence with Li (2000; see also Li & Berta, 1999) resulted in access to the following recommended hot issue market control variable.

$$HotIssueMarketIndex = (OP - AP) / AP$$

Where:

$Averageprice(AP) = (Hi + Lo)/2$

Hi is the high intended price of the new issue as indicated on the prospectus filed to the SEC

Lo is the low intended price of the new issue as indicated on the prospectus filed to the SEC

OP is the offering price of the new issue.

A hot issue will display a high score. A cold issue will display a low score.

Percentage of Insider Shares Before the IPO

The number of shares held by insiders, where insiders are defined by SDC, divided by the total number of shares in the entrepreneurial firm before going public identifies percentage of insider shares before the IPO. This data comes from SDC in percentage form.

IPO Deal Size

IPO deal size is measured as the total proceeds gained from the new issue. Total proceeds equals the number of shares offered multiplied by the offering price per share.

Summary of Methods

Statistical methods used to test the hypotheses presented in Chapter Two appear in summary on Table 2. The details of the different databases and methods employed to test each hypothesis are provided in Chapter Four along with the results of each test. Variable abbreviations are taken from Table 1 (page 56).

Table 2: Summary of Statistical Methods Used		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 1: The higher the reputational capital of the constellation, the higher the IPO's stock price performance.	REPCAP is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Use all firms in this database. Repeat for only those IPOs backed by one NVCA-member. Repeat for only IPOs backed by more than one NVCA-member (i.e., syndicated IPOs).
Hypothesis 2: The higher the syndicate's cumulative experience, the higher the IPO's stock price performance.	CE is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.
Hypothesis 3a: The higher a venture capital firm's intra-industry SISC, the higher the IPO's stock price performance.	The lowest intra-industry SISC score of any member in the syndicate is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.
Hypothesis 3b: The higher a venture capital firm's inter-industry CISC, the higher the IPO's stock price performance.	The highest inter-industry CISC score of any member in the syndicate is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.

Table 2: Summary of Statistical Methods Used, continued		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 3c: IPO stock price performance is better explained by venture capital firm CISC than by venture capital firm SISC.	Multiple regression: IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + CISC(X_4) + SISC(X_5) + error term Where: CISC is the highest score associated with any syndicate member's inter-industry network. SISC is the lowest score associated with any syndicate member's intra-industry network.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.
Hypothesis 4a: Venture capital firms that focus on working with highly related industries prefer earlier financing.	Pearson's Product Moment Correlation statistic—IR and FSP.	VCF_DATA Select the 419 unique NVCA-VCF-IPO combinations.
Hypothesis 4b: Venture capital firms that focus on locating within a close geographic proximity to the entrepreneurial firms they support prefer earlier financing.	Pearson's Product Moment Correlation statistic—GP and FSP.	VCF_DATA Select the 419 unique NVCA-VCF-IPO combinations.
Hypothesis 4c: Venture capital firms that focus on working with highly related industries will locate within a close geographic proximity to the entrepreneurial firms they support.	Pearson's Product Moment Correlation statistic—IR and GP.	VCF_DATA Select the 419 unique NVCA-VCF-IPO combinations.

Table 2: Summary of Statistical Methods Used, continued		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 5a: The greater the range of organizational-related capital in the syndicate, the higher IPO stock price performance.	The maximum minus the minimum value of syndicate members' ORC is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.
Hypothesis 5b: The greater the diversity of organizational-related capital in the syndicate, the higher IPO stock price performance.	The standard deviation of the syndicate's ORC is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.
Hypothesis 5c: IPO stock price performance is better explained by the range of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.	Multiple regression: IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + ORC_{range}(X_4) + ORC_{only}(X_5) + error term Where: ORC_{range} is the range for each NVCA-syndicate, and ORC_{range} equals zero for IPOs backed by only one NVCA-member in this study. ORC_{only} is the value for the one NVCA VCF backing the IPO, and ORC_{only} equals zero for syndicate-backed IPOs in this study.	IPO_DATA Use all firms in this database.

Table 2: Summary of Statistical Methods Used, continued		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 5d: IPO stock price performance is better explained by the diversity of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.	Multiple regression: IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + $ORC_{diversity}$(X_4) + ORC_{only}(X_5) + error term Where: $ORC_{diversity}$ is the standard deviation of the NVCA-syndicate. $ORC_{diversity}$ equals zero for IPOs backed by only one NVCA-member. ORC_{only} is the value of the VCF for IPOs backed by only one NVCA-member. Note that ORC_{only} equals zero for syndicate-backed IPOs in this study.	IPO_DATA Use all firms in this database.
Hypothesis 5e: For non-syndicated venture-backed IPOs, IPO stock price performance is best explained by early-focused type organizational capital.	ORC is regressed on IPOPERF after entering control variables—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—as a block.	IPO_DATA Select only those IPOs backed by one NVCA VCF.

Table 2: Summary of Statistical Methods Used, continued		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 6: IPO stock price performance is better explained by social capital than by organizational-related capital.	Multiple regression: (1) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + CISC(X_4) + $ORC_{diversity}$(X_5) + error term (2) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + CISC(X_4) + ORC_{range}(X_5) + error term (3) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + SISC(X_4) + $ORC_{diversity}$(X_5) + error term (4) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + SISC(X_4) + ORC_{range}(X_5) + error term (5) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + CISC(X_4) + SISC(X_5) + $ORC_{diversity}$(X_6) + error term continued on next page	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.

Table 2: Summary of Statistical Methods Used, continued		
Hypothesis	**Statistical Test**	**Database**
Hypothesis 6 continued	(6) IPOPERF = Hot Issue Market Index(X_1) + Percentage of Insider Shares Before the IPO(X_2) + IPO Deal Size(X_3) + CISC(X_4) + SISC(X_5) + ORC_{range}(X_6) + error term Where: CISC is the highest score associated with any syndicate member's inter-industry network. SISC is the lowest score associated with any syndicate member's intra-industry network. $ORC_{diversity}$ is the standard deviation for each NVCA-syndicate. $ORC_{diversity}$ equals zero for IPOs backed by only one NVCA-member in this study. ORC_{range} is the range of values for each NVCA-syndicate. ORC_{range} equals zero for IPOs backed by only one NVCA-member in this study.	
Exploratory testing will be performed to determine the relative contributions of syndicates' reputational capital, social capital, organizational-related capital and cumulative experience toward explaining IPO stock price performance.	Multiple regression.	IPO_DATA Select only those IPOs backed by more than one NVCA VCF.

CHAPTER FOUR: STATISTICAL TESTS AND RESULTS

Database Descriptions

There are two databases where variables are stored. One database is named VCF_DATA, and the other is named IPO_DATA. The VCF_DATA database contains venture capital firm (VCF) specific data only for National Venture Capital Association (NVCA) member VCFs, and is organized by each unique VCF-initial public offering (IPO) combination over the period 1/1/95 through 12/31/98. Thus, the VCF is the level of analysis for this database, which is described in greater depth below.

The IPO_DATA database is a constellation or IPO-level database and contains information for each venture-backed IPO between 1/1/97 and 12/31/98. Twenty-seven (27) IPOs are backed by no NVCA-member VCFs, sixty-three (63) IPOs are backed by only one NVCA VCF, and one hundred (100) IPOs are backed by more than one NVCA VCF with these syndicates ranging in size from two to twelve firms. The syndicates studied here are, therefore, NVCA-member syndicates and do not include non-NVCA VCFs. This database is also described in greater depth below. When databases are described and the number of observations differs, this is due to listwise data selection whereby only those observations having all variables under consideration present are analyzed.

The selection of VCFs found in database VCF_DATA are described as follows. These VCFs were all members of the National Venture Capital Association (NVCA) as of March 11, 2000. Data were found on 1,783 VCF-IPO combinations over the time period studied. However, in order understand network boundaries more precisely, only VCFs that were member of the NVCA were chosen for further exploration. There were 1,130 unique NVCA-VCF-IPO combinations between 1/1/95 and 12/31/98. Four-hundred nineteen (419) of these unique combinations apply to IPOs during 1/1/97 and 12/31/98. Of these 419 NVCA-VCF-IPO combinations, several VCFs supported multiple IPOs each year. One hundred thirty–nine VCFs are represented in this sample of 419 observations. These 139 NVCA member VCFs are described in depth in Tables 3 through 7.

Table 3: Frequency Table for NVCA Venture Capital Firm Headquarters[24]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CA	44	31.7	31.7	31.7
	CO	2	1.4	1.4	33.1
	CT	6	4.3	4.3	37.4
	FL	1	.7	.7	38.1
	IL	11	7.9	7.9	46.0
	LA	1	.7	.7	46.8
	MA	25	18.0	18.0	64.7
	MD	3	2.2	2.2	66.9
	MN	4	2.9	2.9	69.8
	NC	2	1.4	1.4	71.2
	NE	1	.7	.7	71.9
	NJ	10	7.2	7.2	79.1
	NY	13	9.4	9.4	88.5
	OH	4	2.9	2.9	91.4
	OK	1	.7	.7	92.1
	PA	4	2.9	2.9	95.0
	TN	1	.7	.7	95.7
	TX	2	1.4	1.4	97.1
	UT	1	.7	.7	97.8
	VA	1	.7	.7	98.6
	WA	2	1.4	1.4	100.0
	Total	139	100.0	100.0	

[24] "Valid Percent" would be different than "Percent" if missing data were occurring. Although, missing data are not found among the observations described, inclusion of "Valid Percent" makes this clear.

Table 4: Frequency Table for NVCA Venture Capital Firm Entity Types

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	advisory	1	.7	.7	.7
	merchant bnkg, sbic, vc s	1	.7	.7	1.4
	private investm't fund	1	.7	.7	2.2
	private investment & LBO	1	.7	.7	2.9
	private investment firm	3	2.2	2.2	5.0
	private investment firm;	2	1.4	1.4	6.5
	private investment, LBO	1	.7	.7	7.2
	private vc	99	71.2	71.2	78.4
	private vc, sbic	1	.7	.7	79.1
	private vc, sbic, vc subs	1	.7	.7	79.9
	private vc; LBO investmen	1	.7	.7	80.6
	private vc; private LBO	1	.7	.7	81.3
	private vc; sbic	5	3.6	3.6	84.9
	public vc	1	.7	.7	85.6
	sbic	1	.7	.7	86.3
	sbic, vc subsidiary	1	.7	.7	87.1
	sbic; private equity subs	1	.7	.7	87.8
	sbic; vc subsidiary	4	2.9	2.9	90.6
	vc subsidiary	13	9.4	9.4	100.0
	Total	139	100.0	100.0	

Table 5: Frequency Table for NVCA Venture Capital Firm Founding Years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1946	1	.7	.7	.7
	1959	1	.7	.7	1.4
	1960	1	.7	.7	2.2
	1961	1	.7	.7	2.9
	1962	1	.7	.7	3.6
	1965	1	.7	.7	4.3
	1967	1	.7	.7	5.0
	1968	2	1.4	1.4	6.5
	1969	4	2.9	2.9	9.4
	1970	3	2.2	2.2	11.5
	1971	3	2.2	2.2	13.7
	1972	4	2.9	2.9	16.5
	1973	1	.7	.7	17.3
	1975	1	.7	.7	18.0
	1976	1	.7	.7	18.7
	1977	2	1.4	1.4	20.1
	1978	2	1.4	1.4	21.6
	1979	6	4.3	4.3	25.9
	1980	4	2.9	2.9	28.8
	1981	6	4.3	4.3	33.1
	1982	16	11.5	11.5	44.6
	1983	10	7.2	7.2	51.8
	1984	9	6.5	6.5	58.3
	1985	7	5.0	5.0	63.3
	1986	6	4.3	4.3	67.6
	1987	6	4.3	4.3	71.9
	1988	5	3.6	3.6	75.5
	1989	5	3.6	3.6	79.1
	1990	1	.7	.7	79.9
	1991	4	2.9	2.9	82.7
	1992	5	3.6	3.6	86.3
	1993	3	2.2	2.2	88.5
	1994	2	1.4	1.4	89.9
	1995	5	3.6	3.6	93.5
	1996	7	5.0	5.0	98.6
	1997	2	1.4	1.4	100.0
	Total	139	100.0	100.0	

Table 6: Frequency Table for NVCA Venture Capital Firm Board of Directorships

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.7	.7	.7
	missing	1	.7	.7	1.4
	not bod	63	45.3	45.3	46.8
	on bod	74	53.2	53.2	100.0
	Total	139	100.0	100.0	

Table 7: Names of the 139 Venture Capital Firms Studied

ABS Ventures	Accel Partners	Advanced Technology Ventures
Advantage Capital Partner	Advent International Corp.	Affinity Capital Mgt.
Alta Partners/Burr Egan Deleage	Ameritech Development Corp.	Ampersand Venture Mgt. Co
Antares Capital Corporation	Apex Investment Partners	Applied Technology Partners
Arch Venture Partners	Arete Ventures, Inc.	Aspen Ventures West II
Asset Mgt. Associates	AT&T Ventures	Atlas Venture
Austin Ventures	AVI Management Partners	Axiom Venture Partners
BancAmerica Ventures	BancBoston Capital Inc.	Battery Ventures
Bay Partners	Bayview Fund c/o Robertson Stephens	BCI Advisors
Benchmark Capital	Bessemer Venture Partners	Boston Capital Ventures
Brantley Venture Partners	Brentwood Venture Capital	Brinson Partners
Canaan Partners	Capstone Ventures	Cardinal Health Partners
Centinnial Funds	Charles River Ventures	Charter Venture Capital
Chase Capital Partners	Chemical & Materials Entetrprises	Cherry Tree Investments
Chisholm Private Capital	CIBC Wood Gundy Capital	Collinson Howe & Lennox
Comdisco Ventures	Conerstone Equity Investors	Crosspoint Venture Partners
CW Group, Inc.	Delphi Ventures	Domain Associates
Dominion Ventures	Draper Fisher Jurvetson	Draper Richards
Edelson Technology Partners	Edison Venture Fund	El Dorado Ventures
Encompass Ventures	Enterprise Partners	Fidelity Ventures
First Analysis Corporation	Forward Ventures	Frazier & Co.
Frontenac Co.	Geneva Venture Partners	Geocapital Partners LLC
Greylock Capital	Hambrecht & Quist Venture	Hambro Intern'tl Equity Partners
HarbourVest Partners LLC	Healthcare Ventures	Heartland Capital Fund
Institutional Venture Partners	InterWest Partners	J.H. Whitney & Co.
JAFCO America	JK&B Capital	Johnson & Johnson Develop
Kitty Hawk Capital	Kleiner Perkins Caufield	Lambda Funds
Matrix Partners	Mayfield Fund	MDT Advisors, Inc.
Medicus Venture Partners	Menlo Ventures	Meridian Venture Partners
Mohr Davidow	Morgan Stanley Dean Witter	Nassau Capital
Needham Capital Management	New Enterprise Associates	Northwest Ohio Venture
Northwood Ventures LLC	Norwest Venture Partners	Novak Biddle Venture Partners
Oak Investment Partners	OneLiberty Ventures	Onset Ventures
Oxford Bioscience Partners	Patricof & Co.	Piedmont Venture Partners
Pioneer Capital	Piper Jaffray	PNC Equity Mgt.
Primus Venture Partners	Roser Ventures	S. R. One, Limited
Salix Ventures	SENMED Medical V	Sequoia Capital
Sevin Rosen Fund	Sierra Ventures	Sigma Partners
Softbank Technology Venture	South Atlantic Venture	Sprout Group
St. Paul Venture	Summit Partners	Sutter Hill Ventures
TA Associates Inc.	Technology Crossover Ventures	Technology Partners
Ticonderoga Capital	TL Ventures	Tribune Ventures
Trident Capital	Trinity Ventures	TVM Techno Venture Mgt.
U.S. Venture Partners	Utah Ventures II LP	VC Fund of New England
Venrock Associates	Walden Group of Ventures	Warburg Pincus Ventures
Weiss, Peck & Greer Ventures	Welsh, Carson, Anderson	Weston Presidio Capital
Willis Stein & Partners		

Founding dates of the IPOs examined average 1982.7 with a standard deviation of 9 years. The oldest NVCA firm observed was founded in 1946 and the youngest was formed in 1997. The majority of these firms are private and are located in either California (Silicon Valley), or Massachusetts, New Jersey and New York (Route 128 Corridor and surrounding area). About half of these firms were on the board of directors of the entrepreneurial firm with which they were associated, and the other half did not hold board seats on the observed IPO.

The database, IPO_DATA, contains IPO level information. Between 1/1/97 and 12/31/98, 190 venture-backed firms went public, comprising slightly more than 30% of the 623 IPOs observed during that period. Between 1/1/95 and 12/31/98, 1,612 IPOs were observed, with 593 of these (almost 37%) supported by VCFs. The 1997 and 1998 IPOs under study are described on Tables 8 through 10.

Table 8: Frequency Table for Stock Exchanges of 97-98 IPOs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	American	2	1.1	1.1	1.1
	Nasdaq	177	93.2	93.2	94.2
	New York	6	3.2	3.2	97.4
	Sm Cap Mkt	5	2.6	2.6	100.0
	Total	190	100.0	100.0	

Table 9: Frequency Table for Industries of 97-98 IPOs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agriculture	2	1.1	1.1	1.1
	Healthcare	7	3.7	3.7	4.7
	Leisure	1	.5	.5	5.3
	Manufacturing	75	39.5	39.5	44.7
	Natural Resource	1	.5	.5	45.3
	Other Services	3	1.6	1.6	46.8
	Pers/Bus/Rep Svc	71	37.4	37.4	84.2
	Radio/TV/Telecom	5	2.6	2.6	86.8
	Restaurant/Hotel	2	1.1	1.1	87.9
	Retail	9	4.7	4.7	92.6
	Sanitation	1	.5	.5	93.2
	Telephone Commun	8	4.2	4.2	97.4
	Transportation	3	1.6	1.6	98.9
	Wholesale	2	1.1	1.1	100.0
	Total	190	100.0	100.0	

Table 10: Frequency Table for Headquarters of 97-98 IPOs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Arizona	1	.5	.5	.5
	California	75	39.5	39.5	40.0
	Colorado	7	3.7	3.7	43.7
	Connecticut	5	2.6	2.6	46.3
	Delaware	1	.5	.5	46.8
	Florida	9	4.7	4.7	51.6
	Georgia	6	3.2	3.2	54.7
	Idaho	1	.5	.5	55.3
	Illinois	4	2.1	2.1	57.4
	Indiana	2	1.1	1.1	58.4
	Louisiana	1	.5	.5	58.9
	Maine	2	1.1	1.1	60.0
	Maryland	3	1.6	1.6	61.6
	Massachusets	13	6.8	6.8	68.4
	Michigan	1	.5	.5	68.9
	Minnesota	3	1.6	1.6	70.5
	Nevada	1	.5	.5	71.1
	New Hampshire	2	1.1	1.1	72.1
	New Jersey	6	3.2	3.2	75.3
	New York	10	5.3	5.3	80.5
	North Carolina	4	2.1	2.1	82.6
	North Dakota	1	.5	.5	83.2
	Ohio	1	.5	.5	83.7
	Oklahoma	2	1.1	1.1	84.7
	Pennsylvania	3	1.6	1.6	86.3
	South Carolina	2	1.1	1.1	87.4
	Tennessee	1	.5	.5	87.9
	Texas	8	4.2	4.2	92.1
	Utah	1	.5	.5	92.6
	Vermont	1	.5	.5	93.2
	Virginia	3	1.6	1.6	94.7
	Washington	9	4.7	4.7	99.5
	Washington DC	1	.5	.5	100.0
	Total	190	100.0	100.0	

Table 8 shows that the majority of IPOs examined in this study were traded on the NASDAQ. Thus, the NASDAQ benchmark is used for IPO performance. Table 9 shows that these IPOs were split primarily between the manufacturing sector and personal/business/repair services sector. Table 10 shows that like VCFs, IPOs examined here are located primarily in California, Massachusetts, and New York. A simple Chi-Square test showed that no relationship existed between region and industry for these IPOs.

Correlation matrices including descriptive statistics for each variable are shown in Tables 11a through 14b. The range and mean for each month of abnormal IPO performance (the dependent variable) is graphically displayed in Figure 3. Briefly, these descriptive statistics tell us that: (1) reputational capital and IPO stock price performance are surprisingly negatively associated in most cases; (2) SISC and CISC are positively associated; (3) the three control variables are unable to explain performance; and (4) the hypothesized relationships are seemingly not likely to be statistically significant.

As mentioned Chapter One, the idea that two controls—IPO deal size and percentage insider shares—may indicate industry norms (indicating their adequacy as industry control variables) was tested using a one-way ANOVA. By examining IPO deal size by industry code (as displayed in Table 9), a significant difference exists ($F=3.312$, $\rho=0.000$) indicating that industries differ by average deal size. This test, however, is violated by a lack of homogeneity of variances due to unequal industry sizes and the great diversity of variance within each industry (Levene statistic = 3.960, $\rho=0.000$). Percentage insider shares before IPO does not differ significantly between industries nor does the Levene statistic indicate that violations are present in this test. In conclusion, these two variables may not be optimal for controlling for industry effects.

The hot issue market index, however, is theoretically justified as being an appropriate environmental control variable and should likewise be able to discriminate industries as some are more sought after than others. When examined by industry code, no difference in industry means is significant ($F=1.125$, $\rho=0.342$) and no test violations are present. This may indicate that the model upon which this study is based may be refined if unpopular industries (those with very few IPOs over a two year period) we omitted from the study. Such remains a task for future investigators.

Table 11a: IPO_DATA Descriptive Statistics for all NVCA Venture Capital Backed IPOs[25]

Valid N, listwise = 156

	N	Mean	Std. Dev.	Range	Kurtosis
1. IPO Performance	189				
a. month 1		0.01952	0.2254	1.48	3.786
b. month 2		0.02866	0.3893	3.54	15.998
c. month 3		0.02836	0.5345	5.75	40.443
d. month 4		0.05489	0.5641	3.98	7.283
e. month 5		0.1134	0.7623	5.83	12.386
f. month 6		0.06236	0.9452	9.26	34.508
2. Reputational Capital	189	-0.2381	0.3610	2.60	11.153
3. Cumulative experience	163	32.8098	31.8948	173.0	2.684
4. Self-interest Social Capital	163	0.1906	0.2344	1.13	6.522
5. Collective-interest Social Capital	163	0.1177	6.014E-02	0.33	2.494
6. IPO Deal Size	190	41838072	26681704	158375000	5.110
7. Percentage Insider Shares Before IPO	183	58.2196	23.8354	97.90	-0.243
8. Hot Issue Market Index	189	1.194E-02	0.20888	1.250	0.310

[25] Organizational-Related Capital is to be computed based on results of hypothesized relationships.

Table 11b: IPO_DATA Correlation Matrix for all NVCA Venture Capital Backed IPOs

(N=156, listwise)

	2	3	4	5	6	7	8
1. IPOPERF							
a. month 1	0.046	-0.042	-0.122	-0.068	-0.118	-0.107	-0.104
b. month 2	-0.181*	0.032	0.027	-0.027	-0.033	0.031	0.013
c. month 3	-0.246**	-0.031	0.152	-0.037	-0.027	0.083	0.019
d. month 4	-0.173*	0.016	0.092	-0.051	-0.065	0.079	-0.020
e. month 5	-0.219**	-0.026	0.098	-0.059	-0.051	0.128	0.034
f. month 6	-0.225**	-0.068	0.150	-0.047	-0.040	0.149*	0.037
2. REPCAP		-0.015	-0.079	0.114	-0.168*	-0.136	-0.530**
3. CE			-0.371**	-0.229**	-0.067	-0.077	0.074
4. SISC				0.119	0.070	0.091	-0.003
5. CISC					-0.137	0.016	-0.091
6. IPO Deal Size						-0.040	0.310**
7. Percentage Insider Shares Before IPO							0.112
8. Hot Issue Market Index							

Pearson's Product Moment Bivariate Correlation Statistic, Two Tail Tests *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

Table 12a: IPO_DATA Descriptive Statistics
for IPOs Backed by More the One NVCA Venture Capital Firm

Valid N, listwise = 95 (see footnote 25)

	N	Mean	Std. Dev.	Range	Kurtosis
1. IPO Performance	99				
a. month 1		0.003078	0.2068	1.13	0.414
b. month 2		-0.00816	0.3056	1.57	0.345
c. month 3		-0.0371	0.3687	1.78	0.717
d. month 4		-0.00399	0.4736	2.41	2.514
e. month 5		0.004963	0.5620	3.52	4.581
f. month 6		-0.0912	0.5283	2.99	2.725
2. Reputational Capital	99	-0.2376	0.3364	1.96	7.047
3. Cumulative experience	100	45.450	34.1445	172.0	1.425
4. Self-interest Social Capital	100	0.1559	0.1879	1.06	14.302
5. Collective-interest Social Capital	100	0.1242	4.780E-02	0.190	-0.861
6. IPO Deal Size	100	43257111	24859674	136000000	3.578
7. Percentage Insider Shares Before IPO	97	58.0666	21.6315	96.99	0.025
8. Hot Issue Market Index	99	1.386E-02	0.21591	1.04545	-0.089

Table 12b: IPO_DATA Correlation Matrix for IPOs Backed by More than One NVCA Venture Capital Firm

(N=95, listwise)

	2	3	4	5	6	7	8
1. IPOPERF							
a. month 1	0.039	0.061	-0.172	-0.166	-0.122	-0.138	-0.105
b. month 2	-0.145	0.258**	-0.244*	-0.110	-0.098	-0.048	0.018
c. month 3	-0.189	0.138	-0.157	-0.022	-0.100	-0.046	-0.021
d. month 4	-0.146	0.152	-0.112	0.026	-0.051	-0.043	-0.023
e. month 5	-0.153	0.121	-0.139	-0.022	-0.024	0.011	0.013
f. month 6	-0.159	0.063	-0.104	-0.002	-0.043	0.069	0.041
2. REPCAP		-0.040	0.142	0.120	-0.260**	-0.181	-0.608**
3. CE			-0.445**	-0.382**	-0.172	-0.167	-0.071
4. SISC				0.429**	0.129	0.112	-0.021
5. CISC					0.030	0.020	-0.004
6. IPO Deal Size						-0.003	0.306**
7. Percentage Insider Shares Before IPO							0.160
8. Hot Issue Market Index							

Pearson's Product Moment Bivariate Correlation Statistic, Two Tail Tests *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

Table 13a: IPO_DATA Descriptive Statistics for IPOs Backed by Only One NVCA Venture Capital Firm

Valid N, listwise = 61 (see footnote 25)

	N	Mean	Std. Dev.	Range	Kurtosis
1. IPO Performance	90				
a. month 1		0.03761	0.2441	1.48	5.291
b. month 2		0.06915	0.4628	3.49	15.923
c. month 3		0.1003	0.6662	5.69	33.695
d. month 4		0.1197	0.6458	3.94	7.412
e. month 5		0.2327	0.9232	5.73	9.969
f. month 6		0.2312	1.2349	9.19	22.449
2. Reputational Capital	90	-0.2386	0.3881	2.60	13.805
3. Cumulative experience	63	12.746	11.389	50.0	0.758
4. Self-interest Social Capital	63	0.2456	0.2867	1.13	2.465
5. Collective-interest Social Capital	63	0.1075	7.503E-02	0.33	3.515
6. IPO Deal Size	90	40261363	28628612	158375000	6.428
7. Percentage Insider Shares Before IPO	86	58.3921	26.2284	97.90	-0.493
8. Hot Issue Market Index	90	9.821E-03	0.20206	1.18333	0.954

Table 13b: IPO_DATA Correlation Matrix for IPOs Backed by Only One NVCA Venture Capital Firm

(N=61, listwise)

	2	3	4	5	6	7	8
1. IPOPERF							
g. month 1	0.051	-0.095	-0.131	0.033	-0.108	-0.084	-0.105
h. month 2	-0.207	-0.135	0.150	0.052	0.016	0.077	0.009
i. month 3	-0.287**	-0.077	0.271*	-0.016	0.022	0.150	0.046
j. month 4	-0.195	-0.004	0.203	-0.077	-0.066	0.161	-0.019
k. month 5	-0.267**	0.011	0.194	-0.047	-0.056	0.194	0.050
l. month 6	-0.273**	0.025	0.213	-0.031	-0.028	0.190	0.040
2. REPCAP		-0.085	-0.245	0.103	-0.092	-0.100	-0.458**
3. CE			-0.265*	-0.579**	0.172	0.241	0.267*
4. SISC				-0.038	0.031	0.067	0.009
5. CISC					-0.321*	0.019	-0.185
6. IPO Deal Size						-0.071	0.317**
7. Percentage Insider Shares Before IPO							0.067
8. Hot Issue Market Index							

Pearson's Product Moment Bivariate Correlation Statistic, Two Tail Tests *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

Table 14a: VCF_DATA Descriptive Statistics for Only 1997-1998 Venture-Backed IPOs

N = 419

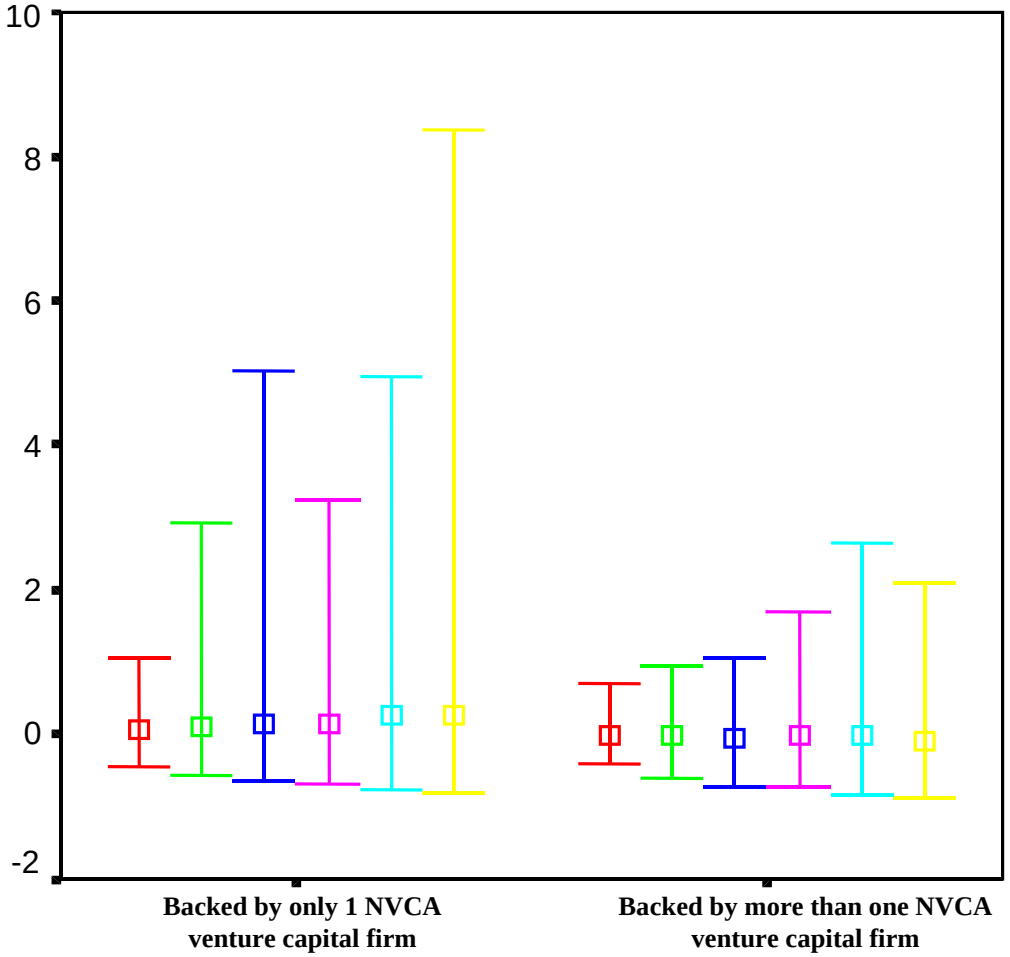
	N	Mean	Std. Dev.	Range	Kurtosis
1. Finanical Stage Preference	419	0.1759	0.2539	1.0	0.161
2. Industry Relatedness	419	3.7159	1.5061	5.0	1.948
3. Geographic Proximity	419	531.7240	534.6083	2663.60	3.168
4. Self-interest Social Capital	419	0.2526	0.2537	1.13	3.242
5. Collective-interest Social Capital	419	8.989E-02	4.865E-02	0.3310	6.099
6. Number of IPOs worked on up to the past 25 months (experience)	419	12.7637	11.6532	53.0	0.980

Table 14b: VCF_DATA Correlation Matrix for Only 1997-1998 Venture-Backed IPOs

(N=419)

	2	3	4	5	6
1. Finanical Stage Preference	0.127**	0.185**	-0.010	-0.139**	0.002
2. Industry Relatedness		-0.068	-0.374**	-0.737**	0.393**
3. Geographic Proximity			0.149**	0.083*	-0.169**
4. Self-interest Social Capital				0.602**	-0.501**
5. Collective-interest Social Capital					-0.557**
6. Number of IPOs worked on during the past 25 months (Experience)					

Pearson's Product Moment Bivariate Correlation Statistic, One Tail Tests *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$



Key

The first line in each set represents performance for the first 21-days after offering (Month One).

The second line represents Month Two.

The third line represents Month Three.

The fourth line represents Month Four.

The fifth line represents Month Five.

The sixth line represents Month Six.

Figure 3: Mean and Range of Abnormal IPO Performance by Month and Type of NVCA Venture Capital Firm Backing

Research Questions, Accompanying Hypotheses, and Findings

The hypotheses have been re-ordered from their presentation in Chapter Two to show how they fit with each research question addressed. The research questions are presented in the order shown in Chapter One. Tables present the results for only the first three months of returns, not six months, because significant changes do not occur between the results pertaining to month 3 and those for months 4, 5 and 6. Only one exception for Hypothesis 1 identifies findings for month 4 that are not consistent for those for months 3, 5 and 6. The three control variables were assessed each singly and then in various combinations before determining that all control variables would be presented simultaneously for each test. There were no statistically significant differences between models using one control variable, two controls and all three controls simultaneously.

1. **Does the reputational capital of the constellation associate with IPO stock price performance?**

   Hypothesis One is designed to address the first research question.

   Hypothesis 1: *The higher the reputational capital of the constellation, the higher the IPO's stock price performance.*

Using all observations in the IPO_DATA database, REPCAP was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. Significant results (at $\rho \leq 0.05$) were found for months 3 through 6 when all IPOs were examined, however, the direction of the relationship was opposite that which was hypothesized. The details of these tests are shown in Tables 15a, 15b, and 15c. These results do not support Hypothesis One.

Table 15a Test for Hypothesis 1 DV: IPO Performance for Month 1		
	B	**B**
Constant	0.112 0.039 *	0.109 0.049 *
Control: Hot Issue Market Index	-6.56E-02 0.453	-8.68E-02 0.394
Control: Percentage of Insider Shares Before the IPO	-9.99E-04 0.160	-1.03E-03 0.151
Control: IPO Deal Size	-8.18E-10 0.222	-8.19E-10 0.223
IV: REPCAP		-2.282E-02 0.682
Model F	1.691 0.171	1.304 0.270
R-Squared	0.028	0.029
N= 181 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 15b Test for Hypothesis 1 DV: IPO Performance for Month 2		
	B	**B**
Constant	2.896E-02 .0760	-1.42E-02 0.880
Control: Hot Issue Market Index	6.544E-02 0.671	-0.191 0.276
Control: Percentage of Insider Shares Before the IPO	4.116E-04 0.742	6.903E-05 0.955
Control: IPO Deal Size	-6.27E-10 0.595	-6.40E-10 0.579
IV: REPCAP		-0.277 0.004 **
Model F	0.173 0.915	2.218 0.069 +
R-Squared	.003	0.048
N= 181 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 15c Test for Hypothesis 1 DV: IPO Performance for Month 3		
	B	**B**
Constant	-4.69E-02 0.718	-0.122 0.336
Control: Hot Issue Market Index	9.804E-02 0.642	-0.351 0.139
Control: Percentage of Insider Shares Before the IPO	1.755E-03 0.306	1.155E-03 0.487
Control: IPO Deal Size	-6.77E-10 0.675	-7.00E-10 0.653
IV: REPCAP		-0.484 0.000 ***
Model F	0.506 0.678	3.913 0.005 **
R-Squared	0.009	0.082
N= 181 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Chapter Two suggests that exploratory tests be performed to determine the relationships between human-based factors and IPOPERF. Since REPCAP is one of these human-based factors, for future comparative purposes, RECAP will be regressed on IPOPERF again using two separate selections of data: once for only those IPOs backed by one NVCA-member, and again for only IPOs backed by more than one NVCA-member (i.e., syndicated IPOs).

Selecting only those IPOs backed by one NVCA VCF from the IPO_DATA database, and regressing REPCAP on IPOPERF after entering control variables in a block—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—significant results appear only for months 3, 5 and 6. The findings pertaining to months 1, 2 and 3 are shown in Tables 16a, 16b, and 16c.

Table 16a Test for Hypothesis 1 DV: IPO Performance for Month 1		
	B	**B**
Constant	0.110 0.171	0.107 0.193
Control: Hot Issue Market Index	-6.10E-02 0.660	-7.28E-02 0.639
Control: Percentage of Insider Shares Before the IPO	-8.03E-04 0.436	-8.16E-04 0.433
Control: IPO Deal Size	-7.28E-10 0.474	-7.16E-10 0.485
IV: REPCAP		-1.367E-02 0.864
Model F	0.532 0.662	0.402 0.807
R-Squared	0.19	0.019
N= 86 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 16b Test for Hypothesis 1 DV: IPO Performance for Month 2		
	B	**B**
Constant	-3.55E-02 0.818	-0.105 0.494
Control: Hot Issue Market Index	2.638E-02 0.921	-0.271 0.352
Control: Percentage of Insider Shares Before the IPO	1.401E-03 0.482	1.077E-03 0.579
Control: IPO Deal Size	3.850E-10 0.845	6.843E-10 0.721
IV: REPCAP		-0.345 0.023 *
Model F	0.187 0.905	1.500 0.210
R-Squared	0.007	0.069
N= 86 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 16c Test for Hypothesis 1 DV: IPO Performance for Month 3		
	B	**B**
Constant	-0.1600.469	-0.0283 0.190
Control: Hot Issue Market Index	0.124 0.747	-0.406 0.321
Control: Percentage of Insider Shares Before the IPO	3.860E-03 0.178	3.283E-03 0.232
Control: IPO Deal Size	6.450E-10 0.819	1.179E-09 0.662
IV: REPCAP		-0.615 0.004 **
Model F	0.704 0.553	2.748 0.034 *
R-Squared	0.025	0.119
N= 86 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Selecting only those IPOs backed by more than one NVCA VCF from the IPO_DATA database (i.e., using only NVCA-syndicated IPOs), the regression of REPCAP on IPOPERF after entering control variables in a block—Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size—provided no statistically significant results. Tables 17a, 17b, and 17c show these findings.

Table 17a Test for Hypothesis 1 DV: IPO Performance for Month 1		
	B	**B**
Constant	0.116 0.122	0.112 0.142
Control: Hot Issue Market Index	-7.10E-02 0.528	-0.113 0.415
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.32E-03 0.195
Control: IPO Deal Size	-8.31E-10 0.358	-8.73E-10 0.337
IV: REPCAP		-4.320E-02 0.601
Model F	1.232 0.303	0.985 0.420
R-Squared	0.039	0.042
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 17b Test for Hypothesis 1 DV: IPO Performance for Month 2		
	B	**B**
Constant	0.110 0.326	8.758E-02 0.432
Control: Hot Issue Market Index	0.107 0.525	-9.91E-02 0.629
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-1.18E-03 0.432
Control: IPO Deal Size	-1.50E-09 0.268	-1.71E-09 0.204
IV: REPCAP		-0.210 0.086 +
Model F	0.516 0.672	1.148 0.339
R-Squared	0.017	0.049
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 17c Test for Hypothesis 1 DV: IPO Performance for Month 3		
	B	**B**
Constant	9.670E-02 0.470	5.875E-02 0.654
Control: Hot Issue Market Index	8.634E-02 0.668	-0.261 0.279
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-1.50E-03 0.396
Control: IPO Deal Size	-1.67E-09 0.301	-2.02E-09 0.201
IV: REPCAP		-0.355 0.015 *
Model F	0.435 0.728	1.892 0.119
R-Squared	0.014	0.078
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

2. Does the cumulative experience of the syndicate associate with IPO stock price performance?

Hypothesis Two is designed to address the second research question.

Hypothesis 2: *The higher the syndicate's cumulative experience, the higher the IPO's stock price performance.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, CE was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 18a, 18b, 18c, the results for this test were not significant.

Table 18a Test for Hypothesis 2 DV: IPO Performance for Month 1		
	B	**B**
Constant	0.116 0.122	9.880E-02 0.279
Control: Hot Issue Market Index	-7.10E-02 0.528	-7.84E-02 0.497
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.19E-03 0.250
Control: IPO Deal Size	-8.31E-10 0.358	-7.57E-10 0.417
IV: CE		2.235E-04 0.736
Model F	1.232 0.303	0.943 0.443
R-Squared	0.039	0.040
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 18b Test for Hypothesis 2 DV: IPO Performance for Month 2		
	B	**B**
Constant	0.110 0.326	-7.56E-02 0.567
Control: Hot Issue Market Index	0.107 0.525	2.798E-02 0.867
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-1.23E-04 0.934
Control: IPO Deal Size	-1.50E-09 0.268	-7.13E-10 0.598
IV: CE		2.391E-03 0.014 *
Model F	0.516 0.672	1.966 0.107
R-Squared	0.017	0.080
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 18c Test for Hypothesis 2 DV: IPO Performance for Month 3		
	B	**B**
Constant	9.670E-02 0.470	-2.07E-02 0.898
Control: Hot Issue Market Index	8.634E-02 0.668	3.638E-02 0.859
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-4.89E-04 0.789
Control: IPO Deal Size	-1.67E-09 0.301	-1.18E-09 0.478
IV: CE		1.512E-03 0.202
IV2:		
Model F	0.435 0.728	0.742 0.566
R-Squared	0.014	0.032
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Thus, Hypothesis Two is not supported statistically. For IPOs backed by NVCA syndicates, the IPO's stock price performance is not associated with the syndicate's cumulative experience (cumulative experience).

3. Does the social capital of the syndicate associate with IPO stock price performance?

The findings from Hypotheses 3a, 3b and 3c are used to determine the answer to Research Question Three. Social capital, a firm level variable, is transformed to the network level by using the "primary member" postulate. The "primary member" postulate states that the variance explained by the strongest member in any one category is not likely to be significantly altered by the contributions of weaker members in that category. Social capital is represented by two different variables that theoretically have different meanings at their maximums and minimums. By selecting the highest or lowest value (depending upon theory) of social capital found in the syndicate, social capital from the level of the firm can be interpreted to represent the network level. In a few cases, the same VCF provides the lowest SISC score and highest CISC score for its syndicate.

> **Hypothesis 3a**: *The higher a venture capital firm's intra-industry SISC, the higher the IPO's stock price performance.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, the lowest intra-industry SISC score of any member in the syndicate was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 19a, 19b, 19c, the results for this test were not statistically significant.

Table 19a Test for Hypothesis 3a DV: IPO Performance for Month 1		
	B	**B**
Constant	0.116 0.122	0.123 0.099 +
Control: Hot Issue Market Index	-7.10E-02 0.528	-8.378-02 0.456
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.06E-03 0.291
Control: IPO Deal Size	-8.31E-10 0.358	-6.25E-10 0.490
IV: SISC		-0.172 0.133
Model F	1.232 0.303	1.510 0.206
R-Squared	0.039	0.063
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 19b Test for Hypothesis 3a DV: IPO Performance for Month 2		
	B	**B**
Constant	0.110 0.326	0.126 0.251
Control: Hot Issue Market Index	0.107 0.525	7.880E-02 0.633
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-4.26E-04 0.774
Control: IPO Deal Size	-1.50E-09 0.268	-1.04E-09 0.436
IV: SISC		-0.382 0.024 *
Model F	0.516 0.672	1.715 0.153
R-Squared	0.017	0.071
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 19c Test for Hypothesis 3a DV: IPO Performance for Month 3		
	B	**B**
Constant	9.670E-02 0.470	0.109 0.414
Control: Hot Issue Market Index	8.634E-02 0.668	6.458E-02 0.748
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-6.21E-04 0.731
Control: IPO Deal Size	-1.67E-09 0.301	-1.32E-09 0.417
IV: SISC		-0.295 0.150
Model F	0.435 0.728	0.856 0.493
R-Squared	0.014	0.037
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$		

Hypothesis 3b: *The higher a venture capital firm's inter-industry CISC, the higher the IPO's stock price performance.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, the highest inter-industry CISC score of any member in the syndicate was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 20a, 20b, and 20c, the results for this test were not statistically significant.

Table 20a Test for Hypothesis 3b DV: IPO Performance for Month 1		
	B	**B**
Constant	0.116 0.122	0.206 0.025 *
Control: Hot Issue Market Index	-7.10E-02 0.528	-9.21E-02 0.412
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.22E-03 0.222
Control: IPO Deal Size	-8.31E-10 0.358	-7.08E-10 0.429
IV: CISC		-0.800 0.089 +
Model F	1.232 0.303	1.684 0.161
R-Squared	0.039	0.070
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 20b Test for Hypothesis 3b DV: IPO Performance for Month 2		
	B	**B**
Constant	0.110 0.326	0.192 0.164
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-8.21E-04 0.585
Control: IPO Deal Size	-1.50E-09 0.268	-1.39E-09 0.306
IV: CISC		-0.725 0.305
Model F	0.516 0.672	0.654 0.626
R-Squared	0.017	0.028
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 20c Test for Hypothesis 3b DV: IPO Performance for Month 3		
	B	**B**
Constant	9.670E-02 0.470	0.117 0.477
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-9.44E-04 0.602
Control: IPO Deal Size	-1.67E-09 0.301	-1.64E-09 0.314
IV: CISC		-0.184 0.828
Model F	0.435 0.728	0.335 0.854
R-Squared	0.014	0.015
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Hypothesis 3c: *IPO stock price performance is better explained by venture capital firm CISC than by venture capital firm SISC.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, the following equation was tested:

$$\begin{aligned} \text{IPOPERF} = \quad & \text{Hot Issue Market Index}(X_1) \\ & + \text{Percentage of Insider Shares Before the IPO}(X_2) \\ & + \text{IPO Deal Size}(X_3) \\ & + \text{CISC}(X_4) \\ & + \text{SISC}(X_5) \\ & + \text{error term} \end{aligned}$$

Where:

CISC is the highest score associated with any syndicate member's inter-industry network.

SISC is the lowest score associated with any syndicate member's intra-industry network.

Tables 21a, 21b, and 21c show the results for this test. The findings are not statistically significant.

Table 21a Test for Hypothesis 3c DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.116 0.122	0.206 0.025 *	0.188 0.046 *
Control: Hot Issue Market Index	-7.10E-02 0.528	-9.21E-02 0.412	-9.46E-02 0.400
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.22E-03 0.222	-1.11E-03 0.270
Control: IPO Deal Size	-8.31E-10 0.358	-7.08E-10 0.429	-6.13E-10 0.498
IV: CISC		-0.800 0.089 +	-0.602 0.254
IV: SISC			-0.104 0.146
Model F	1.232 0.303	1.684 0.161	1.476 0.206
R-Squared	0.039	0.070	0.077
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 21b Test for Hypothesis 3c DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	0.110 0.326	0.192 0.164	0.126 0.364
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604	7.877E-02 0.636
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-8.21E-04 0.585	-4.26E-04 0.775
Control: IPO Deal Size	-1.50E-09 0.268	-1.39E-09 0.306	-1.04E-09 0.438
IV: CISC		-0.725 0.305	-1.30E-03 0.999
IV: SISC			-0.382 0.046 *
Model F	0.516 0.672	0.654 0.626	1.357 0.248
R-Squared	0.017	0.028	0.071
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 21c Test for Hypothesis 3c DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	9.670E-02 0.470	0.117 0.477	5.776E-02 0.732
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689	7.318-02 0.718
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-9.44E-04 0.602	-5.84E-04 0.747
Control: IPO Deal Size	-1.67E-09 0.301	-1.64E-09 0.314	-1.33E-09 0.146
IV: CISC		-0.184 0.828	0.475 0.617
IV: SISC			-0.348 0.134
Model F	0.435 0.728	0.335 0.854	0.730 0.603
R-Squared	0.014	0.015	0.039
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Thus, the social capital of the syndicate does not appear to be associated with IPO stock price performance.

4. How is a venture capital firm's organizational-related capital constructed?

The VCF_DATA database is used to test Hypotheses 4a, 4b, and 4c. The selection of firms from this database upon which the statistical tests will be performed contains 419 unique VCF-IPO combinations. The rationale for using this selection of VCFs instead of examining only the last IPO on which each specific venture capital worked (i.e., the N=139 selection mentioned previously in this Chapter) is based on the assumption that controlling for firm level differences is preferred to equal weighting.

> **Hypothesis 4a**: *Venture capital firms that focus on working with highly related industries prefer earlier financing.*

Hypothesis 4a was tested using Pearson's Product Moment Correlation statistic, which resulted in a one-tailed correlation statistic of .127 (ρ = .005, N=419). This finding indicates that Hypothesis 4a is supported.

> **Hypothesis 4b**: *Venture capital firms that focus on locating within a close geographic proximity to the entrepreneurial firms they support prefer earlier financing.*

Hypothesis 4b was also tested using Pearson's Product Moment Correlation statistic, which resulted in a one-tailed correlation statistic of .185 (ρ = .000, N=419). This finding indicates that Hypothesis 4b is supported.

> **Hypothesis 4c**: *Venture capital firms that focus on working with highly related industries will locate within a close geographic proximity to the entrepreneurial firms they support.*

Again, Pearson's Product Moment Correlation statistic was used to test Hypothesis 4c. A one-tailed correlation statistic of -.068 was not found to be significant (ρ = .083, N=419), yet it indicates an unexpected negative association. Perhaps, VCFs located within close proximity to the entrepreneurial firms they support participate in a greater diversity of industries than do those who locate farther away. Close proximity was found previously to positively correlate with financing stage preference, consistent with prior research. Likewise, industry relatedness was correlated with financing stage preference, consistent with previous research. However, FSP or another variable not in

these equations may be intervening as a moderator or mediator in the relationship between IR and GP. No support exists for Hypothesis 4c.

In response to the research question, ORC as defined by the triangulation of FSP, IR and GP can not be constructed as expected. Had the three tests above coincided with the theory, all three variables would have been significantly and positively correlated with each other. Because FSP theoretically serves as the foundation upon which GP and IR are linked, FSP will be used to represent the ORC construct where appropriate. Clarity is still needed as to how to develop a construct of ORC for VCFs.

5. **Does the composition of venture capital firm's organizational-related capital associate with IPO stock price performance?**

The answer to Research Question Five is found by testing Hypotheses 5a, 5b, 5c, and 5d.

> **Hypothesis 5a**: *The greater the range of organizational-related capital in the syndicate, the higher IPO stock price performance.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, ORC (which is the same as the maximum FSP value of any syndicate member less the minimum FSP value of any syndicate member, as per the findings of Research Question Four below) was regressed on IPOPERF after entering control variables as a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 22a, 22b, and 22c, the results for this test were not statistically significant.

Table 22a Test for Hypothesis 5a DV: IPO Performance for Month 1		
	B	**B**
Constant	0.116 0.122	0.138 0.088 +
Control: Hot Issue Market Index	-7.10E-02 0.528	-7.30E-02 0.518
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.212	-1.32E-03 0.193
Control: IPO Deal Size	-8.31E-10 0.358	-6.70E-10 0.471
IV: ORC_{RANGE}		-5.96E-02 0.449
Model F	1.232 0.303	1.064 0.379
R-Squared	0.039	0.045
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 22b Test for Hypothesis 5a DV: IPO Performance for Month 2		
	B	**B**
Constant	0.110 0.326	0.166 0.165
Control: Hot Issue Market Index	0.107 0.525	0.102 0.544
Control: Percentage of Insider Shares Before the IPO	-8.56E-04 0.569	-1.02E-03 0.498
Control: IPO Deal Size	-1.50E-09 0.268	-1.08E-09 0.435
IV: ORC_{RANGE}		-0.156 0.184
Model F	0.516 0.672	0.838 0.505
R-Squared	0.017	0.036
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 22c Test for Hypothesis 5a DV: IPO Performance for Month 3		
	B	**B**
Constant	9.670E-02 0.470	0.113 0.432
Control: Hot Issue Market Index	8.634E-02 0.668	8.482E-02 0.675
Control: Percentage of Insider Shares Before the IPO	-9.52E-04 0.597	-1.00E-03 0.582
Control: IPO Deal Size	-1.67E-09 0.301	-1.55E-09 0.353
IV: ORC_{RANGE}		-4.56E-02 0.747
Model F	0.435 0.728	0.349 0.844
R-Squared	0.014	0.015
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$		

Hypothesis 5b: *The greater the diversity of organizational-related capital in the syndicate, the higher IPO stock price performance.*

Using the IPO_DATA database and selecting only those IPOs backed by more than one NVCA VCF, ORC (which is the same as the standard deviation of all syndicate members' FSP values, as per the findings of Research Question Four below) was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 23a, 23b, 23c, the results for this test were not statistically significant.

Table 23a Test for Hypothesis 5b DV: IPO Performance for Month 1		
	B	**B**
Constant	0.120 0.106	0.133 0.083 +
Control: Hot Issue Market Index	-6.53E-02 0.557	-7.15E-02 0.522
Control: Percentage of Insider Shares Before the IPO	-1.34E-03 0.174	-1.29E-03 0.191
Control: IPO Deal Size	-8.33E-10 0.354	-5.90E-10 0.538
IV: $ORC_{DIVERSITY}$		-0.121 0.466
Model F	1.287 0.284	1.094 0.364
R-Squared	0.040	0.046
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 23b Test for Hypothesis 5b DV: IPO Performance for Month 2		
	B	**B**
Constant	0.114 0.300	0.150 0.187
Control: Hot Issue Market Index	0.112 0.495	9.672E-02 0.560
Control: Percentage of Insider Shares Before the IPO	-9.48E-04 0.518	-8.18E-04 0.576
Control: IPO Deal Size	-1.50E-09 0.264	-8.45E-10 0.553
IV: $ORC_{DIVERSITY}$		-0.329 0.185
Model F	0.558 0.644	0.868 0.486
R-Squared	0.018	0.037
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 23c Test for Hypothesis 5b DV: IPO Performance for Month 3		
	B	**B**
Constant	0.103 0.436	0.117 0.391
Control: Hot Issue Market Index	9.556E-02 0.631	8.875E-02 0.658
Control: Percentage of Insider Shares Before the IPO	-1.08E-03 0.537	-1.03E-03 0.559
Control: IPO Deal Size	-1.68E-09 0.298	-1.41E-09 0.413
IV: $ORC_{DIVERSITY}$		-0.134 0.654
Model F	0.473 0.702	0.402 0.807
R-Squared	0.015	0.017
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Hypothesis 5c: *IPO stock price performance is better explained by the range of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.*

Using the entire IPO_DATA database, the following equation was tested using multiple regression.

$$\begin{aligned} IPOPERF = \quad & \text{Hot Issue Market Index}(X_1) \\ & + \text{Percentage of Insider Shares Before the IPO}(X_2) \\ & + \text{IPO Deal Size}(X_3) \\ & + ORC_{range}(X_4) \\ & + ORC_{only}(X_5) \\ & + \text{error term} \end{aligned}$$

Where:

ORC_{range} is the range of FSP values (as per the findings of Research Question Four) for each NVCA-syndicate. ORC_{range} equals zero for IPOs backed by only one NVCA-member in this study.

ORC_{only} is the FSP value (as per the findings of Research Question Four) of the VCF for IPOs backed by only one NVCA-member. Note that ORC_{only} equals zero for syndicate-backed IPOs in this study.

The regression equation was not significant, resulting in the rejection of Hypothesis 5c (see Tables 24a, 24b, and 24c).

Table 24a Test for Hypothesis 5c DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.134 0.034 *	0.153 0.017 *	0.124 0.080 +
Control: Hot Issue Market Index	-0.113 0.278	-0.117 0.259	-0.114 0.269
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.125	-1.31E-03 0.108	-1.17E-03 0.160
Control: IPO Deal Size	-7.64E-10 0.335	-5.78E-10 0.470	-7.05E-10 0.384
IV: ORC_{RANGE}		-9.23E-02 0.152	-4.77E-02 0.542
IV: ORC_{ONLY}			7.197E-02 0.319
Model F	1.964 0.122	2.002 0.097 +	1.802 0.116
R-Squared	0.038	0.051	0.057
N= 155 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 24b Test for Hypothesis 5c DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	5.854E-02 0.595	0.104 0.354	8.859E-02 0.473
Control: Hot Issue Market Index	0.107 0.558	9.688E-02 0.592	9.816E-02 0.588
Control: Percentage of Insider Shares Before the IPO	1.218E-05 0.993	-1.25E-04 0.930	-5.00E-05 0.972
Control: IPO Deal Size	-4.59E-10 0.741	-1.89E-11 0.989	-8.32E-11 0.953
IV: ORC_{RANGE}		-0.219 0.053 +	-0.196 0.154
IV: ORC_{ONLY}			3.641E-02 0.773
Model F	0.123 0.946	1.049 0.84	0.851 0.516
R-Squared	0.002	0.027	0.028
N= 155 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 24c Test for Hypothesis 5c DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	-1.56E-02 0.918	2.792R-02 0.858	-2.06E-02 0.905
Control: Hot Issue Market Index	0.134 0.597	0.124 0.622	0.128 0.612
Control: Percentage of Insider Shares Before the IPO	1.035E-03 0.602	9.026E-04 0.649	1.145E-03 0.571
Control: IPO Deal Size	-3.27E-10 0.865	9.926E-11 0.959	-1.09E-10 0.956
IV: ORC_{RANGE}		-0.212 0.178	-0.138 0.470
IV: ORC_{ONLY}			0.118 0.502
Model F	0.208 0.891	0.616 0.652	0.581 0.714
R-Squared	0.004	0.016	0.019
N= 155 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Hypothesis 5d: *IPO stock price performance is better explained by the diversity of organizational-related capital of syndicated venture capital firms than by the organizational-related capital of a single venture capital firm.*

Again, using the entire IPO_DATA database, the following equation was tested.

$$\begin{aligned} IPOPERF = \quad & \text{Hot Issue Market Index}(X_1) \\ & + \text{Percentage of Insider Shares Before the IPO}(X_2) \\ & + \text{IPO Deal Size}(X_3) \\ & + ORC_{diversity}(X_4) \\ & + ORC_{only}(X_5) \\ & + \text{error term} \end{aligned}$$

Where:

$ORC_{diversity}$ is the standard deviation of FSP values (as per the findings of Research Question Four) for each NVCA-syndicate. $ORC_{diversity}$ equals zero for IPOs backed by only one NVCA-member in this study.

ORC_{only} is the FSP value (as per the findings of Research Question Four) of the VCF for IPOs backed by only one NVCA-member. Note that ORC_{only} equals zero for syndicate-backed IPOs in this study.

The regression equation was not statistically significant, resulting in the rejection of Hypothesis 5d (see Tables 25a, 25b, and 25c).

Table 25a Test for Hypothesis 5d DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.134 0.034 *	0.146 0.021 *	0.119 0.083 +
Control: Hot Issue Market Index	-0.113 0.278	-0.120 0.249	-0.115 0.266
Control: Percentage of Insider Shares Before the IPO	-1.26E-03 0.125	-1.24E-03 0.129	-1.13E-03 0.171
Control: IPO Deal Size	-7.64E-10 0.335	-5.06E-10 0.532	-6.77E-10 0.414
IV: $ORC_{DIVERSITY}$		-0.184 0.158	-8.87E-02 0.583
IV2: ORC_{ONLY}			7.318E-02 0.320
Model F	1.964 0.122	1.985 0.100 +	1.787 0.119
R-Squared	0.038	0.050	0.057
N= 155 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 25b Test for Hypothesis 5d DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	5.854E-02 0.595	8.936E-02 0.418	8.067E-02 0.502
Control: Hot Issue Market Index	0.107 0.558	8.988E-02 0.618	9.115E-02 0.615
Control: Percentage of Insider Shares Before the IPO	1.218E-05 0.993	5.705E-05 0.968	9.276E-05 0.948
Control: IPO Deal Size	-4.59E-10 0.741	1.898E-10 0.893	1.352E-10 0.926
IV: $ORC_{DIVERSITY}$		-0.462 0.043 *	-0.432 0.128
IV: ORC_{ONLY}			2.330E-02 0.856
Model F	0.123 0.946	1.137 0.341	0.910 0.476
R-Squared	0.002	0.029	0.030
N= 155 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 25c Test for Hypothesis 5d DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	-1.56E-02 0.918	1.697E-02 0.912	-1.65E-02 0.921
Control: Hot Issue Market Index	0.134 0.597	0.116 0.646	0.121 0.633
Control: Percentage of Insider Shares Before the IPO	1.035E-03 0.602	1.083E-03 0.584	1.222E-03 0.541
Control: IPO Deal Size	-3.27E-10 0.865	3.62EE-10 0.854	1.494E-10 0.941
IV: $ORC_{DIVERSITY}$		-0.491 0.122	-0.373 0.345
IV: ORC_{ONLY}			9.075E-03 0.613
Model F	0.208 0.891	0.761 0.552	0.657 0.657
R-Squared	0.004	0.020	0.022
N= 155 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

In conclusion, neither Hypothesis 5a, 5b, 5c nor 5d were supported. A defined composition of ORC that associates with IPO stock price performance is unable to be created.

6. Which human-based factors are associated with higher IPO stock price performance?

Research Question Six is to be tested using Hypotheses 5e and 6, as well as exploratory testing to determine the relative contributions of syndicates' reputational capital, cumulative experience, social capital and ORC. Although the results of Hypotheses 5e and 6 are presented below, exploratory testing was not performed because neither of the human-based factors examined previously were found to be associated with IPO performance (see the results of tests for Research Questions One, Two, Three, and Five). Examining variables identifying reputational capital, cumulative experience, social capital, and ORC in a various combinations of models to determine their relative impact would also result in statistically non-significant findings.

> **Hypothesis 5e**: *For non-syndicated venture-backed IPOs, IPO stock price performance is best explained by early-focused type organizational capital.*

Using the IPO_DATA database and selecting only those IPOs backed by one NVCA VCF, ORC (otherwise known as FSP due to the outcome of Research Question Four) was regressed on IPOPERF after entering control variables in a block: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size. As shown in Tables 26a, 26b, and 26c, the results for this test were not significant.

Table 26a Test for Hypothesis 5e DV: IPO Performance for Month 1		
	B	**B**
Constant	0.160 0.154	9.970E-02 0.477
Control: Hot Issue Market Index	-0.206 0.335	-0.193 0.370
Control: Percentage of Insider Shares Before the IPO	-1.32E-03 0.343	-9.70E-04 0.510
Control: IPO Deal Size	-4.82E-10 0.747	-7.25E-10 0.637
IV: ORC		9.293E-02 0.473
Model F	0.808 0.495	0.731 0.575
R-Squared	0.041	0.050
N= 60 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 26b Test for Hypothesis 5e DV: IPO Performance for Month 2		
	B	**B**
Constant	-3.17E-03 0.988	1.256E-03 0.996
Control: Hot Issue Market Index	0.114 0.783	0.113 0.787
Control: Percentage of Insider Shares Before the IPO	9.684E-04 0.719	9.430E-04 0.743
Control: IPO Deal Size	1.366E-09 0.638	1.384E-09 0.645
IV: ORC		-6.80E-03 0.978
IV2:		
Model F	0.191 0.902	0.141 0.966
R-Squared	0.010	0.010
N= 60 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Table 26c Test for Hypothesis 5e DV: IPO Performance for Month 3		
	B	**B**
Constant	-0.145 0.650	-0.152 0.706
Control: Hot Issue Market Index	0.261 0.669	0.262 0.671
Control: Percentage of Insider Shares Before the IPO	3.237E-03 0.416	3.278E-03 0.440
Control: IPO Deal Size	2.008E-09 0.639	1.979E-09 0.655
IV: ORC		1.102E-02 0.976
IV2:		
Model F	0.430 0.733	0.317 0.866
R-Squared	0.022	0.023
N= 60 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10		

Hypothesis 6: *IPO stock price performance is better explained by social capital than by organizational-related capital.*

Using the IPO_DATA database and selecting only those IPOs backed by NVCA syndicates, various combinations of CISC, SISC, and ORC (shown below) were regressed on IPOPERF after entering control variables in this order: Hot Issue Market Index, Percentage of Insider Shares Before the IPO, and IPO Deal Size.

(1) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ CISC(X_4)
+ $ORC_{diversity}$(X_5)
+ error term

(2) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ CISC(X_4)
+ ORC_{range}(X_5)
+ error term

(3) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ SISC(X_4)
+ $ORC_{diversity}$(X_5)
+ error term

(4) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ SISC(X_4)
+ ORC_{range}(X_5)
+ error term

(5) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ CISC(X_4)
+ SISC(X_5)
+ $ORC_{diversity}$(X_6)
+ error term

(6) IPOPERF = Hot Issue Market Index(X_1)
+ Percentage of Insider Shares Before the IPO(X_2)
+ IPO Deal Size(X_3)
+ CISC(X_4)
+ SISC(X_5)
+ ORC_{range}(X_6)
+ error term

Where:

CISC is the highest score associated with any syndicate member's inter-industry network.

SISC is the lowest score associated with any syndicate member's intra-industry network.

$ORC_{diversity}$ is the standard deviation of FSP values (as per the findings of Research Question Four) for each NVCA-syndicate. $ORC_{diversity}$ equals zero for IPOs backed by only one NVCA-member in this study.

ORC_{range} is the range of FSP values (as per the findings of Research Question Four) for each NVCA-syndicate. ORC_{range} equals zero for IPOs backed by only one NVCA-member in this study.

As shown in Tables 27(a-c) through 32(a-c), the results for these tests were not significant.

Table 27a Test for Hypothesis 6 Model 1 DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.116 0.122	0.206 0.025 *	0.213 0.022 *
Control: Hot Issue Market Index	-7.099E-02 0.528	-9.207E-02 0.412	-9.499E-02 0.400
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.220E-03 0.222	-1.198E-03 0.232
Control: IPO Deal Size	-8.306E-10 0.358	-7.079E-10 0.429	-5.402E-10 0.572
IV: CISC		-0.800 0.089 +	-0.773 0.103
IV: $ORC_{DIVERSITY}$			-8.612E-02 0.607
Model F	1.232 0.303	1.684 0.161	1.389 0.236
R-Square	0.039	0.070	0.072
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 27b Test for Hypothesis 6 Model 1 DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	0.110 0.326	0.192 0.164	0.216 0.121
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604	7.772E-02 0.646
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-8.214E-04 0.585	-7.467E-04 0.619
Control: IPO Deal Size	-1.499E-09 0.268	-1.388E-09 0.306	-8.029E-10 0.576
IV: CISC		-0.725 0.305	-0.634 0.371
IV: $ORC_{DIVERSITY}$			-0.300 0.234
Model F	0.516 0.672	0.654 0.626	0.813 0.543
R-Square	0.017	0.028	0.044
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 27c Test for Hypothesis 6 Model 1 DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	9.670E-02 0.470	0.117 0.477	0.127 0.450
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689	7.748E-02 0.705
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-9.436E-04 0.602	-9.143E-04 0.615
Control: IPO Deal Size	-1.673E-09 0.301	-1.645E-09 0.314	-1.414E-09 0.417
IV: CISC		-0.184 0.828	-0.148 0.863
IV: $ORC_{DIVERSITY}$			-0.118 0.698
Model F	0.435 0.728	0.335 0.854	0.396 0.914
R-Square	0.014	0.015	0.016
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 28a Test for Hypothesis 6 Model 2 DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.116 0.122	0.206 0.025 *	0.222 0.020
Control: Hot Issue Market Index	-7.099E-02 0.528	-9.207E-02 0.412	-9.324E-02 0.407
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.220E-03 0.222	-1.274E-03 0.205
Control: IPO Deal Size	-8.306E-10 0.358	-7.079E-10 0.429	-5.735E-10 0.534
IV: CISC		-0.800 0.089 +	-0.779 0.099 +
IV: ORC_{RANGE}			-5.098E-02 0.514
Model F	1.232 0.303	1.684 0.161	1.425 0.223
R-Square	0.039	0.070	0.074
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 28b Test for Hypothesis 6 Model 2 DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	0.110 0.326	0.192 0.164	0.238 0.095 +
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604	8.449E-02 0.617
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-8.214E-04 0.585	-9.787E-04 0.515
Control: IPO Deal Size	-1.499E-09 0.268	-1.388E-09 0.306	-9.964E-10 0.472
IV: CISC		-0.725 0.305	-0.666 0.345
IV: ORC_{RANGE}			-0.148 0.207
Model F	0.516 0.276	0.654 0.626	0.850 0.518
R-Square	0.017	0.028	0.046
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 28c Test for Hypothesis 6 Model 2 DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	9.670E-02 0.470	0.117 0.477	0.131 0.446
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689	8.048E-02 0.694
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-9.436E-04 0.602	-9.900E-04 0.588
Control: IPO Deal Size	-1.673E-09 0.301	-1.645E-09 0.314	-1.529E-09 0.363
IV: CISC		-0.184 0.838	-0.167 0.845
IV: ORC_{RANGE}			-4.372E-02 0.758
Model F	0.435 0.728	0.335 0.854	0.284 0.921
R-Square	0.014	0.015	0.016
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 29a Test for Hypothesis 6 Model 3 DV: IPO Performance for Month 1			
	B	**B**	**B**
Constant	0.116 0.122	0.123 0.099 +	0.129 0.096 +
Control: Hot Issue Market Index	-7.099E-02 0.528	-8.366E-02 0.456	-8.525E-02 0.450
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.065E-03 0.291	-1.061E-03 0.295
Control: IPO Deal Size	-8.306E-10 0.358	-6.249E-10 0.490	-5.266E-10 0.584
IV: SISC		-0.172 0.133	-0.162 0.173
IV: $ORC_{DIVERSITY}$			-5.508E-02 0.750
Model F	1.232 0.303	1.510 0.206	1.217 0.308
R-Square	0.039	0.063	0.064
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 29b Test for Hypothesis 6 Model 3 DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	0.110 0.326	0.126 0.251	0.147 0.196
Control: Hot Issue Market Index	0.107 0.525	7.880E-02 0.633	7.318E-02 0.659
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-4.269E-04 0.774	-4.131E-04 0.781
Control: IPO Deal Size	-1.499E-09 0.268	-1.041E-09 0.436	-6.945E-10 0.623
IV: SISC		-.382 0.024 *	-0.348 0.047 *
IV: $ORC_{DIVERSITY}$			-0.194 0.445
Model F	0.516 0.672	1.715 0.153	1.484 0.203
R-Square	0.017	0.071	0.077
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 29c Test for Hypothesis 6 Model 3 DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	9.670E-02 0.470	0.109 0.414	0.111 0.423
Control: Hot Issue Market Index	8.634E-02 0.668	6.458E-02 0.748	6.416E-02 0.751
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-6.209E-04 0.731	-6.199E-04 0.732
Control: IPO Deal Size	-1.673E-09 0.301	-1.320E-09 0.417	-1.294E-09 0.453
IV: SISC		-0.295 0.150	-0.292 0.170
IV: $ORC_{DIVERSITY}$			-1.442E-02 0.963
Model F	0.435 0.728	0.856 0.493	0.678 0.641
R-Square	0.014	0.037	0.037
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 30a
Test for Hypothesis 6 Model 4
DV: IPO Performance for Month 1

	B	**B**	**B**
Constant	0.166 0.122	0.123 0.099 +	0.141 0.080 +
Control: Hot Issue Market Index	-7.099E-02 0.528	-8.366E-02 0.456	-8.477E-02 0.451
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.065E-03 0.291	-1.123E-03 0.269
Control: IPO Deal Size	-8.306E-10 0.358	-6.249E-10 0.490	-5.021E-10 0.589
IV: SISC		-0.172 0.133	-0.165 0.153
IV: ORC_{RANGE}			-4.857E-02 0.536
Model F	1.232 0.303	1.510 0.206	1.277 0.281
R-Square	0.039	0.063	0.067

N= 95 (IPO_DATA)
*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10

Table 30b Test for Hypothesis 6 Model 4 DV: IPO Performance for Month 2			
	B	**B**	**B**
Constant	0.110 0.326	0.126 0.251	0.173 0.141
Control: Hot Issue Market Index	0.107 0.525	7.880E-02 0.633	7.579E-02 0.646
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-4.259E-04 0.774	-5.839E-04 0.694
Control: IPO Deal Size	-1.499E-09 0.268	-1.041E-09 0.436	-7.088E-10 0.603
IV: SISC		-0.382 0.024 *	-0.363 0.033 *
IV: ORC_{RANGE}			-0.131 0.255
Model F	0.516 0.672	1.715 0.153	1.640 0.158
R-Square	0.017	0.071	0.084
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10			

Table 30c Test for Hypothesis 6 Model 4 DV: IPO Performance for Month 3			
	B	**B**	**B**
Constant	9.670E-02 0.470	0.109 0.414	0.118 0.409
Control: Hot Issue Market Index	8.634E-02 0.668	6.458E-02 0.748	6.398E-02 0.751
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-6.209E-04 0.731	-6.522E-04 0.720
Control: IPO Deal Size	-1.673E-09 0.301	-1.320E-09 0.417	-1.254E-09 0.453
IV: SISC		-0.295 0.150	-0.291 0.160
IV: ORC_{RANGE}			-2.607E-02 0.853
Model F	0.435 0.728	0.856 0.493	0.685 0.636
R-Square	0.014	0.037	0.037
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$			

Table 31a **Test for Hypothesis 6 Model 5** **DV: IPO Performance for Month 1**				
	B	**B**	**B**	**B**
Constant	0.116 0.122	0.206 0.025 *	0.188 0.046 *	0.195 0.045 *
Control: Hot Issue Market Index	-7.099E-02 0.528	-9.207E-02 0.412	-9.456E-02 0.400	-9.626E-02 0.395
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.220E-03 0.222	-1.112E-03 0.270	-1.108E-03 0.274
Control: IPO Deal Size	-8.306E-10 0.358	-7.079E-10 0.429	-6.133E-10 0.498	-5.108E-10 0.594
IV: CISC		-0.800 0.089 +	-0.602 0.254	-0.604 0.255
IV: SISC			-0.104 0.416	-9.392E-02 0.478
IV: $ORC_{DIVERSITY}$				-5.740E-02 0.739
Model F	1.232 0.303	1.684 0.161	1.476 0.206	1.236 0.296
R-Square	0.039	0.070	0.077	0.078
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10				

Table 31b Test for Hypothesis 6 Model 5 DV: IPO Performance for Month 2				
	B	**B**	**B**	**B**
Constant	0.110 0.326	0.192 0.164	0.126 0.364	0.148 0.300
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604	7.877E-02 0.636	7.302E-02 0.662
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-8.214E-04 0.585	-4.260E-04 0.775	-4.137E-04 0.782
Control: IPO Deal Size	-1.499E-09 0.268	-1.388E-09 0.306	-1.041E-09 0.438	-6.943E-10 0.625
IV: CISC		-0.725 0.305	-1.296E-03 0.999	-8.314E-03 0.992
IV: SISC			-0.382 0.046 *	-0.347 0.078 +
IV: $ORC_{DIVERSITY}$				-0.194 0.448
Model F	0.516 0.672	0.654 0.626	1.357 0.248	1.223 0.302
R-Square	0.017	0.028	0.071	0.077
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10				

Table 31c Test for Hypothesis 6 Model 5 DV: IPO Performance for Month 3				
	B	**B**	**B**	**B**
Constant	9.670E-02 0.470	0.117 0.477	5.776E-02 0.732	5.914E-02 0.732
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689	7.318E-02 0.718	7.281E-02 0.721
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-9.436E-04 0.602	-5.837E-04 0.747	-5.829E-04 0.749
Control: IPO Deal Size	-1.673E-09 0.301	-1.645E-09 0.314	-1.329E-09 0.416	-1.306E-09 0.451
IV: CISC		-0.184 0.828	0.475 0.617	0.475 0.619
IV: SISC			-0.348 0.134	-0.345 0.150
IV: $ORC_{DIVERSITY}$				-1.259E-02 0.968
Model F	0.435 0.728	0.335 0.854	0.730 0.603	0.602 0.728
R-Square	0.014	0.015	0.039	0.039
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10				

Table 32a Test for Hypothesis 6 Model 6 DV: IPO Performance for Month 1				
	B	**B**	**B**	**B**
Constant	0.116 0.122	0.206 0.025 *	0.188 0.046 *	0.204 0.039 *
Control: Hot Issue Market Index	-7.099E-02 0.528	-9.207E-02 0.412	-9.456E-02 0.400	-9.548E-02 0.397
Control: Percentage of Insider Shares Before the IPO	-1.258E-03 0.212	-1.220E-03 0.222	-1.112E-03 0.270	-1.167E-03 0.251
Control: IPO Deal Size	-8.306E-10 0.358	-7.079E-10 0.429	-6.133E-10 0.498	-4.961E-10 0.593
IV: CISC		-0.800 0.089 +	-0.602 0.254	-0.594 0.262
IV: SISC			-0.104 0.416	-9.842E-02 0.445
IV: ORC_{RANGE}				-4.643E-02 0.554
Model F	1.232 0.303	1.684 0.161	1.476 0.206	1.280 0.275
R-Square	0.039	0.070	0.077	0.080
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$				

Table 32b **Test for Hypothesis 6 Model 6** **DV: IPO Performance for Month 2**				
	B	**B**	**B**	**B**
Constant	0.110 0.326	0.192 0.164	0.126 0.364	0.170 0.238
Control: Hot Issue Market Index	0.107 0.525	8.789E-02 0.604	7.877E-02 0.636	7.615E-02 0.647
Control: Percentage of Insider Shares Before the IPO	-8.559E-04 0.569	-8.214E-04 0.585	-4.260E-04 0.775	-5.824E-04 0.697
Control: IPO Deal Size	-1.499E-09 0.268	-1.388E-09 0.306	-1.041E-09 0.438	-7.090E-10 0.605
IV: CISC		-0.725 0.305	-1.296E-03 0.999	2.021E-02 0.979
IV: SISC			-0.382 0.046 *	-0.365 0.057 +
IV: ORC_{RANGE}				-0.132 0.257
Model F	0.516 0.672	0.654 0.626	1.357 0.248	1.351 0.243
R-Square	0.017	0.028	0.071	0.084
N= 95 (IPO_DATA) *** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.10				

Table 32c Test for Hypothesis 6 Model 6 DV: IPO Performance for Month 3				
	B	**B**	**B**	**B**
Constant	9.670E-02 0.470	0.117 0.477	5.776E-02 0.732	6.707E-02 0.703
Control: Hot Issue Market Index	8.634E-02 0.668	8.148E-02 0.689	7.318E-02 0.718	7.263E-02 0.721
Control: Percentage of Insider Shares Before the IPO	-9.524E-04 0.597	-9.436E-04 0.602	-5.837E-04 0.747	-6.167E-04 0.736
Control: IPO Deal Size	-1.673E-09 0.301	-1.645E-09 0.314	-1.329E-09 0.416	-1.259E-09 0.454
IV: CISC		-0.184 0.828	0.475 0.617	0.480 0.615
IV: SISC			-0.348 0.134	-0.344 0.141
IV: ORC_{RANGE}				-2.780E-02 0.844
Model F	0.435 0.728	0.335 0.854	0.730 0.603	0.608 0.723
R-Square	0.014	0.015	0.039	0.040
N= 95 (IPO_DATA) *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$				

CHAPTER FIVE: SUMMARY, DISCUSSION AND CONCLUSION

Summary

This study's application of the RBV focused on human-based factors, as opposed to technology-based, financial-based, land-based or other asset-based factors traditionally studied in economic research. Human-based factors comprised reputational capital, cumulative experience, social capital, and ORC. Control variables included hot issue market index, percentage of insiders holding shareholders before the IPO, and total proceeds as a measure of deal size.

The objective of this research was to be able to conclude that additional variance existing in the abnormal performance of venture capital-backed IPOs could be explained by the human-based factors attributed to the VCFs that support these IPOs. The results, however, were inconclusive. Had this study's objective been reached, scholars would know more about which resources VCF syndicates can utilize to positively impact the stock price performance of the IPOs they support. With an understanding of specific resources upon which to focus, VCF syndicates would be able to purposefully develop certain strategies designed to gain these resources and impart them in ways that can increase the value they add to their investments.

Discussion of Reasons for Results

There are many possible reasons for these lackluster results. The main reason may be that primary members of NVCA-member venture capital firm syndicates do not add value to IPO performance alone. Another reason may include the selection of observations—they may not exhibit enough variability to support hypothesized differences in performance. Or, the measurement of several variables could be improved. Lastly, the RBV may be an inappropriate framework for this study. Each of these reasons will be expanded upon below.

"Primary-Member" Postulate

The "primary member" postulate addressed previously on page 114 was used to convert firm-level data to syndicate-level data by assuming that contributions by the primary member of each syndicate (e.g., the member with the most social and organizational-related capital) were able to explain the majority of variance in

performance. The variance in performance that can be explained by all other members is assumed to be less important. The results of this study indicate that variance in performance is unable to be explained by the primary syndicate members.

If the quality of the VCF matters to abnormal IPO performance, then this homogeneous group should have homogeneous returns. The VCFs studied here are homogeneous in the sense that they are all NVCA members, which means that they are all relatively strong, established firms (a function of being allowed membership). Based on the history of the venture capital industry (see Appendix F for a brief overview), there seems to be a fairly stable core of established venture capital firms (presumably NVCA-members) that are surrounded by a highly fragmented and volatile array of relatively new entrants. Thus, selecting only NVCA-member VCFs assumably serves as a control for quality. After running a one-way ANOVA with the VCF as the factor[26] and cumulative abnormal IPO returns for each 21-day period as the dependent variable, the differences in performance of NVCA-member VCFs was found not to be statistically significant. (See Table 33). Even when cumulative abnormal IPO performance over the 126-day period (6 "months) was averaged for each VCF, no differences were observed ($F = 1.222$; $p = 0.083$). Thus, assuming the variance in abnormal IPO performance can be explained, this finding leads to the conclusion that abnormal IPO performance is either a function of chance or explainable by other variables unrelated to the quality of the primary VCF.

An area for future research would be to explore the effect of syndicates on IPO performance. The way the syndicate is structured along with who belongs to it may have more to do with explaining the impact of VCFs on abnormal IPO performance than the qualities of a single VCF.

[26] Only VCFs doing IPOs duing the 1997-1998 period were selected. This provided observations on 139 different VCFs covering 190 different ipos to create 419 different unique vcf/ipo combinations.

Table 33
Cumulative Abnormal IPO Performance
by Venture Capital Firm

One-Way ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Days 1-21	Between Groups	6.835	138	4.953E-02	1.160	.152
	Within Groups	11.829	277	4.271E-02		
	Total	18.664	415			
Days 1-42	Between Groups	15.697	138	.114	.982	.541
	Within Groups	32.069	277	.116		
	Total	47.766	415			
Days 1-63	Between Groups	31.088	138	.225	1.222	.083
	Within Groups	51.078	277	.184		
	Total	82.166	415			
Days 1-84	Between Groups	33.407	138	.242	1.024	.429
	Within Groups	65.472	277	.236		
	Total	98.879	415			
Days 1-105	Between Groups	57.573	138	.417	1.101	.251
	Within Groups	104.951	277	.379		
	Total	162.524	415			
Days 1-126	Between Groups	75.465	138	.547	1.138	.184
	Within Groups	133.077	277	.480		
	Total	208.542	415			

*** p < 0. 001; ** p < 0.01; * p < 0.05; + p < 0.10

Selection

Empirically, venture capital-backed IPOs have been shown to outperform non-venture-backed IPOs. However, in this study, the degree of homogeneity among the types of IPOs backed by NVCA-member venture capital firms may be too high to capture any of the relatively small amounts of variance explainable in otherwise noisy IPO performance. Sample selection may explain why traditional IPO control variables are not statistically significant in this study.

Measurement

The measurement of several variables may be improved. For example, industry relatedness suffers from the biases associated with left censorsed data. This means that by nature of the dataset, relatedness will be low for all IPOs that occurred early in the VCFs portfolio, and high for those in later years. The measure of industry relatedness used in this study also tends to identify venture capital firms as being involved more in unrelated than related industries simply because the entrepreneurial firms are so diverse (have up to five SIC codes per IPO), as opposed to being focused in a single business (have only one SIC code).

The negative relationship between reputational capital and performance (e.g., the positive relationship between underpricing and performance) found in this study may be due to many things. First, the unexpected relationship may be due to the fact that all NVCA-member syndicated venture-capital backed IPOs are supported by reputable others, and thus no difference is distinguishable between IPOs. Perhaps the variance observed in the amount of underpricing associated with NVCA-syndicated venture-backed IPOs is not great enough to distinguish certification from the support of reputable others. Second, the unexpected relationship between reputational capital and performance may be a function of how performance is computed. Both performance and underpricing include the stock's first aftermarket price in each equation. By their nature, issues that are underpriced more are likely to have greater room to grow as well as experience increased demand to the extent investors believe they are getting a good deal. Third, the reputational capital measure also may be in need of being better benchmarked. Prior research identifying the link between underpricing and reputational capital focused on IPOs in general, not just venture-backed IPOs. Since all IPOs are underpriced to some

extent, the degree to which a general-IPO underpricing threshold is exceeded may need to be noted. Fourth, underpricing may simply be an inappropriate proxy for reputational capital, but this does not explain why the relationship behaves unexpectedly. Signaling theories upon which certification theory is founded are still in relative infancy. "There are a variety of signalling mechanisms available to a firm," claim Firth and Liau-Tan (1998, p. 148). "Some of the conflicting evidence on the validity of a specific hypothesized signal may be due to the confounding effects of other signals that were not controlled for," they say (1998, p. 148). Deepening our understanding of how firms use their reputational capital could broaden our understanding of how these firms create network structures, synergies, and strategies.

Another measurement issue rests with the abnormal stock price performance variable. This variable could be recomputed to address change in abnormal performance instead of simply an absolute measure. It may be that the growth of a stock keeps investors more motivated to hold on to their new issue than the extent to which their investment outperforms the NASDAQ index. Performance could also be assessed over a longer time frame than just in 21-day intervals using many different algorithms than Ritter's (1991), which was employed here.

Lastly, the identification of pertinent network relationships may be improved, as well as the direction of those relationships. In this study, only IPO-based linkages were noted, and these were made symmetrical. Acknowledging directional relationships (asymmetries) may provide accuracy in identifying important connections. Not all parties connect with each other in the same way. A firmer understanding of the types and strengths of linkages between firms within the venture capital industry and other professional service provider industries would advance our understanding of how to best measure vital network structures. Firms also play various roles with each other and use their networks in many different ways. This study uses only data pertaining to IPOs that served to identify relationships between NVCA-member VCFs. Multiplex relationships (i.e., those where the VCF has numerous roles outside of working with IPO-based networks) were not addressed. The VCFs' networks within the entrepreneurship community, within the broader venture capital community (some venture-backed companies do not go public), with suppliers, distributors, technical experts, business

consultants and corporate executives, as well as with other professionals may need to be included in future studies. Relevant communication linkages that are responsible for the benefits of social capital may also be highly constrained by exploring only IPO-based relationships of NVCA-member firms. As stated by Stuart, Hoang, and Hybels (1999) as a limitation to their study as well: this study may be limited by the fact that "… the instrumental value of many interorganizational ties is highly uncertain." (p. 345)

Framework

The RBV has been cited as lacking theoretical rigor for two reasons. First, valuable resource identification is problematic (Araujo & Easton, 1999; Conner, 1991) because the most valuable resources already identifiably controlled by the firm (Barney, 1991) are most likely to be intangible (Itami, 1987) or unobservable (Godfrey, & Hill, 1995). It may not be the resource itself that is valuable as much as it is how the resource is used that creates the most value (Porter, 1991), and in the case of VCFS, at what level (Conner, 1991) the resource is measured.[27] Second, the RBV is likely to be tautological (Porter, 1991). In this light, the RBV may be best suited for exploiting existing firm assets, but not for creating dynamic capabilities—the ability to redeploy, renew, and reconfigure internal competencies in a fast-changing environment. Teece, Pisano, and Shuen (1997) criticize the RBV on these grounds because they say the RBV implies that firms have "sticky endowments"—resources that firms are stuck with and have to live with what they lack. Stickiness arises from the inability of firms to quickly develop new competencies, tacit know-how that cannot be identified readily, and the fact that any asset sold on the market will be priced so that the price fully capitalizes the rent from the asset unless luck or an information advantage is involved (Teece, Pisano, & Shuen, 1997). In this sense, applicability of the projected outcome of this study—an heuristic to aid VCFs in determing resource-based strategies that lead to increased IPO performance—may not

[27] Gathering data at the venture capital fund level and not the VCF level may provide more accurate assessments of venture capitalists' resources. Given that VCFs are comprised of one or more funds typically structured as limited partnerships (Barry, 1994; Bygrave, Fast, Khoylian, Vincent, & Yue, 1989; Chalk & Peavy, 1990; Chiampou & Kallett, 1989; Gifford, 1997; Gompers, 1994; Gompers & Lerner, 1996; Sahlman, 1990), and different funds may have different strategies and preferences, more accurate measures may be able to be obtained by using fund-level instead of firm level venture capital data. Venture capital firms' strategies may be deemed idiosyncratic due to the divergence in approaches to multiple-round financing. Fund-level data were unavailable for this study.

be realistically attainable by VCFs (i.e., their deal evaluation strategies are undefined[28], or VCF strategies are affected differently by the industry's cyclical factors[29]). Even though Collis (1994) discounts the sustainability of the dynamic capabilities approach, Mahoney and Pandian (1992) call for scholars to integrate the RBV with the dynamic capabilities approach. The intended application of this study may benefit from further developing such integration. Including more traditional measures of performance (such as firm profitability, sales, growth in terms of change in sales or profits, size or number of employees, and/or market share, to name a few options) may enhance applicability of the RBV. Or, instead of using the RBV perspective, this study may benefit from a refocus based on a team-based angle of examination. Literature on small groups and teams may illuminate interesting relationships worthy of study. In fact, Lorenzoni and Lipparini (1999) point out that exploring networks from an RBV perspective does not properly address the processes by which multiple firms, working collaboratively, develop individual and common capabilities.

Control Variables, Findings, and Discussion

Control variables neither displayed statistically significant relationships with IPO performance as expected, nor did they consistently behave as expected based on prior research. Control variables differed in their relationship to abnormal IPO stock price performance depending upon the selection of IPOs observed at the time.

For example, a low score for the variable hot issue market index indicates a "hot issue," and hence should be associated with high performance. For syndicated NVCA-venture-backed IPOs, the hot issue market index typically behaved as expected by showing a negative relationship to IPO performance for the first 21-day period. However, for the remaining 21-day periods, the hot issue index typically behaved in the unexpected direction of showing positive relationships to performance. These results indicate that more risky IPOs (those with high hot issue scores) outperform those with presumably high investor sentiment (those with low hot issue scores).

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[28] Venture capital firms implement their strategy through deal making. Thus, deal making should be further researched before being able to fully understand VCF's strategies. Refer to Appendix B, Summary of the Venture Capital Deal Evaluation Literature, for a brief review of the literature.

[29] See Tyebjee & Bruno, 1984a. Also refer to Appendix F for a summary of the history of the venture capital industry. Some strategies may be emphasized more than other strategies during certain times.

Percentage insiders before IPO and IPO deal size consistently showed negative relationships to IPO performance for this same selection of IPOs even though these relationships were expected to be positive. Perhaps relationships found among IPOs in general (as examined by most Finance scholars) do not hold true for a specific subset of IPOs—those that are backed by a syndicate of NVCA-member venture capital firms. These results indicate that higher holdings by insiders are associated with poorer performing IPOs, and smaller offerings performed better than large offerings of new stock. One reason smaller offerings outperformed large offerings may be provided by Chopra, Lakonishok and Ritter (1992) who found that overreaction was more prevalent in smaller firm's stocks compared to larger firm's stocks and more prevalent by individual investors than institutional investors.

Use of other control variables may be needed in future studies. For example, age of the entrepreneurial firm is a commonly used control (c.f., Carter, Dark & Singh, 1998; Carter & Manaster, 1990; Muscarella & Vetsuypens, 1989; Stuart, Hoang & Hybels, 1999; Young & Zaima, 1986). The inclusion of more control variables may alter the results of the study, because they may cause confounding effects depending upon the combination of and number of variables used. Conflicting findings may depend upon whether variables used in the study complement or substitute for each other.

Conclusion

"The predicitability of stock returns is one of the most controversial topics in financial research," claim Chopra, Lakonishok, and Ritter (1992, p. 235). Low R-squared values are expected when examining abnormal returns and firm strategies (c.f., Haleblian & Finkelstein, 1999), and relevant theory lacks robustness. Thus, an endeavor to explain additional variance in abnormal IPO stock price performance as a reflection of assumed "nurture" from the primary venture capital firms in NVCA-member venture capital syndicates above and beyond the "nature" of economic activity was equally, if not more controversial, than past attempts to explain IPO stock price performance in general.

Many of the recommendations that emerged from this research can enlighten future studies that investigate IPO performance using non-economic-based theory. The resource-based view of the firm is difficult to empirically substantiate. Its illustrious features provide challege for future investigations, both theoretically and

methodologically. A stronger understanding of the activities and relationships of VCFs will build a firmer foundation for scholarship that seeks to explain this powerful segement of society.

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Appendix A: The Stability of IPO-Based Constellations

The foundation of this study rests on the perpetuation of the venture capital industry and the continued presence of IPO constellations. Thus, reasons addressing the viability and longevity of constellations in the going public process will be the focus of this section. Puissant conditions exist for constellation members to remain separate entities, since public standing cannot be achieved self-sufficiently. Also, and perhaps more importantly, due diligence and independence are required for proper evaluation as to the worthiness of the "going public" transaction. If conditions favored consolidation of activities, this research might have only short-term applicability. However, no firm has the incentive or ability to internalize all the resources needed to go public, since going public is an infrequently recurring transaction. Although offerings of new, public-traded common stock may be placed subsequent to the initial public offering, such offerings do not occur often enough to justify internalization of the resources that this activity requires. Hence, environmental conditions of uncertainty/complexity and small numbers problems cannot be rectified by moving the IPO transaction from the market into a single firm's hierarchy (c.f., Williamson, 1975). Start-ups, in particular, engaged in the fast-paced and sedulous process of going public do not have the wherewithal to administer such specific transactions more efficiently than the market. Their process of going public alone requires substantial assets (Aggarwal & Rivoli, 1991). Resources such as expertise in filing SEC paperwork, creation of a red herring prospectus, certain legal representation, underwriting, and particular publishing activities required to file an IPO are distinctly applicable only to the transaction of going public. Such infrequently needed competencies are expensive to maintain. When not needed repeatedly, the cost of

these assets cannot be spread out over time creating neither experience curves, nor economies of scale. Other resources such as auditing expertise and some legal representation cannot be internalized due to conflicts of interest (Mann & Wilkinson, 1991). Keeping service providers as separate entities though is actually purported to add greater value to the entrepreneurial firm than if these services could be internalized, because of the value of "outsider's" reputational effects. A constellation member's choice of whether or not to work with an entrepreneurial firm is an important signal. Acceptance that is signaled by a constellation member of high status is a source of legitimization for the start-up, especially if it is searching for ways to offset its liabilities of newness. Credibility is valuable. Constellation members may be able to bring positive contributions to the start-up above and beyond those qualities indicative of the firm alone, especially when the entrepreneurial firm's executive managers are receptive to members' inputs (Barney, Busenitz, Fiet, & Moesel, 1996). Constellation members can have major ramifications on the IPO's success in both the short- and the long-term, especially those whom entrepreneurs find to be enthusiastic and objective (Ernst & Young, 1998). Constellation members also offer strategic informational advantages to emerging entrepreneurial firms via their networks (Larson, 1992). Contracted relationships therefore surround the IPO process and are not foreseen to be consolidated into one hierarchical governance structure. In fact, the philosophy of entrepreneurship is grounded on utilizing external resources (Jarillo, 1989). The idea of a one-stop firm that helps private entities make the transition into the public limelight is not portrayed to be a reality in the future primarily because of cost inefficiencies, conflicts of interest, and the presumption that many separate entities add value to the IPO in terms of certification and

signaling. The expectation that constellation members will remain separate entities means that the relationships explored within this study will be relevant for the long-term.

Appendix B: Summary of the Venture Capital Deal Evaluation Literature

The literature addressing venture capital firm's strategy—specifically, specialization—is at odds with literature addressing how venture capitalists evaluate deals. The deal evaluation literature, in general, gives a much less structured view of the venture capital firm's activities than that implied by Fried and Hisrich (1994), who claim that:

> Many [venture capitalists'] have firm-specific criteria on investment size, industries in which they invest, geographic location of the investment, and stage of financing. The firm-specific screen eliminates proposals that clearly do not meet these criteria.[30] At most, the firm-specific screen involves a cursory glance at the business plan without any analysis of the proposal. … The net result of … screens is that most proposals are rejected with minimal investment of time. (p. 32)

The majority of scholars examining venture capitalists' deal evaluation criteria imply less systematic decision-making than that required for the pursuit of strategic specialization. Since making deals is the essence of venture capital firm strategies, it is necessary to review this literature base.

To begin, the deal evaluation process is often lengthy. According to Fiet (1995b), "… the *due diligence* process [time and methods taken to adequately analyze information and make a decision] of venture capital firms frequently lasts six month or longer and consists largely of gathering and verifying informant-provided information." (p. 196) During this evaluation time, venture capitalists use their networks extensively (per phone conversations between randomly selected venture capitalists and the author during the summer of 1998). Networks serve valuable purposes, especially when the venture capitalist receives knowledge of the deal via a quality referral. In such cases, any screening mechanisms that may be in place are likely to be less rigorously applied (Fried & Hisrich, 1994). Thus, the value of these networks is for information purposes. Venture capital firms are in competition for the best proposals, as they all desire to invest in those entrepreneurial firms having the highest potential for profitability.

[30] A venture capitalist on Fried and Hisrich's (1994) industry panel comments: "While most venture capital firms profess to have a firm specific screen, they are opportunistic, and investment opportunities outside that screen may still have an opportunity to be funded." (footnote, p. 32)

The link between deal evaluation criteria and venture capital firm performance was examined by MacMillan, Zemann and SubbaNarasimha (1987). These scholars found that the only two evaluation criteria consistently and pervasively predicted venture capital performance—competitive threat and market acceptance of the product. Competition and the product market are external to the entrepreneurial firm compared to the importance of the entrepreneurial team's characteristics, which is internal and emphasized as being most important by all other studies examined regarding venture capital deal screening. In general, the majority of studies on deal evaluation echo the sentiments of Camp and Sexton (1992) who say:

> … it should be noted that venture capitalists do not invest in industries. Rather, each investment opportunity is critically analyzed to determine its merit. (p. 18)

Such critical examination is, in reality, traditionally carried out by "gut feel" or intuition (MacMillan, Zemann, & SubbaNarasimha; 1987). [31]

Zopounidis (1994) has put together a synopsis of the major studies of venture capitalists' deal evaluation methods and criteria. The great diversity of criteria and their various rankings in terms of importance seem to indicate that "… each decision in a venture capital investment is a single case," says Zopounidis (1994, p. 63). Zacharakis and Meyer (1998) have put together a comprehensive summary of information used in venture capitalists' decision-making processes. They concluded that the majority of researchers found that venture capitalists choose deals in which to invest based on (1) the entrepreneur/team capabilities; (2) product/service attributes; (3) market/competitive conditions; and (4) potential returns if the new venture is successful. Industry, geographic location, stage preference, and size of the entrepreneurial firm were not given heavy consideration when reviewing whether or not to accept an entrepreneurial firm's

[31] According to Hisrich and Jankowicz's (1990) study of intuition in venture capital decisions, subjective decisions lie at the heart of venture capitalists' judgements, even though they require highly quantified information before making decisions. Venture capitalists, they found, exemplified low cognitive complexity, meaning that one or two preponderant themes dominate thinking instead of taking into account many markedly different aspects of an issue. The theme prioritized by venture capitalists, according to Hisrich and Jankowicz (1990) is the adequacy of management. Rosman and O'Neill (1993) found support for Hisrich's and Jankowicz's (1990) claims. Roseman and O'Neill (1993) added that venture capitalists tended to focus on strategic information and study potential deals by looking at the "whole picture" as opposed to commercial bankers who search for details. Khan's (1987) research on venture capitalists' behavioral decision models concluded that decisions that emphasized the entrepreneur's desire for creativity and ingenuity are more likely to resulted greater investment performance than decisions made that stress desire for success and nature of the product.

proposal for funding. According to Dixon (1991), and Zacharakis and Meyer (1998), using studies addressing venture capitalists' decision processes and screening criteria to extrapolate their strategic posture may be controversial because venture capitalists, in general, do not use systematic, formalized or even accurate evaluation methods, they are poor at introspection, lack precision, and rely greatly on intuition. Hence, what venture capitalists advertise as qualities they seek in firms (c.f., specializations noted in directories such as *Pratt's* and *Galante's*) may be different from what they actually emphasize. Industry level inefficiencies can result from such misrepresentation.[32] The degree of inefficiency existing in a system is positively associated with the likelihood that any malfeasance that exists will go undiscovered (Fiet, 1995b).

Muzyka, Birley, and Leleux (1996) confirm that the majority of venture capital investment decision-criteria place the "human factor" (i.e., management team behaviors such as leadership abilities, as well as competence, experience, tenure together, etc.) first as being of utmost importance (see also Dixon, 1991, Khan, 1987; Zopounidis, 1994).[33] This finding is interesting in light of a comment made by one of the venture capitalists in Fiet's (1995b, p. 216) study, who said that 30%-50% of an entrepreneurial firm's talent

[32] To the extent that what venture capitalists say they do (i.e., construed by investors to indicate the venture capital firm's preferred or intended strategy) differs from what they actually do (i.e., construed to indicate the venture capital firm's actual or realized strategy), outside investors' perceptions of venture capital firm's intentions may be inaccurate resulting in industry inefficiencies. Because many authors claim that only 1 to 2 percent of all investment options receive venture capital funding (Gompers, 1994; Lerner, 1994a; Norton & Tenenbaum, 1993a; Sahlman, 1990), inefficiencies in terms of the time and energy utilized by both entrepreneurs and venture capitalists to match needs with wants exist. Bygrave (1987) alludes to inefficiencies in the venture capital industry by pointing out that networks provide the only conduits for the transfer of pricing and deal information within the industry. No formal mechanisms exist to disseminate information. Norton (1993) also discusses inefficiencies present in the venture capital industry. Inefficiencies cause investor's understandings of venture capital firm's formal network structures to be obscured by strategic misrepresentations. If network structures do in fact predict performance in the venture capital industry, keeping them hidden protects the low earning venture capital firms from being recognized as such. Low earning venture capital firms or those without a track record (i.e., new firms that have yet to overcome their liability of newness) can therefore have a chance of surviving by attracting investors who base their bets on firms' probabilities of odds. This perpetuates the "mystery" associated with venture capital firms' performance. Replacing such "mystery" with the use of a more systematic assessment of firms' capabilities may occur if venture capital firms' investors could recognize actual strategies and distinct network structures. The already tightly constructed communalistic properties of the venture capital industry would become more apparent if obfuscation was lacking, and expectations were not intractable.

[33] Deficiencies in the new venture's management are the reason 33% of the venture capitalists gave for denying funding (Bruno & Tyebjee, 1985). Measures of founders' and top management team's behaviors and other qualities are presently lacking in their ability to predict future firm performance (Amit, Glosten & Muller, 1990a; Roure & Keeley, 1990; Sandberg & Hofer, 1987). Dubini (1989), however, did identify

may be replaced [implied to be at the venture capitalist's discretion] after two years if they fail to achieve the results projected for them. If the top management team is so important for the entrepreneurial firm, why are they considered replaceable? The venture capitalists surveyed in the 1982 US GAO report mentioned that a dearth of and/or inaccessibility to highly competent management talent was one primary reason so few proposals are financed. Although Muzyka, Birley, and Leleux (1996) and Dixon (1991) examine only European and British venture capitalists, respectively, they found that management team criteria still ranked at the top in terms of criteria used to evaluate investments. Product-oriented criteria such as demand and market share sustainability was second in importance, and financial criteria such as liquidity (i.e., the ability to cash out[34]) and returns (both length of time to earn and amount) ranked third (Muzyka, Birley, & Leleux , 1996). Muzyka's, Birley's, and Leleux's (1996) findings are logical when considering Roure and Keeley's (1990) predictors of success in new technology based ventures. Roure and Keeley (1990) determined that 57% of the variance in new venture performance can be explained when expectations converge regarding the entrepreneurial firm's "… completeness of the founding team, technical superiority of the product, expected time for product development, and buyer concentration." (p. 201) Muzyka's, Birley's, and Leleux's (1996) research tells us that although venture capitalists say that they focus on particular industries or stages of development, they actually exhibit great flexibility and latitude in choosing investments. If an opportunity shows good promise in terms of the management team and the market opportunity, expressed evaluation criteria is not likely to apply (Muzyka, Birley, & Leleux, 1996). Norton (1995) points out that "… it is an unanswered empirical question whether venture capitalists do any kind of strategic planning regarding the types of firms and technologies in which they will invest." (p. 20) The US GAO (1982) report sums up quite nicely the components of the venture capital selection process, and confirms these sentiments by stating that:

> Any conclusion that this is a mechanical process misses the mark. The process involves people, which is to say it involves egos, personal drive, judgment,

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four clusters of entrepreneurial team characteristics and determined that each cluster predicted performance for a given product and market combination.

[34] Without adequate probabilities of a successful exit, venture capital firms are left with their biggest nightmare—a "living dead investment" (Ruhnka, Feldman, & Dean, 1992).

> knowledge, experience, skills, and business savvy. These characteristics vary from person to person and are difficult, if not impossible, to describe accurately. (pp. 13-14)

Aside from its allusiveness, seeking venture capital funding is also costly from both the entrepreneur's and the venture capitalists' perspective. Skilled analysts command high fees (US GAO, 1982) as they prepare detailed investment prospectuses. The price of providing funding increases for venture capital firms when historically we know that only one out of every five or six of deals that receive funding is likely to be successful (US GAO, 1982). For a transaction of such import, venture capital deal making appears to be art more than science—lacking order and strategic planning.

Appendix C: Data Discrepancies and How They were Resolved

1. The following IPOs are identified as being venture-backed per VentureOne, but not by SDC/Venture Economics. Because VentureOne is more stringent than SDC/Venture Economics in determining which IPOs are venture-backed, I accepted these firms as being venture-backed IPOs. When contacted about this discrepancy, neither VentureOne nor SDC/Venture Economics would change the way they classified these IPOs. SDC admitted, however, that their identification of venture-backed was more lax than VentureOne's definition in that SDC was more likely to accept informal venture capital firms. VentureOne accepts only professional, institutional venture capital firms as investors as defined in their reports. [VC=Yes,App.E, VC-Conf=1.00; where the variable label VC contains data from SDC and the variable label VC-Conf contains data from VentureOne (1=backed by a VC and 0=not backed by a VC)].

AIRS American Aircarriers Support
AUGS Augment Systems
AVGN Avigen
CLCX Computer Learning Centers
CPWM Cost Plus
EMKR Emcore
ETEK E-Tek Dynamics Inc
GALTF Galileo Technology
GCW Gerber Childrenswear(Gerber)
GIGX Giga Information Group Inc
GPSI Great Plains Software
GTIS GT Interactive Software
GTSG Global TeleSystems Group Inc
IMSX International Manufacturing
KNSY Kensey Nash
LCCI LCC International
NTEC Neose Technologies
NUCO NuCo2
OMNI Omni Energy Services
PATH Ameripath
PRBZ ProBusiness Services
PRDM Paradigm Technology
RACN Racing Champions
RBOT Computer Motion
REMC Remec
STFF Staff Leasing
TFRC TechForce
TMCS Ticketmaster Online-CitySearch
VNGD Vanguard Airlines

2. The following IPOs are identified as being venture-backed per SDC/Venture Economics, but not by VentureOne. As above, because VentureOne uses more stringent standards upon which to classify an IPO as being venture-backed, I chose not to classify these IPOs as being venture-backed. When contacted about this discrepancy, neither VentureOne nor SDC/Venture Economics would change the way they classified these IPOs. [VC=No,App.E, VC-Conf=.00; where the variable label VC contains data from SDC and the variable label VC-Conf contains data from VentureOne (1=backed by a VC and 0=not backed by a VC)]

Abgenix Inc ABGX
AnswerThink Consulting Group ANSR
Bindview Development BVEW
Global Imaging Systems Inc GISX
HLM Design Inc HLMD
Horizon Medical Products Inc HMPS
Master Graphics Inc MAGR
Merge Technologies Inc MRGE
Province Healthcare Co PRHC
SQL Financials International SQLF
Software.net Corp SWNT
Golden State Vintners VINT
William Greensberg Jr Desserts BAKE
Brigham Exploration BEXP
Cable-Sat Systems CFAX
Clearview Cinema Group CLV
Computational Systems CSIN
Data Processing Resources DPRC
Digital Power DPWR
DSI Toys DSIT
Datastream Systems DSTM
EduTrek International EDUT
Firefox Communications FFOX
First Virtual Holdings FVHI
Gateway Data Sciences GDSC
Gentle Dental Service GNTL
Gradall Industries GRDL
Heritage Propane Partners HPG
Housecall Medical Resources HSCL
Independence Brewing IBCO
Medical Alliance MAII
MIDCOM Communications MCCI
Millbrook Press MILB
Multicom Publishing MNET
MotorVac Technologies MVAC
Microware Systems MWAR
Myriad Genetics MYGN
NHancement Technologies NHAN
Nutrition Medical NMED
ONTRACK Data International ONDI
Patient Infosystems PATI
PCD PCDI
Petroglyph Energy PGEI
Progenitor PGEN
Peerless Group PLSS
Profit Recovery Group PRGX
Princeton Video Image PVII
Radiant Systems RADS
RMH Teleservices RMHT
RadiSys RSYS
Stage Stores STGE
Titan Exploration TEXP
Trico Marine Services TMAR
US Satellite Broadcasting USSB
V-One VONE
ViaSat VSAT
Pete's Brewing WIKD
Wesley Jessen Vision Care WJCO
World of Science WOSI

3. All IPOs reported in the 1995-1996 VentureOne “IPO Reports” that were identified as venture-backed but which did not have investors identified in VentureOne’s Appendix are backed by foreign Venture Capital Firms according to Rizwan Hussain, July 30, 1999. Mr. Hussain could not account for the 4 IPOs from 1997 missing the names of their investors. These 79 IPOs include the following:

1995, ACT Networks, ANET
1995, ADCO Technologies, ADCO
1995, ADE, ADEX
1995, Cardiovascular Diagnostics, CVDI
1995, Coda Music Technologies, COMT
1995, COREStaff, CSTF
1995, Cutter & Buck, CBUK
1995, Desktop Data, DTOP
1995, DSP Communications, DSPC
1995, FEI, FEIC
1995, Garden Ridge, GRDG
1995, HighwayMaster Communications, HWYM
1995, IMNET Systems, IMNT
1995, Intevac, IVAC
1995, Logic Works, LGWX
1995, Maxis, MXIS
1995, MiniMed, MNMD
1995, Ostex International, OSTX
1995, PACE Health Management, PCES
1995, Redhook Ale Brewery, HOOK
1995, Schlotzsky's, BUNZ
1995, SCP Pool, POOL
1995, Secure Computing, SCUR
1995, Smartflex Systems, SFLX
1995, StorMedia, STMD
1995, Tegal, TGAL
1995, Unison Software, UNSN
1995, Wireless One, WIRL
1996, Ace*Comm, ACEC
1996, Alyn, ALYN
1996, American Residential Services, ARS
1996, BioTransplant, BTRN
1996, Cadus Pharmaceutical, KDUS
1996, Cornell Corrections, CRN
1996, Document Sciences, DOCX
1996, EntreMed, ENMD
1996, Forensic Technologies, FTIC
1996, HealthCor Holdings, HCOR
1996, Hot Topic, HOTT
1996, Image Guided Technologies, IGTI
1996, Intelliquest Information Group, IQST
1996, K&G Men's Center, MENS
1996, Kentek Information Systems, KNTK
1996, KVH Industries, KVHI
1996, LanVision Systems, LANV
1996, Lion Brewery, MALT
1996, Loehmann's Inc (May Department), LOEH
1996, Marks Bros. Jewelers, MBJI
1996, Mazel Stores, MAZL
1996, McLeod, MCLD
1996, Novoste, NOVT
1996, Omnipoint, OMPT
1996, Preferred Networks, PFNT
1996, Premier Parks, PARK
1996, Puma Technology, PUMA
1996, Qualmark, QMRK
1996, Roadhouse Grill, GRLL
1996, SeaMED, SEMD
1996, SS&C Technologies, SSNC
1996, TALX, TALX
1996, TeleSpectrum Worldwide, TLSP
1996, Triumph Group Holdings, TGI
1996, United Auto Group, UAG
1996, UOL Publishing, UOLP
1996, USCS International, USCS
1996, Versatility, VERS
1996, Virus Research Institute, VRII
1996, Walsh International, WSHI
1996, Xionics Document Technologies, XION
1997, Compass Plastics, CPTI
1997, Pegasus Systems, PEGS
1997, Peregrine Systems, PRGN
1997, Travel Services International, TRV

For 70 of these 79 IPOs, venture capital backers' names could be recognized by searching ipodata.com's listings of "over 5% stockownership before IPO" and by purchasing a customized report from VentureOne. These venture capital firms' names were added to the database. However, no data could be found for the variable labeled BOD_YN (board of director membership) for any of the 79 IPOs listed above. The remaining 9 IPOs having no names of venture backers were left with missing data. [VC=Yes,missg, VC-Conf=1.00; where the variable label VC contains data from SDC and the variable label VC-Conf contains data from VentureOne (1=backed by a VC and 0=not backed by a VC)]

Note: VentureOne data does not include IPOs backed by foreign venture capital firms. IPOs backed by foreign venture capital firms were listed in 1995 and 1996 reports without identification of these investors' names. This data omission was resolved as best possible in Section #3 above. However, for 1997 and 1998, VentureOne no longer listed IPOs backed by foreign capitalists as being venture backed. Thus, IPOs addressed in Section #2 above could be backed by foreign venture capital firms, or a combination of both US and foreign venture capital firms.

Appendix D: Comparison of *Pratt's* and *Galante's* Data

Using the complete database of all venture capital firm-IPO combinations over four years (1/1/95 through 12/31/98; N=1,783), 492 observations were selected for the purpose of comparing of *Pratt's* and *Galante's* Data because they had data available from both sources. If a combination did not have data from either *Galante's* or *Pratt's*, it could not be evaluated. Four-hundred forty-seven (447) venture capital firm-IPO combinations were selected as having adequate data. Of these combinations, two-hundred eighty-six (286) different firms supplying venture capital (about 64%) were chosen when duplicate firms were not desired for comparative purposes.

Data from both sources were compared using the following variables:

1. Each financing stage preference reported below:
    a. Research & Development
    b. Seed
    c. Start-up
    d. First-stage
    e. Second-stage
    f. Mezzanine
    g. Bridge
2. The FSP measure operationalized in Chapter Three of this study
3. The venture capital firm's headquarters zip code
4. One of the venture capital firm's branch offices, if applicable
5. Founding date of the venture capital firm

The results of several statistical tests are as presented in Tables 33, 34, 35, and 36. In spite of some significant differences between data, the comparison of the computed FSP variable shows no significant difference between data sources. Financing stage preference is the variable for which both data sources are used in this study. Thus, use of two different data sources is not of concern to the quality of this computation.

Table 34: Comparison of *Pratt's* and *Galante's* FSP Data: Duplicate Firms Across Different Years

Variable	Number of observations	Correlation and Sig. Level[35]	T-Statistic and Sig. Level[36]	Frequency of Differences[37]
R&D FSP	431	0.586 0.000 ***	3.904 0.000 ***	0=86.8% -1=3.2%; 1=10%
Seed FSP	431	0.719 0.000 ***	3.605 0.000 ***	0=85.6% -1=3.9%; 1=10.4%
Start-up FSP	431	0.737 0.000 ***	2.912 0.004 **	0=88.9% -1=3.2%; 1=7.9
1st Stage FSP	431	0.677 0.000 ***	1.722 0.086 +	0=90.5% -1=3.5%; 1=6.0%
2nd Stage FSP	431	0.599 0.000 ***	0.714 0.476	0=88.6% -1=5.1%; 1=6.3%
Mezzanine FSP	431	0.574 0.000 ***	3.682 0.000 ***	0=78.4% -1=6.7%; 1=14.8%
Bridge FSP	431	0.230 0.000 ***	8.901 0.000 ***	0=83.5% -1=0.2%; 1=16.2%
Measure of FSP[38]	404[39]	0.772 0.000 ***	-0.666 0.506	0=48% detail omitted

+ $\rho \leq 0.10$; * $\rho \leq 0.05$; ** $\rho \leq 0.01$; *** $\rho \leq 0.001$

[35] Correlation statistics (Spearman's Rho, bivariate, two-tailed excluding cases pairwise) are between *Galante's* and *Pratt's* information for each variable. For example, the correlation between *Galante's* data for R&D financing stage preference (0,1) and *Pratt's* data for R&D financing stage preference (0,1) is 0.586 ($\rho \leq .000$).

[36] The T-test is a two-tailed paired sample statistic between *Galante's* and *Pratt's* information for each variable. For example, when t= 3.904 ($\rho \leq .000$) between *Galante's* and *Pratt's* information for R&D financing stage preference (0,1), the two sources of data are deemed to be statistically different regarding this variable.

[37] Frequency of differences is the valid percent difference between *Galante's* and *Pratt's* information for a given variable. For example, for the variable R&D financing stage preference, "-1=2.8%" means that 14% of *Pratt's* data showed that the venture capital firm preferred R&D financing when *Galante's* data showed no preference for R&D financing. The notation "0=76%" means that both data sources agreed on the preference of R&D financing. Lastly, the notation "1=8.7%" means that almost 9% of *Galante's* data showed that the venture capital firm preferred R&D financing when *Pratt's* data showed no preference for R&D financing. In this case, 12.4% of the observations had missing data for either *Galante's* or *Pratt's* but not both.

[38] Pearson's Product Moment Correlation (bivariate, two-tailed) was used to calculate the FSP correlation.

[39] When all financing stage preference data is comprised of zeros, the computation of FSP is classified as missing.

Table 35: Comparison of *Pratt's* and *Galante's* Location and Founding Data: Duplicate Firms Across Different Years

Variable	Number of observations	Correlation and Sig. Level	T-Statistic and Sig. Level	Frequency of Differences
Hdqtrs. Zip[40]	441[41]			Same=92.7% Diff't=7.3%
Branch Zip	441			Same=86.2% Diff't=13.8%
Founding Date	431	0.887 0.000 ***	-0.884 0.377	-73=0.2% -28=0.2% -26=0.2% -17=0.5% -15=0.2% -9=0.5% -7=0.2% -5=0.5% -3=1.6% -2=0.5% -1=5.6% 0=81.4% 1=4.2% 2=0.9% 3=0.5% 4=0.2% 5=0.2% 7=0.2% 9=0.5% 12=0.2% 14=0.9% 18=0.2% 20=0.2%

+ $\rho \leq 0.10$; * $\rho \leq 0.05$; ** $\rho \leq 0.01$; *** $\rho \leq 0.001$

[40] Instead of measuring the numerical difference between zip codes, data were coded "1" if the zip codes between the two sources were identical, and "2" if they differed. In the majority of cases where data differed (about 65%), it was determined that the reason was merely a slight difference in zip code or address provided even though location was still in the same city. In other cases (about 35%), the location of headquarters was switched with a branch location. This difference is immaterial considering the computation of geographical proximity in this study is based on the location closest to the IPO. Headquarters and branch offices are not differentiated in the algorithm.

[41] Of the total number of venture capital firms analyzed having *Galante's* data, 51 were missing zip code data from *Pratt's Guides*. Thus, 492 minus 51 equals 441. Sixty-one firms were missing financial stage preference and founding date information from *Pratt's Guides* (hence, 492 minus 61 equals 431).

Table 36: Comparison of *Pratt's* and *Galante's* FSP Data: No Duplicate Firms per Year—Split by Year

Variable	Number of observations	Correlation[42]	T-Statistic[9]	Percentage "Same" (=0)
1995 R&D FSP	86	**0.617**	**2.397**	89.5%
1996 R&D FSP	94	**0.608**	1.518 ☆	88.3%
1997 R&D FSP	147	**0.588**	**1.983**	85.7%
1998 R&D FSP	104	**0.542**	**2.030**	84.6%
1995 Seed FSP	86	**0.768**	0.630 ☆	88.4%
1996 Seed FSP	94	**0.747**	1.157 ☆	87.2%
1997 Seed FSP	147	**0.698**	**2.772**	84.4%
1998 Seed FSP	104	**0.684**	**2.224**	83.7%
1995 Start-up FSP	86	**0.803**	1.423 ☆	90.7%
1996 Start-up FSP	94	**0.797**	1.683 ☆	90.4%
1997 Start-up FSP	147	**0.670**	**2.088**	87.1%
1998 Start-up FSP	104	**0.685**	0.575 ☆	88.5%
1995 1st Stage FSP	86	**0.780**	1.136 ☆	91.9%
1996 1st Stage FSP	94	**0.769**	1.136 ☆	92.6%
1997 1st Stage FSP	147	**0.579**	1.902 ■	87.8%
1998 1st Stage FSP	104	**0.597**	-1.000 ☆	91.3%
1995 2nd Stage FSP	86	**0.716**	1.136 ☆	91.9%
1996 2nd Stage FSP	94	**0.670**	1.518 ☆	88.3%
1997 2nd Stage FSP	147	**0.597**	0.229 ☆	87.1%
1998 2nd Stage FSP	104	**0.513**	-1.157 ☆	88.5%
1995 Mezzanine FSP	86	**0.549**	**2.106**	77.9%
1996 Mezzanine FSP	94	**0.551**	1.539 ☆	77.7%
1997 Mezzanine FSP	147	**0.584**	1.625 ☆	78.9%
1998 Mezzanine FSP	104	**0.590**	**2.170**	78.8%
1995 Bridge FSP	86	**0.414**	**3.713**	86.0%
1996 Bridge FSP	94	**0.103**	**4.034**	85.1%
1997 Bridge FSP	147	0.103 ☆	**4.955**	83.0%
1998 Bridge FSP	104	**0.196**	**4.952**	80.8%
1995 Measure of FSP	82	**0.817**	0.480 ☆	51.2%
1996 Measure of FSP	87	**0.801**	-0.322 ☆	52.9%
1997 Measure of FSP	136	**0.745**	-1.241 ☆	75.7%
1998 Measure of FSP	99	**0.744**	0.110 ☆	44.4%

[42] All statistics in bold type are significant at $\rho \leq 0.05$ unless noted by ☆. "☆" means the statistic is not significant. "■" is the only exception where the significance level is under 0.10 and over 0.50 ($\rho = 0.059$).

TABLE 37: Comparison of *Pratt's* and *Galante's* Location and Founding Data: No duplicate firms per year—Split by Year

Variable	Number of observations	Correlation[9]	T-Statistic[9]	Percentage "Same" (=0)
1995 Hdqtrs. Zip	87			78.2%
1996 Hdqtrs. Zip	97			80.4%
1997 Hdqtrs. Zip	150			91.3%
1998 Hdqtrs. Zip	107			90.7%
1995 Branch Zip	87			93.1%
1996 Branch Zip	97			91.8%
1997 Branch Zip	150			96.0%
1998 Branch Zip	107			88.8%
1995 Fnd'g Date	85	**0.886**	-1.239 ☆	82.4%
1996 Fnd'g Date	93	**0.822**	-0.867 ☆	84.9%
1997 Fnd'g Date	147	**0.903**	-0.243 ☆	80.3%
1998 Fnd'g Date	106	**0.966**	1.541 ☆	79.2%

Appendix E: Summary of the IPO Stock Price Performance Literature

IPO stock price performance is correlated with market waves. Performance is higher during high waves or "hot issue" markets than during low waves or "cold issue" markets. Regardless of market wave in which placed, though, most new issues usually experience a brief time of stock price acceleration shortly after their offering date[43], to be followed by a decline in price (Aggarwal & Rivoli, 1990; McDonald & Fisher, 1972; Ritter, 1991). Ritter (1991) claims that, "A strategy of investing in IPOs at the end of the first day of public trading and holding them for 3 years would have left the investor with only 83 cents relative to each dollar from investing in a group of matched firms listed on the American and New York stock exchanges." (p. 23) Young and Zaima (1988) observed a significant number of negative aftermarket returns in their study of IPOs, leading them to believe that such may be a function of investors exercising short sale strategies and/or companies' going public too soon. McConaughy, Dhatt, and Kim (1995) believe that poor aftermarket performance is due more to overoptimistic investors extrapolating current growth into the future. Shiller (1990) uses the impresario hypothesis to describe his view that irrationally overoptimistic forecasts for certain industries or "fads" explain market prices. Although research supportive of fads is controversial, Aggarwal and Rivoli (1990) also found support for it as an explanation of abnormal IPO returns in the early aftermarket period. According to Ibbotson, Sindelar, and Ritter (1994):

> … periodic overoptimism by investors creates "windows of opportunity" during which many firms rush to market, which results in disappointing returns to long-term investors when the issuers fail to live up to overly optimistic expectations. In contrast, firms that issue during low-volume periods typically experience neither high initial price run-ups nor subsequent long-run underperformance. The above patterns, moreover, are much more pronounced for smaller, younger companies going public than for older, more established counterparts. This finding is consistent with other evidence suggesting inefficiencies in markets for smaller-cap stocks. (p. 66)

[43] Prasad (1994) claims that "The after-market prices of common stocks have consistently been found to be higher than their corresponding offering prices by approximately 3% to 35%." (p. 25) Reilly (1973) found that "… new issues experienced relatively superior short-run returns even during a period of declining stock prices." (p. 87)

Obviously, many scholars have attempted to explain why IPO returns go up in the short-term and then down again over the long-term (see Anderson, Beard, & Born, 1995, for a review of the IPO literature from a Finance perspective). The most prevalent theory as to why returns are initially high has to do with underpricing[44] initial offerings (Aggarwal & Rivoli, 1990; Ibbotson, Sindelar, & Ritter, 1994), and the view that underpricing is presumably caused by asymmetric information between the issuer, the underwriter and investors, even though scholars disagree as to which actors have superior information within this pricing mechanism (Ibbotson, Sindelar, & Ritter, 1988). Rock (1986) developed the most renown underpricing theory, according to Anderson, Beard and Born (1995), who say:

> Perhaps the best known and most studied explanation of IPO underpricing is the adverse selection mechanism first formally proposed by Rock (1986), and analyzed by Beatty and Ritter (1986), Carter & Manaster (1990), Koh and Walter (1989), Ritter (1984b), McStay (1992), and others. Unlike many earlier explanations of IPO underpricing, the Rock mechanism provides a theoretically coherent model rich in structure and predictions. Underpricing is viewed as a consequence of rational behavior by issuing firms in an environment characterized by important informational asymmetries among potential investors. (pp. 30-31)

In Rock's (1986) model pertaining to firm commitment offerings, the informational asymmetry of informed versus uninformed investors implies that informed investors queue up for "good" issues, whereas uninformed investors, assuming they are not able to distinguish between "good" and "bad" issues, compete for all issues. As a consequence, there is a much greater probability that uninformed investors will obtain more shares in "bad" issues than in "good" issues. Koh's and Walter's (1989) findings support Rock's (1986) theory, viewing underpricing in terms of demand between informed and uninformed investors. Koh and Walter (1989) say that greater rationing occurs for "good" issues compared to "bad" issues.[45] Thus, a winner's curse[46] causes uninformed investors to lower their valuation of new issues because the high demand for "good" issues by informed investors makes the uninformed investor's probability of

[44] Underpricing is defined as the "… observation of systematically positive abnormal returns from offer price to first aftermarket price," according to Booth and Smith (1986, p. 277).
[45] Beneveniste and Spindt (1989) found that distributional priority is given to an underwriter's regular investors.
[46] See Rock, K. (1986). Why new issues are underpriced, Journal of Financial Economics, 15, 187-212.

receiving a "good" issue less likely than a "bad" issue (Koh & Walter, 1989). Ibbotson and Brinson (1987) attempt to succinctly explain Rock's (1986) logic:

> Outsiders [uninformed investors] demand a competitive return and get stuck with the relatively overpriced issues. These relatively bad issues must be at least fairly priced to induce outsiders to take their chances in the new-issue market. If the bad issues are fairly priced at issuance, then the good issues must be *underpriced*, making the whole market underpriced on average. (p. 99)

Although Rock's (1986) view has gained much attention, no one theory of IPO underpricing may be entirely satisfactory as a stand-alone explanation (Ibbotson, Sindelar, & Ritter, 1988). Many theories of underpricing have been proposed.[47]

Obviously, underpricing is a very complex phenomenon, and has been criticized on many angles. Whereas the above explanations of underpricing have basically relied on agency theory (which addresses the incentives, problems, and costs of monitoring delegated decision-making authority which can significantly impact performance), other attempts to explain underpricing are based on signaling and the role of certification by underwriters, auditors, or venture capitalists. The reputations of these service providers can be instrumental in offsetting the amount of underpricing (Beatty & Ritter, 1986;

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[47] Baron (1982), for example, establishes that the principal-agent relationship between the issuer and underwriter may produce moral hazard, which explains underpricing; contraire to Rock's (1986) model, which attributes underpricing to investor asymmetries. Baron (1982) believes that the investment banker is better informed about the market than the issuer, and the issuer does not observe the banker's distribution efforts. (See Baron and Holmstrom, 1980, for a more complete discussion of the investment banker's efforts with respect to new issues.) Muscarella and Vetsuypens (1989) test Baron's model and find contrary results suggesting that lead underwriters deliberately underprice suggesting that underpricing cannot be explained solely by information asymmetries between issuers and underwriters. Chalk and Peavy (1990) provide a third explanation of underpricing arguing that:

> … the public-offering process can be thought of as a disguised discriminatory auction and that this leads to new issues appearing to be underpriced. In fact, they are not. The abnormal returns earned by the recipients of the offering must be paid for such that, in equilibrium, the recipients earn only a normal rate of return. The investment banker enforces this rate of return by making the receipt of IPOs conditional on the purchase of other investment banking services at prices higher than the marginal production cost.
> (p. 233)

Mauer and Senbet (1992) provide a fourth theory of underpricing, arguing that underpricing is a function of the role that the secondary market plays in the pricing of new issues. The price differential resulting from incomplete access, incomplete substitution and incomplete spanning equates to underpricing (Mauer & Senbet, 1992). Anderson, Beard and Born (1995) mention other explanations of underpricing, as addressed in this succinct paragraph:

> Competing heterodox theories of underpricing include: the lawsuit avoidance theory of Tinic (1988), the incomplete spanning arguments of Mauer & Senbet (1992), the presale information gathering model of Benveniste & Spindt (1989), the monopoly power argument, the "Cascades" theory of Welch (1992), the divergence of opinion argument of Miller (1977), … (p. 53)

Booth & Smith, 1986; Carter & Manaster, 1990; Johnson & Miller, 1988; Megginson & Weiss, 1991; Neuberger & Hammond, 1974; Neuberger & La Chapelle, 1983). The underwriter's reputation, in particular, is very influential. Too little underpricing can be just as punishing as too much underpricing (Beatty & Ritter, 1986; Ibbotson, Sindelar, & Ritter, 1994; 1998). Prestigious underwriters are selective in the issues they underwrite (Logue, 1973), and prefer not to work with speculative offerings because the uncertainty of these offerings can cause reputational harm if the offering turns bad (Brav & Gompers, 1997). Thus, lower risk firms are more likely to be supported by the most credible professional service providers (Carter & Manaster, 1990), and are less underpriced compared to other IPOs (Johnson & Miller, 1988; Neuberger & La Chapelle, 1983). Other signals, such as a direct disclosure of insider information (Hughes, 1986) such as a lack of insider trading (Leland & Pyle, 1977; McBain & Krause, 1989), and choice of auditor (Balvers, McDonald, & Miller, 1988; Datar, Feltham, & Hughes, 1991; Feltham, Hughes, & Simunic, 1991; Firth & Liau-Tan, 1998; Titman & Trueman, 1986) may also influence valuation of the new issue and/or the corresponding extent of underpricing. Chemmanur (1993) builds on these scholarly works by adding that outsiders are induced by insiders to produce costly information about the IPO helping to clarify its value. A direct relationship usually exists between the amount of underpricing and uncertainty surrounding a company (i.e., its risk)[48] (Brandi, 1987; Gompers, 1996; Miller & Reilly, 1987). Therefore, venture capital firms are better off waiting until an IPO's value is more confidently understood by investors and/or linked with credible "others" to offset uncertainty, so as to not lose their wealth or that of existing shareholders when new shareholders are allowed to buy-in.

New issues perform in a cycle of typically rising then lowering prices primarily as a result of initial underpricing, and other factors over the longer-term (Miller & Reilly, 1987). Underpricing is not fully understood, even though Welch (1992) concludes that, "All successful offerings are underpriced." (p. 701) Pricing new issues is particularly uncertain because it involves the issuer and investors sentiments, as well as a lack of

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Ibbotson, Sindelar, and Ritter (1994) also provide a brief synopsis of various theories of IPO performance fluctuations.

[48] Note that the Capital Asset Pricing Model (CAPM) concept of systematic risk does not apply to the ex ante uncertainty which leads to underpricing (Beatty & Ritter, 1986).

price history (Ibbotson, Sindelar, & Ritter, 1988). Brandi (1987) points out that, in spite of these uncertainties, the offering price is partially dependent upon minimum benchmarks or standards governing the new issue (Brandi, 1987). Setting the offering price is not an arbitrary act. "For example," states Brandi (1987), "the offering price of a new issue may be restricted to prevent excessive dilution of value to new public investors." (p. 701)[49] These merit standards are set to ensure that new issues are fair, just, and equitable to new public investors. Merit standards attempt to reduce risk, which protects uninformed investors (Brandi, 1987). Brandi (1987) argues that while underpricing contributes to the "initial-issue abnormal returns phenomenon," so does a lack of merit regulation "imposed on initial issues by the states in which the issue is marketed." (p. 702) According to Brandi (1987):

> Because each state maintains and exercises the right to set unique standards of quality, the national capital market includes a wide spectrum or variation of standards. (p. 702)

The lowest risk issues are those subjected to the greatest amount of merit regulation. Abnormal return is therefore minimized in issues prepared under strict standards (Brandi, 1987).

In conclusion, IPO performance is, at least, a function of market characteristics, underpricing, and the regulatory environment in which the issue is structured. Hensler, Rutherford, and Springer (1997) found that the length of time an IPO survives in the aftermarket before delisting is a function of the IPO firm's size, age, amount of the initial return, percentage of insider ownership, and amount of trade activity. The survivability of an IPO over time decreases when the market timing of the IPO is unfavorable, and the firm going public is wrought with risk characteristics (Hensler, Rutherford, & Springer, 1997). Ritter (1991) also considers issue size, industry, sales, age, and year of issuance in explaining IPO performance. In essence, higher quality firms going public will have

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[49] Brandi (1987) provides an example of a formula upon which an offering price may be computed: Offering price equals [I_p (Number of Insider Shares) – Expenses]/[Total Number (1-%) - Number of Public Shares]; Where I_p = insider prices, (1-%) = one minus the dilution percentage allowable, and total number = the total number of shares after offering.

higher probabilities of success.[50] Both qualities of the issuer and the issuer's external environment, though, affect long-term IPO performance.

How various scholars have measured IPO performance, though, varies. Whereas few, if any, departures from efficiency are thought to exist in the aftermarket (Ibbotson, 1975), many inefficiencies are thought to exist during the initial period following the public offering.[51] Thus, IPO performance is significantly different during both of these eras and measured accordingly.

Aggarwal and Rivoli (1990) and Ritter (1991) are scholars who have examined the long-term performance of IPOs in the aftermarket. Aggarwal and Rivoli (1990) claim that "The returns to investors who purchase [IPOs] at the closing price on day 1 in the aftermarket and hold until day 250 are found to be significantly negative (-13.73%) after adjusting for market movements. … Returns to investors who purchase at the initial offering price and hold for 250 days are also negative." (p. 46) One concern of Aggarwal and Rivoli (1990) is the fact that IPOs have comparable systematic risk to market indices. However, IPOs have a greater systematic risk than most market indices, making computations using market indices upwardly biased estimates of abnormal returns. Ritter (1991), likewise, has similar conclusions. Ritter (1991) documented the long-run performance of IPOs and in so doing claimed that "… the quantitative measurement of the long-run performance of initial public offerings is very sensitive to the benchmark [index] employed. … [yet] it is not at all clear what constitutes the appropriate benchmark portfolio." (p. 12) However, "… *some* benchmark must be used," says Ritter (1991, p. 13). Ritter's (1991) solution to this dilemma was to create a wealth relatives performance measure which used matching firms instead of a market index benchmark. As more IPOs are traded on exchanges other than the traditional over-the-counter (O.T.C., now NASDAQ) market, benchmarking by market index becomes tedious. Although selecting matching firms is novel, it too is time consuming. Scholars have yet

[50] This should apply in the short- to moderately long-term (i.e., less than 5 years). It is important to point out, though, that a phenomenon known as the overreaction effect has been recognized. This is described as the very long-term reversal of stock performance, whereby extreme prior losers outperform extreme prior winners. Chopra, Lakonishok, and Ritter (1992) documented the existence of overreaction effects especially for small firms' stocks. Overreaction effects are more prevalent when individuals are dominant stockholders compared to institutions (Chopra, Lakonishok, & Ritter, 1992). Thus, IPO performance over the very long-term is subject to interesting changes (see also Loughran & Ritter, 1996).

to agree as to how to measure long-term IPO performance, particularly because a commonly accepted benchmark does not exist. The choice of benchmark is a sensitive issue, because it can significantly sway how performance is interpreted. So, although IPO performance during the initial period is easy to measure, the long-term operationalization of IPO performance is seemingly more complex. Both short- and long-term performance, though, can not fully be explained yet.

[51] Brandi (1987) says it may take 4 weeks or more for the IPO to reach market equilibrium.

Appendix F: History of the Venture Capital Industry

According to Schilit (1991), the year 1492 sparked the beginning of the venture capital industry. The place was Spain, and the venture capitalist was Queen Isabella (see also Morris, 1991a). Her investment was in Christopher Columbus. She provided not only financial assistance but helped with management and recruitment as well. One might say the Queen commanded her court, an organized entity, to help other entities discover, commercialize, and make accessible new knowledge and a product (land). When entrepreneurs, due to a lack of collateral, are unable to obtain traditional financing, venture capital is often their only funding option.

Over 450 years later, from a domestic standpoint, venture capital (otherwise known as risk capital; Barry, 1994; Tyebjee & Bruno, 1984a) began as a low profile, private industry (Venture Economics, Inc., 1991). Florida and Kenney (1988), Liles (1977), Morris (1991a), Robinson (1987) and the US GAO (1982) describe this early industry as sponsored by wealthy individuals, families, family organizations employing professional managers, and syndicated investment bankers (e.g., Phipps—Bessemer Securities, Rockefeller Brothers, Inc.—Venrock[52], and J. H. Whitney, Inc.[53]). These early venture capitalists serviced primarily New York and Chicago. The industry's institutionalization did not commence until post World War II in Boston with the 1946 creation of American Research and Development (AR&D; Florida & Kenney, 1988; Morris, 1991a; Schilit, 1991; US GAO, 1982). Harvard Business School professor General Georges F. Doriot started AR&D and hence, has been labeled "the father of venture capital," according to Gompers (1994, p. 5). AR&D began in 1946 with the goal of financing "noble" commercial applications of technologies developed during World War II, as opposed to strictly seeking high monetary returns on investments (Lerner, 1994a; Liles, 1977; Morris, 1991a). AR&D, albeit a publicly traded firm, established the venture capital paradigm that is in place today—to be active versus passive investors in new-sprung technologies offering promising societal benefits by adding value in terms of industry expertise, management experience, and money (Lerner, 1994a; Morris, 1991a). AR&D also was the first to establish the now pervasive concept of a "home run" in

[52] Important investments for the Rockefeller family were McDonnell Douglas and Eastern Airlines (Florida & Kenney, 1988).

[53] An important investment for J. H. Whitney and Co. was Minute Maid (Florida & Kenney, 1988).

venture capital investing through publicizing its success with the funding of Digital Equipment Company (Lerner, 1994a).[54]

Although AR&D's goal was the same as that held by the majority of first-generation venture capital firms—to provide early-stage financing for relatively small, emerging companies—venture capital firms of the present prefer to cover a broader spectrum by catering to different stages of financing (Venture Economics, Inc., 1991). Many of AR&D's venture capitalists left and started their own funds over the years (Gompers, 1994; Lerner, 1994a), making AR&D an incubator for venture capital (Florida & Kenney, 1988).

Over next decade since 1946, other venture capital firms began organizing in the Northeast (primarily in Massachusetts and New York; Gompers, 1994; Lerner, 1994a). The emergence of venture capital firms onto the West Coast, particularly the Bay Area (Silicon Valley/San Francisco) began around 1957 with Arthur Rock's efforts (Gompers, 1994), providing a home for a vast variety of new and different types of venture capital organizations (Florida & Kenney, 1988), compared to AR&D. Between 1956 and 1963, Bay Area venture capitalists were, according to Florida and Kenney (1988): "faced with acute difficulties mobilizing funds and the need to share information and expertise." (p. 310) As a result, these early venture capitalists began participating together in rudimentary co-investments (now most commonly called syndicates), and created a highly interactive community for the exchange of information (Florida & Kenney, 1988).[55]

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[54] According to Lerner (1994a) and Schilit (1991), during 1957, AR&D invested $70,000 for a 77% stake in Digital Equipment Company (DEC). Fourteen years later, this investment had increased to a value of $355 million, contributing to almost half of all money earned by AR&D in its 26-year existence (Gompers, 1994). Morris (1991a) claims that "AR&D ultimately turned a $60,000 investment in DEC into $400 million." (p. 8). Bygrave, Fast, Khoylian, Vincent, and Yue (1989) acknowledge this discrepancy in amounts, but admit that DEC is the famous investment "of which legends are made." (p. 95) AR&D's success with DEC was a significant accomplishment, spurring new investors to put their money into venture capital. Also, AR&D, through its DEC investment, served to develop greater entrepreneurial talent by being the primary impetus for the creation of the Boston-Route 128 high technology community (Florida & Kenney, 1988).

[55] By 1992, West Coast venture capital claimed 48% of all dollars invested in entrepreneurial activity (Gompers, 1994, pp. 8-9) Gompers (1994) says that while the Northeast accounted for 20% of all venture capital dollars invested as of 1992, venture capital was expanding rapidly into the Midwest and Southwest.

During 1958, the US government gave the Small Business Administration the authority to charter Small Business Investment Companies (SBICs; Gompers, 1994; Liles, 1977; Morris, 1991a; Schilit, 1991)—the first phase of a true venture capital industry (US GAO, 1982). SBICs, according to Lister and Harnish (1996);

> … leverage private money with federal dollars to establish venture funds. Special Small Business Investment Companies (SSBICs) fund businesses owned and operated by socially or economically disadvantaged people. SBICs and SSBICs are privately owned and operated, but are licensed, regulated, and partially funded by the Small Business Administration. Nearly 35 percent of SBICs are operated or controlled by commercial banks (representing 65 percent of the investment dollars). The balance of SBIC funds is managed by financial companies (such as established venture capital firms), individuals, and other organizations. SBIC and SSBIC funds tend to be smaller than the average venture capital fund, many with less than $20 million under management. (p. 2)

According to Gompers (1994):

> … SBICs were able to borrow four government guaranteed dollars for each dollar of equity capital in the investment company. Because SBICs needed to make periodic interest payments, they chose to finance firms with debt rather than equity, as AR&D had chosen to do. Had they used equity, SBICs would not have been able to service their own debt obligations. Because high-risk projects are unsuited for leveraged capital structures, the use of debt financing meant that SBICs focused on more stable industries. (p. 7)

Schilit (1991) claims that AR&D was offered the first SBIC license.[56] The proliferation of SBICs gave way to a rapid emergence of venture capital activity (Robinson, 1987). By 1962, SBICs were controlling the majority of risk capital invested in the US (Lerner, 1994a; Morris, 1991a). The 1970s recession resulted in the liquidation of most government sponsored SBICs, reducing their prominence in the venture capital industry from over 75% in 1963 to about 7% in 1988 (Lerner, 1994a). The SBIC's demise was a function of poor incentives centering on their "hands-off" philosophy and use of debt-based financing, unreasonable expectations, inadequate private capitalization, a short-term investment orientation, excessive government regulation, poor economic and market conditions, a lack of management experience, and a widespread misunderstanding of the industry (Lerner, 1994a; Morris, 1991a; Schilit, 1991). In essence, because the US Government sponsored and hence guaranteed SBIC investments, SBICs were motivated

to gamble without monitoring firm performance, allowing risk to get out of control (Gompers, 1994; Lerner, 1994a). The late 1960s and early 1970s were consumed by many new, private venture capital firms that took up the slack in the market segment left unfulfilled by failed SBICs. The problem at this time was the limited supply of venture capital (US GAO, 1982).

Between the early and mid-1970s, the venture capital industry was filled with learning and questioning. Early-stage investments were still preferred by venture capitalists, but the lag time before returns could be realized from these investments made it difficult for venture capitalists to retain their investors (Liles, 1977; Morris, 1991a). Institutional investors could not please their constituents by having to wait so long for returns. This, when coupled with the failure rate of new companies, left many investors questioning the rationality of investing in venture capital firms (Morris, 1991a). Just as the venture capital industry was trying to sort out its problems, the recession of 1974/75 hit (Morris, 1991a). Even some of the most successful companies were stung. As Schilit (1991) says:

> Numerous problems arose due to below average portfolio returns, lack of public interest in the stock market, and a severe recession that hurt venture capital commitments in the early to mid-1970s. … several corporate venture capital subsidiaries, both large and small exited the industry, and SBIC and venture capital activity were at a virtual standstill. (p. 31)

Turnaround finally came in the late 1970s and early 1980s when several momentous regulatory changes took place. In 1978, the Revenue Act,[57] which significantly decreased capital gains taxes from 49.5% to 28%, was passed.[58] Then, the "prudent man" rule was incorporated into the 1979 Employee Retirement Income Security Act (ERISA), which released previous restrictions on the amount that pension funds could invest in venture capital (Gompers, 1994). Also, the Securities and Exchange Commission (SEC) established regulations to boost venture capital investment (Lerner, 1994a; Morris, 1991a; Schilit, 1991; Swartz, 1991). Lastly, the 1980 Small

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[56] AR&D's president, General Georges Doriot refused this license according to Schilit (1991), because "he felt that venture capital investing was too risky an undertaking for taxpayer money." (p. 30)
[57] Bygrave, Fast, Khoylian, Vincent & Yue (1989) refer to this as the Steiger amendment.
[58] Gompers (1994) says that because "… the Tax Reform Act of 1978 lowered the capital gains tax to 28% without changing the top marginal tax rate," the tax advantage of capital gains was increased to 42%,

Business Investment Act helped venture capital firms by allowing them to raise money from the public (Tyebjee & Bruno, 1984a).[59] These regulatory changes created tremendous growth, yet resulted in overinvestment in certain industries (such as the Winchester disk drive industry; Gompers, 1994; Sahlman & Stevenson, 1985). Alignment of investors' incentives with venture capitalists' and entrepreneurs' incentives were in need of adjustment following ERISA (Gompers, 1994). Venture capitalists, especially, learned many lessons.

The most crucial lesson learned by venture capitalists was "the ability to work with operating managements over an extended period of time," claims Morris (1991a, p. 8). These "new" venture capitalists, says Lerner (1994a) sought "home-runs" by practicing "hands-on" management and services to entrepreneurs "including access to investment bankers, corporate lawyers, accountants, and industry experts." (p. 6) Because of repeat relationships with these service providers, the venture capitalists were able to provide higher quality contacts to entrepreneurial firms' founders and top management teams than could otherwise be acquired (Lerner, 1994a). Adding value through personal involvement was deemed a legitimate contributor to the success of a venture capital firm. Thus, public confidence in the value of advisory services renewed the service of "personal involvement" as a significant part of the venture capital paradigm just as it was in the years of AR&D. Morris (1991a) points out that two new strategies also resulted during this time—one, that venture capitalists reduce their focus on specialization by diversifying into wider investment interests; and two, that the venture capital industry strengthen itself by creating cooperative arrangements.

By the 1980s, the general inexperience of the many new venture capitalists that recently entered the industry, coupled with excess available cash and a desire to hastily expand investment portfolios resulted in a "herding" mentality (Gompers, 1994; Lerner, 1994a; see also Welch's (1992) cascades theory). According to a study performed by the

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giving incentives to taxable investors to invest in venture capital. (p. 10) Gompers (1994) notes that this advantage declined after the 1981 Economic Recovery Tax Act and the 1986 Tax Reform Act.

[59] Gompers (1994) explains that the 1980 Small Business Investment Act eased allowed public venture capital firms to incorporate as Business Development Companies, enabling them to operate similar to the way limited partnerships operate.

Joint Economic Committee in 1984, the recent expansion of venture capital availability[60] caused competition for venture capital deals to increase while decreasing the quality of decision-making (US Congress, 1985). This "mental myopia" as termed by Sahlman and Stevenson's (1985) critique of venture capitalists' lack of rationality during this time, had negative effects.[61] Many investments were chosen which had little if any likelihood of being profitable simply because they were acceptable choices of other investors. Hence, diversifying into popular industry sectors, and cooperating with others in these sectors which made worse the effects of such concentration, resulted in the poor performance of many IPOs (Morris, 1991a). Such over-zealousness gave rise to another wave of skepticism about the venture capital industry, reducing industry returns.

However, the mid-1980s provided an impetus that helped to spark a revitalization of the venture capital industry—a plethora of start-ups emerged (Lerner, 1994a; Gompers, 1994), and many venture capitalists had hit "home runs" (Schilit, 1991).[62] By this time, "megafunds" had emerged whereby "venture capitalists pyramided partnership funds on top of one another," claim Florida and Kenney (1988; p. 311)—resulting in larger venture commitments.[63] The Tax Reform Act of 1986 began to dampen venture capital by signaling to the public that long-term building over short-term trading would not be rewarded (Morris, 1991a). However, the stock market crash of 1987 counteracted the immediate effects of this legal change by inciting new investment in venture capital as interests in private investment surpassed uncertainties surrounding public investment

[60] Kozmetsky, Gill, & Smilor (1985) claim that the total number of venture capital firms increased 83% between 1978 and 1983.

[61] Bygrave (1987) refers to Sahlman and Stevenson's (1985) capital market myopia as "lemming-like behavior." (p. 153)

[62] These "home runs" included Apple Computer, Vector Graphic, Altos Computer, ASK Computer Systems, Pizza Time Theatre, and Cetus (Schilit, 1991). It is also important to note the venture capital industry's "revitalization" may be a function of reduced industry density (Manigart, 1994). Although Manigart (1994) examined venture capital industries in countries other than the US, her findings support population ecology theory.

[63] Megafunds developed "in response to the large amounts of pension fund dollars seeking to be managed by the most experienced venture capital fund management companies," claims Silver (1985, p. 21). In addition to megafunds, the venture capital industry comprises a plethora of different venture capital entities, such as: (1) corporate-sponsored venture capital subsidiaries; (2) investment banking sponsored funds; (3) specialty venture capital funds comprised mostly of institutional investors and led by individuals with special industry knowledge; (4) both university-related and private sector incubators; (5) state venture capital funds; and (6) funds of funds created by a service organization who monitors several venture capital funds as one fund. [For insights on 'funds of funds,' see Brophy & Gunter (1988).] Barry (1994) characterizes the various venture capital entities in terms of legal structure—publicly traded venture capital entities, captive subsidiaries of large banks or corporations, SBICs, and private limited partnerships.

(Morris, 1991a).[64] In addition to individual investors becoming more interested in private investments such as venture capital, the "profit-squeeze" faced by many large corporations during this time attracted more corporate capital to the industry (Florida & Kenney, 1988).

Camp and Sexton (1992), Gompers (1994), Lerner (1994a), and Schilit (1991) summarize the main transformations of the venture capital industry during the 1980s:

(1) The amount of venture capital under management increased over sevenfold after controlling for inflation;
(2) The number of venture capital firms rose 1.65 times with most of the growth occurring in independent limited partnerships compared to corporate or SBIC funds, both of which had prevailed in the past;
(3) The number of venture capital professionals increased by a factor of 2.5;
(4) Pension funds surpassed individuals in the amount of capital supplied to new venture funds;
(5) Venture capitalists began to prefer later stage investments compared to providing seed money and funding start-ups;[65]
(6) A larger percentage of total venture capital going into first-round financing is being invested in low- and non-technology ventures.

These trends indicating growth throughout the venture capital industry will positively affect the intensity of competition, and need for specialization (Camp & Sexton, 1992).

When the impact of venture capital on the nation's economic development is examined (US GAO, 1982), particular attention must be given to issues that will influence whether the complex venture capital process works successfully. Both government and industry have a stake in the success of the venture capital process (US GAO, 1982).

[64] Schilit (1991) disagrees and claims that the October 19, 1987 stock market crash negatively impacted the venture capital industry. Companies were not going public, so venture capitalists could not exit their investments (Schilit, 1991). Hence, although more funds became available, they were spent serving the "living dead" instead of being used for new investment.

[65] Twenty-five percent of all venture capital investing was early stage financing during 1980, whereas by 1988 this percentage dropped to 12.5% (Gompers, 1994).

Vitae: Ann Elizabeth Echols

Education

Ed.D. Vocational & Technical Education (Comprehensive Policy-Business Cognate)
Dissertation: *Self-Employed Youth and Youth Employed in Governmental Positions: An Analysis of High School And Beyond Data*
Successfully defended September 9, 1994; Virginia Polytechnic Institute & State University, Blacksburg, VA

M.B.A. (concentration in Accounting & Finance)
April 1992; Florida Atlantic University, Boca Raton, FL

B.B.A. Accounting
August 1986; Texas A&M University, College Station, TX

Study Abroad: People's Republic of China, 1995 (Study of Marketing and Chinese Business Practices); University of Siegen, Germany, 1984 (Study of German Language)

Publications

Tegarden, L. F., Hatfield, D. E., & Echols, A. E. (1999). Doomed from the start: What is the value of selecting the future dominant design?, *Strategic Management Journal, 20*(6), 495-518.

Echols, A. E., & Meredith, J. W. (1998). A case study of the Virginia Tech Corporate Research Center in the context of the Cabral-Dahab paradigm with comparison to other U.S. research parks, *International Journal of Technology Management, 16*(8), 761-777.

Echols, A. E., & Neck, C. P. (1998). The impact of behaviors and structure on corporate entrepreneurial success, *Journal of Managerial Psychology, 13*(1/2), 38-46.

Teaching

Pamplin College of Business, Management & Professional Development Programs, Virginia Tech (1998-2000)

Instructor, Department of Management, Pamplin College of Business, Virginia Tech (1994-2000)
MGT 4334: Social Issues in Management: 1 section
MGT 3304: Management Theory & Leadership Practice: 1 section
MGT 4394: Business Policy & Strategy: 15 sections

Adjunct Faculty, New River Community College, Dublin, VA (1994)
BUS 227: Quantitative Business Methods

Accounting Instructor, Florida College of Careers, West Palm Beach, FL (1989)

Math Teacher, Saint Michael's Academy--Private Episcopal School, Bryan, TX (1986-1987)

Graduate Assistantship Duties

Department of Management, Pamplin College of Business, Virginia Tech (1994-1995, 1997-1998)
Duties as required for various professors

Division of Vocational & Technical Education, Virginia Tech (1992-1994)
Contract work for the Commonwealth of VA, Department of Education (see Other Publications; Resulted in 7 publications)

Internship, Economic Development Assistance Center, Virginia Tech (1993)
Project leader; prototype of a computerized entrepreneurial self-assessment instrument.

Industry Work Experience

Financial Analyst, Palm Beach County Tourist Development Council, W. Palm Beach, FL (1990-1991)
Responsible for accounting (including payroll and related tax returns). Prepared and monitored budgets and furnished reports.

Land Development Accountant, PGA National, Ltd., W. Palm Beach, FL (1989-1990)
Responsible for a $44 million budget. Set up books for Ibis Golf & Country Club, Ltd. at its inception. Supervised bookkeepers and clerks.

Staff Tax Accountant, Simmons & Stein, CPAs, W. Palm Beach, FL (1988-1989)
Prepared tax returns for small businesses: corporations, partnerships, sub-S entities, sole-proprietorships/1040s. Provided accounting services to clients such as: Custom Home Builders; Pawn Shops; Used Car Dealers; Interior Designers; Small Retail Kiosk in a mall; Local Hardware Store; Restaurant.

Accountant, Department of Economics, Texas A&M University, College Station, TX (1987-1988)
Computerized the manual system in place; re-balanced all accounts & found additional grant money unaccounted.

Honors

The Jack Hoover Award for Doctoral Student Teaching & Advising Excellence; 1999
Robert J. Litschert Memorial Fellowship in Management; 1998
Nominated for the Virginia Tech university-wide Graduate Student Teaching Award; 1997, 1998
Scholarship gift to the Eleanor Roosevelt Fund made by Blacksburg Area VA AAUW in my honor, 1998
Beta Gamma Sigma, Business Honor Society (1996 to present)
Co-awarded First Place Outstanding Dissertation, 1995, by the University Council for Vocational Education
Phi Kappa Phi: Honor Society (1994 to present)
Omicron Tau Theta--Iota Chapter (Officer, 1993-1995)
Delta Pi Epsilon: Graduate Society-Business Education (1993-1996)
Phi Delta Kappa: Professional Education Fraternity (Officer, 1993-1996)
Phi Beta Lambda Mentor (1989)
Cap and Gown of Mortar Board Senior Honor Society (1985-1986)
Tau Kappa Junior Honor Society (1984-1985)

This information is true and describes my background and qualifications.

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Ann Elizabeth (Darby) Echols

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Date