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What is This?
Constraints on the Control Benefits of Brokerage: A Study of Placement Agents in U.S. Venture Capital Fundraising

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This paper theorizes about constraints on brokers’ control benefits. I propose that brokers prefer to represent high-quality actors and that the value an actor places on representation is inversely related to the actor’s perceived quality. But matching of more reputable brokers with higher-quality actors should mitigate these quality constraints. Empirical analyses of 1,028 venture capital funds raised by 745 firms from 2001 to 2006 support the theory. The likelihood that a firm’s venture fund is represented by a placement agent first increases and then decreases with firm quality, measured as size, experience, and status. Neither those that value representation most (i.e., funds of low perceived quality) nor those that placement agents would most like to represent (i.e., funds of high perceived quality) are most likely to be represented by a placement agent. Results also show that more reputable placement agents represent funds raised by higher-quality firms, which indicates that a broker’s reputation mitigates constraints on the control benefits of brokerage.

Fundamental to a sociological view of markets is the idea that actors’ positions within structures of relationships determine their opportunities and constraints and, consequently, inequality in economic outcomes. Few structural positions have received as much theoretical and empirical attention as the position of the “broker,” an actor who connects otherwise unconnected actors (Burt, 1976, 1992; Galaskiewicz, 1979; Marsden, 1982; Gould and Fernandez, 1989). Returns to brokerage are well documented (see Burt, 2002, for an extensive review). In comparisons of brokers and others, actors that occupy brokerage positions accumulate more resources (Cook and Emerson, 1978), profit more (Burt, 1983, 1988), receive more favorable evaluations (Burt, 2004), experience greater rates of advancement (Podolny and Baron, 1997; Burt, 2004), close more deals (Mizruchi and Stearns, 2001), receive greater compensation (Burt, 1997, 2002), exert greater influence over other actors (Gould, 1989; Padgett and Ansell, 1993), are perceived as more influential (Fernandez and Gould, 1994), form more strategic alliances (Stuart, Ozdemir, and Ding, 2007), and produce greater innovative output (Hargadon and Sutton, 1997). In short, brokers tend to do well.

Returns to brokerage positions are generally attributed to privileged access to information and control over its use (Burt, 1992). Recent research reveals some specific ways in which brokers leverage the information advantages of their positions to extract value from the actors they connect. For example, preferred clients of staffing agencies pay discounted wage rates that are subsidized not by the agency but rather, unknowingly, by the workers that the agency staffs on clients’ projects (Fernandez-Mateo, 2007). Real estate agents sell others’ homes sooner and for less money than they would likely sell their own homes, exploiting information advantages over the homeowners they represent to save on marketing costs (Levitt and Syverson, 2008). In both cases, information advantages present entrepreneurial opportunities for brokers to extract rents (Sørensen, 1996), or payments in excess of the cost of services provided, from parties to a brokered transaction. Both examples illustrate how brokers’ benefits
are contingent on others agreeing to the brokered exchange. Yet brokerage studies often focus on brokers’ outcomes and neglect this negotiated process.

Although the control benefits of brokerage have received less scholarly attention than the information benefits, recent work demonstrates how information and control benefits not only reinforce but also limit one another (Reagans and Zuckerman, 2008; Gargiulo, Ertug, and Galunic, 2009). The term control benefits describes a broker’s ability to use informational advantages to determine which actors are included in a brokered exchange. For example, talent agencies in Hollywood shape the careers of actors, writers, and directors by matching some but not others to film projects (Bielby and Bielby, 1999). The information benefits of bridging structural holes enable these brokers to potentially profit from mediating labor market transactions between studios and workers; determining which workers and which studios to connect is the control benefit of the agency’s structural position. If the raw material of the opportunity is information, then control of its use is the mechanism by which brokers realize the returns to brokerage.

Perhaps because studies of brokers are typically cast at the broker’s level of analysis, consideration of others’ participation in a brokered transaction is rarely explicit. Yet implicit in the notion of the broker as tertius gaudens, or third who benefits (Simmel, 1955; Burt, 1992: 30–32), and the notion of the broker as tertius iungens, or third who joins (Obstfeld, 2005), is that returns to brokerage are realized only after brokers, acting on their information advantages, determine which actors will be invited to participate, extend invitations, and negotiate the terms of participation. Failure to negotiate an exchange imposes costs on brokers but generates no offsetting fees, so this process limits brokers’ control benefits and, plausibly, the returns to their structural positions. These limits constitute constraints on the control benefits of brokerage. Although recent work offers rich theorizing (e.g., Khurana, 2002) and descriptive studies (e.g., Abolafia, 1996; Finlay and Coverdill, 2000) of brokers’ control benefits, there has been no large-scale empirical study of constraint on those benefits.

Constraints on the control benefits of brokerage are particularly likely to affect brokers that are paid to act as liaisons (Gould and Fernandez, 1989), or actors independent of the other two parties to a brokered exchange, because liaisons must assuage both parties’ uncertainty about their proposed exchange partner (Podolny, 2001). These brokers can exercise control by determining which of many potential alters (or “actors”) they are willing to represent in an exchange, but constraint is imposed by the willingness of an actor to agree to representation. Uncertainty about actors seeking and brokers providing representation is likely to influence which actors are most likely to secure representation in a market for brokerage services, as well as the specific matches realized. I develop a theory that predicts how a focal actor’s perceived quality influences the likelihood of representation and test hypotheses with data from U.S. venture capital fundraising, in which the brokers are organizational intermediaries called “placement agents” that are paid (legally) by some venture
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capital firms to market fund offerings to institutional investors. Placement agents mediate uncertainty for investors by identifying high-quality venture capital funds and then representing some of these funds in the market. Their returns to brokerage depend largely on a represented fund’s perceived quality, as placement agents must influence investors’ perceptions of the offering’s merits before a transaction occurs.

Uncertainty about the quality of fundraising firms is exacerbated by restricted access to the funds of the top-performing venture capital firms. Unlike in mutual funds (e.g., Carhart et al., 2002), if a firm’s last venture fund (or last several funds) performed well, then the firm’s next venture fund is also likely to perform well (Kaplan and Schoar, 2005). Though limited partners prefer to invest in funds raised by firms that previously produced excellent performance, limits to scale in venture capital investing (Metrick and Yasuda, 2009) prevent such firms from accommodating all willing investors. Consequently, the top venture capital firms routinely reject investors’ offers of capital. As a general partner at one prominent Silicon Valley firm put it, “Limited partners now want to be in the top-tier funds, leaving the top funds oversubscribed and the new, emerging funds having difficulty lining up capital” (Thompson, 2005). As a result, many limited partners seek to identify emerging fund managers (Swensen, 2000), whose quality is difficult to ascertain. By helping institutional investors cope with this uncertainty, placement agents have become increasingly important players in venture capital fundraising (Gompers and Lerner, 2001) by representing some funds but not others. They have also increased in number. The number of operating placement agents grew from five to 16 between 1984 and 1994 (Fenn, Liang, and Prowse, 1997: 84) and to approximately 100 in 2006 (Private Equity International, 2006: 97–182). Because of the low rate of placement agent representation prior to 2001, however, instances of repeat firm-agent partnering are extremely rare, so general partners and placement agents have yet to develop the familiarity bred by repeated transactions (Gulati, 1995). This uncertainty implies that placement agents’ control benefits are subject to substantial constraints.

CONSTRAINTS ON THE RETURNS TO BROKERAGE

The information and control benefits of brokers’ structural positions are clearly interrelated, but delineating the two illuminates an important source of constraint on brokers’ abilities to reap the returns to brokerage. Converting the potential rewards of advantageous access to information to realized returns entails “bringing together players who are willing to negotiate” (Burt, 1992: 33). Autonomy to determine how privileged information is used and which actors will be included or excluded in a brokered exchange is a broker’s control benefit. But the information asymmetries that provide brokerage opportunities also constrain brokers’ abilities to control the interactions that bring two parties to a potential exchange. The reason is that the parties a broker aims to connect face substantial uncertainty about the value of the proposed exchange because the quality of potential partners is often difficult to judge (Podolny, 2001). When brokers

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possess information that unambiguously supports a focal actor’s quality claims, they must use that information to convince potential exchange partners of the actor’s quality. Unless a broker is able to reduce this uncertainty for potential parties to an exchange and negotiate terms favorable to the broker, there are no returns to brokerage. Accordingly, brokerage is the result of a negotiated process in which uncertainty that might otherwise impede exchange is somehow resolved. The rewards of resolution are therefore net of the costs of resolving uncertainty for exchanging parties.

**Mediating Uncertainty about Potential Partners**

Resource providers often face uncertainty about the quality of potential exchange partners (Podolny, 2001; Stuart, Hoang, and Hybels, 1999). Brokers can mediate this uncertainty for potential exchange partners by screening actors for their quality—i.e., their propensities toward reliable performance and accountability (Hannan and Freeman, 1984). By leveraging the information advantages of their structural positions to identify high-quality actors in ways that resource providers are unable to do, or unable to do at a reasonable cost, brokers can facilitate exchanges between actors interested in becoming interdependent but uncertain about the value of doing so (Thompson, 1967).

To realize the returns to brokerage, it is insufficient for a broker, even an experienced and credible one, to identify high-quality actors for representation. Represented actors must also be perceived as high quality by potential exchange partners. The more difficult it is to convince a potential exchange partner of a focal actor’s quality, the greater are the broker’s costs to provide representation. Because of this, most brokers will prefer to represent actors whose quality can be easily demonstrated to potential partners. Conversely, the less difficult it is for actors to convince a potential exchange partner of their underlying quality, the less they value a broker’s endorsement. Actors of unambiguously high quality do not need a broker to mediate exchanges. This logic leads to two plausible assumptions. First, the greater an organization’s perceived quality, the more willing a broker is to represent the organization. Second, the greater an organization’s perceived quality, the less valuable is a broker’s representation to the organization.

If brokers incur costs in screening actors and demonstrating their quality to potential partners, then they might charge higher fees to actors whose quality is more difficult and/or costly to ascertain and demonstrate. But a broker’s ability to endorse an actor’s quality to potential partners is likely to be compromised by a variable fee structure. From the perspective of a potential partner, such arrangements bias a broker’s quality evaluations (Han, 1994). As a result, most brokers’ fees are unlikely to vary greatly across represented actors. To the extent that this is true, a broker’s reputation for consistently representing actors of high quality is a valuable, intangible asset that enables a broker to realize future rents on the brokerage position (Weigelt and Camerer, 1988; Sørensen, 1996; Bielby and Bielby, 1999). If a positive reputation reduces the costs of assuaging potential exchange partners’
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Concerns, then the returns to brokerage should be positively related to a broker’s reputation. Accordingly, if brokers generally value a reputation for representing high-quality actors, then they should be reluctant to accept unusually large payments (e.g., bribes) from low-quality actors in return for representation.

To realize the returns to brokerage, a broker must influence market actors’ quality perceptions. As a result, an actor’s perceived quality will influence that actor’s likelihood of being represented by a broker. The arguments above imply that in a market for brokerage services, a broker’s willingness to represent a focal actor increases with the actor’s perceived quality but that the willingness of the actor to pay for representation decreases with the actor’s perceived quality. This tension leads to the core proposition of this paper.

**Proposition 1:** The likelihood that a broker represents an organization in an exchange first increases and then decreases with the organization’s perceived quality.

Counterintuitively, this proposition implies that brokers are most likely to represent neither those actors that value representation most (i.e., actors of low perceived quality) nor those actors that brokers would most like to represent (i.e., actors perceived of high perceived quality).

Quality Constraints on Control Benefits

Organizations may evaluate the quality of potential partners using a variety of methods, but as Thompson (1967: 134–137) noted, when “outcome preferences are clear but cause/effect relationships are uncertain,” “judgmental” decision making methods help organizations identify an appropriate course of action. When a potential partner’s quality is unobservable, difficult to observe, or expensive to observe, judgmental methods that leverage observable indicators of quality will likely be used in evaluations (Podolny, 1993; Stuart, Hoang, and Hybels, 1999). Prior researchers have identified at least three suitable indicators of organizational quality that might inform such judgments: size, experience, and status.

First, for several reasons, quality perceptions are likely to be positively related to an organization’s size. Potential partners are likely to be skeptical of small organizations because small organizations often find it difficult to produce consistently high-quality outputs and to account for deviations from expected quality (Hannan and Freeman, 1984). Moreover, small organizations often lack the resources to withstand extended periods of poor performance and therefore tend to fail at higher rates than large organizations (Aldrich and Auster, 1986; Levinthal, 1991; Barron, West, and Hannan, 1994). Small organizations that perform poorly are also likely to focus more on survival than implementing organizational changes that could improve their performance (Audia and Greve, 2006). Last, small organizations are typically not esteemed in the way that large organizations are (e.g., Haveman, 1993; Han, 1994; Staw and Epstein, 2000; Still and Strang, 2009). Because of their reliability, high survival chances, and esteemed market standing, large organizations are likely to be perceived by market actors as higher quality.
than small organizations. If market actors view quality as positively correlated with organizational size, then one should expect a non-monotonic relationship between size and representation by a broker.

**Hypothesis 1a:** The likelihood that a broker represents an organization first increases and then decreases with organizational size.

Second, perceptions of an organization’s quality are likely to be positively related to an organization’s experience. New organizations typically have limited resources, lack clearly defined member roles, and struggle to demonstrate superiority over established alternatives (Stinchcombe, 1965). They often find it difficult to produce reliability and accountability and are therefore at a disadvantage relative to experienced competitors in securing scarce resources (Freeman, Carroll, and Hannan, 1983). Consequently, inexperienced organizations encounter skepticism from potential partners when trying to form exchange relationships (Stuart, Hoang, and Hybels, 1999). With experience, organizations learn, develop routines, refine processes, implement correctives, and improve performance (Argote and Epple, 1990). Quality improvements may then be visibly demonstrated to market actors in ways that enhance market actors’ perceptions of the organization’s quality (Rao, 1994) and facilitate the formation of interorganizational relationships (Ahuja, 2000; Hallen, 2008). If market actors view quality as positively correlated with organizational experience, then brokers will prefer to represent experienced organizations. Conversely, the value an organization places on a broker’s representation is likely to be a declining function of experience. This logic implies a non-monotonic relationship between organizational experience and the likelihood of representation by a broker.

**Hypothesis 1b:** The likelihood that a broker represents an organization first increases and then decreases with organizational experience.

A third basis for inferring an organization’s quality is organizational status. Because perceptions of an actor’s quality partially depend on the identities of the actor’s affiliates (Blau, 1964), high-status organizations have incentives to avoid affiliating with low-quality alters (Benjamin and Podolny, 1999) and to evaluate the quality of their affiliates diligently prior to forming a relationship (Stuart, 1998). Because organizations facing market uncertainty tend to restrict exchange to market actors of similar status (Podolny, 1994), organizations that maintain high-status affiliations are likely to be viewed positively by market actors facing uncertainty about potential partners. In this way, an organization’s affiliations with high-status actors are useful indicators of otherwise difficult-to-observe quality (Baum and Oliver, 1991; Stuart, Hoang, and Hybels, 1999; Higgins and Gulati, 2003) that reduce an organization’s costs of demonstrating quality to potential partners (Benjamin and Podolny, 1999; Podolny, 2001; Jensen, 2003). If brokers prefer to represent higher-status organizations but higher-status organizations place little value on a broker’s representation, then a non-monotonic relationship between organizational status and the likelihood of representation by a broker is to be expected.
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Hypothesis 1c: The likelihood that a broker represents an organization first increases and then decreases with organizational status.

Thus far, the theory pertains to a market-level outcome but offers implications for micro-level transactions. At the market level, brokerage is constrained by the willingness of brokers to provide representation and the willingness of actors to pay for it. These constraints on brokers’ control benefits may be at least partially alleviated by a broker’s reputation. Considering variance in brokers’ reputations as well as actor-level variance in perceived quality leads to predictions about the broker-actor matches that are realized in a market for brokerage services.

Alleviating Constraint

Producers often differentiate their products and services by staking out market positions relative to other producers (White, 1981). Applying this insight to the market for brokerage services raises the possibility that brokers attempt to distinguish themselves on the basis of the quality of the actors they represent. Because an organization’s reputation is based on its prior behaviors (Podolny, 2005), market actors can reasonably expect that brokers that have represented either high- or low-quality actors in the past will represent high- or low-quality actors in the future. If so, then brokers’ reputations for consistently representing actors of higher or lower quality, relative to other brokers, will vary.

If brokerage tends to occur away from the extremes of the perceived quality distribution, then variance in brokers’ reputations likely accounts for their tendencies to represent organizations positioned toward either extreme of this distribution. Thus brokers with a reputation for representing high-quality actors should be in the best positions to mitigate constraints on their control benefits. Both economic (Becker, 1973) and sociological (Lazarsfeld and Merton, 1954; McPherson, Smith-Lovin, and Cook, 2001) theories of relationship formation suggest that brokers with better reputations are likely to represent organizations of greater perceived quality. In other words, although most brokers prefer to represent higher-quality organizations, brokers with excellent reputations are most likely to do so. This logic leads to the second proposition of this paper.1

Proposition 2: The more reputable a broker, the greater the perceived quality of the organizations the broker represents.

Several empirical studies support the prediction of matching on the basis of a broker’s reputation and an organization’s perceived quality. Large firms tend to transact with more reputable underwriters when issuing securities (Fernando, Gatchev, and Spindt, 2005), and the most reputable auditors represent the largest corporate clients (Han, 1994). Similar matching on reputation and perceived quality is also documented in studies of syndicates formed to offer bonds (Podolny, 1994) and equities (Chung, Singh, and Lee, 2000) to public markets. Furthermore, the more experience a startup company has with raising funds, the more likely the company is to attract investments from high-status venture capital providers.

1 I gratefully acknowledge Isabel Fernandez-Mateo’s encouraging insistence that this matching argument be developed.

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firms (Podolny, 2001). Last, the initial public offerings of biotech firms are more likely to be managed by a highly reputable investment bank if the firm’s managers were previously affiliated with high-status life sciences companies (Higgins and Gulati, 2003). These examples suggest that brokers’ reputations mitigate quality constraints on the control benefits of brokerage by enabling more reputable brokers to represent organizations of greater size, experience, and status. Thus, for organizations represented by brokers, I hypothesize:

Hypothesis 2a: The greater an organization’s size, the more likely the organization is to be represented by a highly reputable broker.

Hypothesis 2b: The greater an organization’s experience, the more likely the organization is to be represented by a highly reputable broker.

Hypothesis 2c: The greater an organization’s status, the more likely the organization is to be represented by a highly reputable broker.

The Role of Placement Agents in U.S. Venture Capital Fundraising

Venture capitalists raise funds that are structured so that the venture capitalists are general partners and the fund’s investors are limited partners. Limited partners include institutional investors like pension funds, university endowments, foundations, banks, and insurance companies, as well as wealthy individuals. Limited partners regularly evaluate fund offerings and, based on evaluations of firms’ perceived abilities to generate attractive returns on investments, commit capital. As attractive investment opportunities are identified, general partners draw on limited partners’ committed capital to invest in private companies until almost all committed capital has been invested, when the firm raises a subsequent fund for future investments (for details, see Freeman, 2001; Gompers and Lerner, 2001).

Placement agents act as liaisons (Gould and Fernandez, 1989) that mediate fundraising transactions between general and limited partners by reducing information asymmetries between the two parties. Venture capital firms typically raise funds every three to five years. Institutions invest regularly. Between fundraising cycles, general partners interact primarily with the limited partners that committed capital to the current fund; similarly, limited partners interact primarily with those general partners that previously received their capital commitments. In contrast, placement agents participate in the fundraising market on a regular basis, frequently interacting with many general and limited partners. Through these interactions, placement agents learn what limited partners’ current concerns are, who makes investment decisions at a given institution, what an institution’s investment strategy is, what the newly hired investment officer considers to be a red flag for a potential investment, and so forth. General partners seeking capital value this information. Similarly, placement agents learn which firms enjoy good deal flow, which firms are displeasing co-investors, which firms are experiencing tensions between junior and senior members, and which firms will be raising a new fund soon. Limited partners value
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this information. In this way, placement agents consolidate valuable information on many limited and general partners—the information benefits of bridging structural holes (Burt, 1992)—that can facilitate transactions.

Fees charged to venture capital firms by placement agents can be as high as 2 percent of total capital raised plus some small percentage of future profits (Fenn, Liang, and Prowse, 1997: 84). General partners do not lightly take the decision to pay a placement agent because, for example, 1 percent of capital raised represents 50 percent of the management fees collected by most general partners in the first year of managing a fund (i.e., 2 percent of committed capital). Though paid by general partners to market a fund offering, a placement agent’s ultimate customers are limited partners. To maintain the trust of limited partners, placement agents conduct extensive due diligence by talking to limited partners in a firm’s prior funds, analyzing the firm’s track record in substantial detail, interviewing managers of the firm’s portfolio companies, and speaking with the firm’s competitors and co-investors. Only by representing funds that can be effectively marketed to limited partners do placement agents realize the returns to brokerage.

Testing the hypotheses with data on placement agent representation in U.S. venture capital fundraising between 2001 and 2006 is appealing for several reasons. First, empirical studies document strong effects of fund size, firm experience, and firm status on the performance of venture capital funds (Kaplan and Schoar, 2005; Metrick and Yasuda, 2009; Hochberg, Ljungqvist, and Lu, 2007). Generally, higher-quality firms tend to raise larger funds, raise more funds and also occupy high-status positions in the industry co-investment network. Second, as Burt (2005: 26) noted, it is rare that an empirical setting offers a “binary variable distinguishing brokers.” Here, the organization initiating the brokered exchange (i.e., a general partnership) and its broker (i.e., a placement agent) are both easily identified in fundraising transactions.

METHOD
Data

I collected data on 1,028 venture capital funds raised by 745 U.S. private equity firms between 2001 and 2006; 64 of these funds were represented by 58 placement agents. Figure 1 shows transactions by year. I analyzed only legal fundraising transactions, thus excluding illegal transactions like kickbacks paid to unlicensed broker-dealers who secured investments from state pension funds (e.g., Karmin, 2009). Investigations in New York and New Mexico have identified several instances of such corruption, but there is no indication that these practices are widespread. All funds were identified in the 2007 Thomson Financial VentureXpert database, which is described extensively in several published papers (e.g., Sorenson and Stuart, 2001; Podolny, 2001; Kaplan and Schoar, 2005; Hochberg, Ljungqvist, and Lu, 2007). I identified funds’ relationships with placement agents using Private Equity Intelligence Ltd. ’s Funds in Market database. I collected fund- and firm-level data from the following sources: Thomson Financial’s 2007 VentureXpert database; Asset Alternative’s Galante
Models of Placement Agent Representation

The first empirical analysis identified which venture capital funds are most likely to be represented by placement agents. To test hypotheses 1a, 1b, and 1c, I modeled the likelihood that a fund is represented by a placement agent, conditional on fund- and firm-level variables. I assumed that each fund raised in a given year was at risk for representation by a placement agent. Because not all funds are equally at risk, fund- and firm-level covariates account for factors (other than a firm's perceived quality) that influence funds' likelihoods of representation. I estimated a pooled cross-sectional logit model in which the dependent variable is a binary indicator variable that takes the value of 1 if a fund is represented by a placement agent, and 0 otherwise. The independent variables are three different indicators of organizational quality: size, experience, and status, which are discussed below. I included year fixed effects to account for annual market conditions common to all funds and generate robust standard errors to account for heteroskedasticity. To test hypotheses 1a, 1b, and 1c, I included the main effect of each independent variable as well as its squared term to test for the predicted non-monotonic effect. Hypotheses 1a, 1b, and 1c predicted positive coefficients on the main effect and negative coefficients on the squared term for each of the three quality variables.

The data for the dependent variable were collected primarily from the 2006 Private Equity Intelligence Ltd. Funds in Market database, which tracks fundraising activity in North America, Europe, and Asia starting in 1991. Although coverage
improves after 2000, pre-2000 reporting biases are unlikely to be problematic given that very few venture capital funds were represented by placement agents prior to 2000. Historically, placement agents represented buyout funds. As the dotcom fallout rendered venture capital fundraising more challenging, placement agents began representing more and more venture capital funds. I extracted all funds represented by placement agents between 2001 and 2006 from the Funds in Market database and matched these data by fund and firm name to all funds listed in the VentureXpert database for 2001–2006. Supplemental searches of firm Web sites, industry newsletters (e.g., Private Equity Analyst, PE Wire, PE Insider), and Lexis-Nexis validated instances of placement agent representation.

Models of Venture Fund-Placement Agent Matching

The second empirical analysis identified which placement agents are most likely to represent the 64 funds that are represented by a placement agent (i.e., matching within the represented subsample). To test hypotheses 2a, 2b, and 2c, I modeled the likelihood that a fund-placement agent dyad is realized as a function of fund-level, firm-level, and placement-agent-level variables. The dependent variable is a binary indicator variable that takes the value of 1 if fund i is represented by placement agent j, and 0 otherwise. The independent variables are three interaction terms involving a placement agent’s reputation and each of the three firm-level quality indicators: size, experience, and status. Hypotheses 2a, 2b, and 2c predicted positive coefficients on each of the three interaction terms. For this dyadic analysis, I started with all 64 of the 1,028 venture capital funds in the sample that were represented by placement agents between 2001 and 2006 and matched each with all placement agents that were active (i.e., represented at least one fund) in the year the focal fund was closed. This yielded a sample of 1,804 possible placement-agent–fund dyads, 65 of which were realized, including one fund represented by two placement agents.

Independent variables. The first independent variable is fund size, which is the total amount of capital raised by the time the fund closes (in hundreds of millions of U.S. dollars). This is the empirical measure for organizational size; firms that raise more capital are generally larger organizations in terms of assets under management and number of employees. I obtained fund data from the VentureXpert database, the Galante Directory of Venture Capital and Private Equity Firms, the Funds in Market database, the Private Equity Performance Monitor, or from a firm’s press release. When sources disagreed, I coded the largest fund size reported. When fund size was not available but a firm’s target fund size was, I coded the target fund size, on the assumption that the final closing amount would be roughly equivalent to the firm’s fundraising target. I squared this variable to test hypothesis 1a.

The second independent variable is fund number, which was coded as the count of previous funds raised by each firm plus one. This is the measure for organizational experience; firms that raised more funds in the past possess more experience with raising funds from limited partners. I obtained fund number data from VentureXpert or the Galante Directory of...
Venture Capital and Private Equity Firms. I squared this variable to test hypothesis 1b.

The third independent variable is the firm’s status in the industry co-investment network. Using investment data obtained from the VentureXpert database, I calculated status using a symmetric firm-by-firm matrix of all venture capital and private equity investments in U.S. companies between 1996 and 2005. Each cell in the matrix takes a value of 1 if firms i and j both made an investment in the same company in the previous five years, and a value of 0 if the firms did not. The matrix is updated annually so that, for example, the network measures for 2001 are based on deals done between 1996 and 2000. The five-year window is consistent with prior studies that used the same data to construct network measures (e.g., Sorenson and Stuart, 2001; Hochberg, Ljungqvist, and Lu, 2007).

Following prior studies (Podolny, 1993, 2001; Jensen, 2003; Hallen, 2008), I operationalized a firm’s status as its Bonacich (1987) centrality in the private equity co-investment network. Each firm’s Bonacich centrality was computed as follows:

$$C_i = \alpha \sum \beta^{R_{k+1}} 1$$

where $\alpha$ is a scaling factor that normalizes the measure by the mean value of $\sum \beta^{R_{k+1}} 1$ in a given year, $\beta$ is a weighting factor that, like prior research in this area (Podolny, 2001; Sorenson and Stuart, 2001), is equal to $\frac{3}{4}$ of the maximum eigenvalue in the firm-by-firm co-investment matrix $R$ in which cell $ij$ equals 1 if firm i and firm j invested in the same company in the previous five years, and 0 otherwise, and 1 represents a column vector of ones. By this measure, the highest-status firms are those that invest with other high-status firms because each firm’s status is a weighted measure of its co-investors’ status scores.

Firms that make many investments may achieve high values of Bonacich centrality even if they do not invest with firms of particularly high status, as the measure is sensitive to the scale of a firm’s investment operations. Because firms that raise larger funds and more funds also tend to make many investments, this statistical issue produces high correlations among the three key indicators of a firm’s quality (i.e., size, experience, and status). Preliminary analyses revealed multicollinearity that is especially problematic for tests of hypotheses 1a, 1b, and 1c because the posited curvilinear effects require squared terms for each of the three key explanatory variables, and these variables are themselves positively correlated.

Therefore, in the models of placement agent representation, I used an adjusted measure to analyze the relationships between firm status and the likelihood of representation by a placement agent. Following Mizruchi (1989) and Jensen (2003), I replaced the dichotomous co-investment indicators in the symmetric firm-by-firm matrix with the geometric mean of the number of companies in which both firms invested before I computed Bonacich centrality. Formally, each cell of the firm-by-firm matrix takes the following value:

$$r_{ij} = \frac{n_i}{(\sqrt{n_i} \times \sqrt{n_j})}$$
where $r_{ij}$ is the number of companies in which both firm $i$ and firm $j$ invested in the previous five years, and $n_i$ and $n_j$ are the total number of companies in which firms $i$ and $j$, respectively, invested during the time period. This adjustment substantially reduces the influence of investment volume on a firm’s status measure. To test hypothesis 1c, I added one to the status measure, because some values are less than one, and squared the sum to generate the status-squared term. For the dyadic matching models, I used the standard (i.e., size-unadjusted) Bonacich centrality measure, primarily because there is less variance in the number of investments made over the previous five years for firms that retained placement agents ($\mu = 104, \sigma = 114$) than for the firms in the full sample of funds included in the representation analyses ($\mu = 77, \sigma = 142$). Furthermore, the squared terms of each variable were not included in these matching models, so the correlations among covariates were at statistically reasonable levels. Due to these two factors, size adjustments to Bonacich centrality are unnecessary to estimate the partial correlation between status and the likelihood of a fund-placement agent match being realized.

I measured placement agent reputation using the results of a survey of general partners and limited partners (Private Equity International, 2006). In 2005, both general partners and limited partners were asked in separate surveys to identify “the top three boutique [and bank] placement agents.” In total, 54 general partners and 50 limited partners offered nominations. Based on a .92 correlation between the number of nominations each placement agent received from general and limited partners, I pooled the results of the two surveys and counted each nomination as a vote. I then tallied the votes by the two organizational forms (i.e., bank and boutique) and constructed a placement agent reputation variable that is the total number of votes the placement agent received from general and limited partners. Those not receiving votes from either group were coded as receiving zero votes. Table 1 summarizes the results of these surveys. Although it was uncommon for placement agents to represent venture capital funds prior to 2001, placement agents regularly represented other private equity funds well before then. Therefore their reputations are based on prior interactions with general and limited partners, and these reputations tend to transfer across similar markets, especially in the early stages of an organization’s participation in a market (Jensen, 2003).

**Control variables.** First, I included the number of venture funds raised in the same state and same year as the focal fund to account for competition among firms to secure representation. To avoid conflicts of interest, many placement agents represent only one fund of a given type and in a given location (e.g., one early-stage venture fund headquartered in California) at any point in time. Second, I coded an indicator variable that equals 1 if a firm does not invest its own capital, and 0 otherwise, to account for firm-level differences in governance structure. Third, because one cannot logically estimate the status of a firm in the industry co-investment network if the firm has yet to make any investments, I included an indicator variable that takes a value of 1 if a firm did not make any investments in the previous five years, and

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2 Including the size-adjusted measure in the models did not significantly improve model fit, independently or in an interaction term. Because the interaction term involving the standard Bonacich centrality measure significantly improved the model fit, I report models including the unadjusted measure.

3 This dummy variable essentially identifies corporate private equity subsidiaries, although the VentureXpert database identifies firms that do or do not invest their own capital and not whether the firm is truly a corporate subsidiary. The results reported here are insensitive to including or excluding these funds.
0 otherwise. This variable distinguishes zero-status firms that have yet to invest from those that invested but without co-investors.\footnote{Excluding firms that made no investments and/or have zero status from the analyses does not substantially alter the results reported here in terms of magnitude, functional form, or significance.} Fourth, to account for fund-level differences in the types of investments a firm intends to make, I created fixed effects for early, balanced, and late stage funds based on the fund-stage categories used by VentureXpert. In the models reported here, I included both early-stage and late-stage indicator variables, so balanced-stage funds are the baseline comparison group. I also included a year fixed effect to account for market conditions in the year in which a fund held its final close.

For the dyadic analyses of fund-placement-agent matching, I coded a dummy variable bank that equals 1 if a placement agent was a bank and 0 if the placement agent was a boutique. Placement agents include large investment banks like

\begin{table}
\centering
\caption{Placement Agents’ Reputations Based on Survey Votes}
\begin{tabular}{ll}
\hline
Bank placement agents & Votes \\
\hline
Credit Suisse First Boston & 69 \\
UBS & 46 \\
Merrill Lynch & 45 \\
Lazard & 36 \\
J.P. Morgan Cazenove & 6 \\
Deloitte & 5 \\
Goldman Sachs & 5 \\
Citigroup & 4 \\
Lehman Brothers & 4 \\
Bear Stearns & 2 \\
Morgan Stanley & 2 \\
\hline
Boutique placement agents & Votes \\
\hline
Probitas Partners & 34 \\
Helix Associates & 32 \\
MVision Private Equity Advisers & 29 \\
Monument Group & 28 \\
Campbell Lutyens & Co. & 11 \\
Denning & Company & 11 \\
C.P. Eaton Partners & 9 \\
Atlantic-Pacific Capital & 8 \\
Triago & 7 \\
Crane Capital Associates & 4 \\
International Private Equity & 4 \\
Capstone Palomar Partners & 3 \\
Global Private Equity & 3 \\
Park Hill Group & 3 \\
Troy Investment Associates & 3 \\
Acanthus Advisers & 2 \\
Almeida Capital & 2 \\
Beacon Hill Financial Corp. & 2 \\
Benedetto, Gartland & Co. & 2 \\
BerchWood Partners LLC & 2 \\
Cue Capital & 2 \\
Far Hills Group & 2 \\
Guggenheim Private Fund Group & 2 \\
Source Capital Group & 2 \\
\hline
\end{tabular}
\end{table}
Merrill Lynch and small organizations of less than ten professionals, so, clearly, these two forms operate on different scales. I also accounted for autocorrelation attributable to the appearance of the 58 placement agents and 208 funds multiple times in the sample. Following Stuart’s (1998) implementation of Lincoln’s (1984) suggested autocorrelation method for dyadic analysis, I included the mean value of the dependent variable for all dyads in which either fund i or placement agent j appear in the current year t, excluding the ijth dyad. This variable accounts for autocorrelation as well as otherwise unobserved fund-level or placement-agent-level heterogeneity by capturing within-year fund- and placement-agent-level effects. I also generated robust standard errors to correct for non-independence of observations introduced by placement agents entering the sample multiple times by clustering observations on the 58 placement agents. Last, to account for the rare-events nature of the data (i.e., 3.6 percent of venture fund-placement agent dyads are realized), I adjusted the coefficient estimates using King and Zeng’s (2001) relogit command in Stata 10, which weights observations by the proportion of positive outcomes.

RESULTS

Summary fund-level data for the models of placement agent representation are presented in table 2. The hypotheses are tested by analyzing the presence or absence of placement agents for 1,028 venture capital funds raised by 745 U.S. firms between 2001 and 2006. On average, the funds in the data set are $153M funds raised by firms raising their fifth venture capital fund. Approximately 6.2 percent of these funds are represented by placement agents. Hypothesis 1a predicted an inverted U-shaped effect of fund size on the likelihood that a venture fund would be represented by a placement agent, hypothesis 1b predicted a similar inverted U-shaped effect of fund number on the likelihood of representation, and hypothesis 1c predicted an inverted U-shaped effect of firm status on the likelihood of representation.

Table 3 presents results of logit models of the likelihood that a venture fund is represented by a placement agent. A few control variables are of note in model 1. First, there is a marginally significant negative relationship between the number of funds that a firm previously raised and the likelihood that the firm’s venture fund is represented by a placement agent ($p < .10$). The more fundraising experience a firm has, the less likely the firm’s fund is to be represented by a placement agent. Second, firms that made no investments in the previous five years are also unlikely to be represented by a placement agent ($p < .05$). Placement agents tend to represent firms with an investing track record. Third, higher-status firms are more likely to be represented by a placement agent than are lower-status firms ($p < .05$).

Model 2 includes the squared term for fund size. Consistent with hypothesis 1a, the likelihood that a venture capital fund is represented by a placement agent first increases and then decreases with fund size ($p < .05$). Model 3 includes the squared term for fund number. Consistent with hypothesis 1b, the likelihood that a venture capital fund is...
Table 2

Summary Statistics and Correlations for Models of Placement Agents’ Representation of Venture Funds, 2001–06 (N = 1,028)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Represented by a placement agent (0/1)</td>
<td>0.06</td>
<td>0.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fund size ($M)</td>
<td>153.1</td>
<td>329.9</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Number of fund in firm sequence</td>
<td>5.13</td>
<td>5.80</td>
<td>.04</td>
<td>.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Network status</td>
<td>1.18</td>
<td>1.33</td>
<td>.11</td>
<td>.33</td>
<td>.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Number of funds raised in state-year</td>
<td>18.8</td>
<td>31.6</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. No deals in previous 5 years (0/1)</td>
<td>0.19</td>
<td>0.39</td>
<td>−.11</td>
<td>−.12</td>
<td>−.29</td>
<td>−.43</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Does not invest own capital (0/1)</td>
<td>0.23</td>
<td>0.42</td>
<td>−.05</td>
<td>−.05</td>
<td>−.07</td>
<td>−.02</td>
<td>−.02</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Early stage venture fund (0/1)</td>
<td>0.54</td>
<td>0.50</td>
<td>−.01</td>
<td>−.07</td>
<td>.00</td>
<td>−.05</td>
<td>.01</td>
<td>.02</td>
<td>−.02</td>
<td></td>
</tr>
<tr>
<td>9. Late stage venture fund (0/1)</td>
<td>0.14</td>
<td>0.34</td>
<td>.03</td>
<td>−.02</td>
<td>.01</td>
<td>.01</td>
<td>−.21</td>
<td>−.07</td>
<td>.01</td>
<td>−.43</td>
</tr>
</tbody>
</table>

Table 3

Logit Models of the Likelihood That a Venture Fund Is Represented by a Placement Agent*

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fund-level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early stage fund (0/1)</td>
<td>0.083</td>
<td>0.060</td>
<td>0.085</td>
<td>0.055</td>
<td>0.038</td>
</tr>
<tr>
<td>(Early stage fund)</td>
<td>(0.321)</td>
<td>(0.315)</td>
<td>(0.319)</td>
<td>(0.316)</td>
<td>(0.312)</td>
</tr>
<tr>
<td>Late stage fund (0/1)</td>
<td>0.420</td>
<td>0.320</td>
<td>0.443</td>
<td>0.404</td>
<td>0.353</td>
</tr>
<tr>
<td>(Late stage fund)</td>
<td>(0.428)</td>
<td>(0.422)</td>
<td>(0.426)</td>
<td>(0.428)</td>
<td>(0.419)</td>
</tr>
<tr>
<td>Fund size ($100M)</td>
<td>0.032</td>
<td>0.642**</td>
<td>0.036</td>
<td>0.029</td>
<td>0.570***</td>
</tr>
<tr>
<td>(Fund size)</td>
<td>(0.021)</td>
<td>(0.227)</td>
<td>(0.023)</td>
<td>(0.022)</td>
<td>(0.225)</td>
</tr>
<tr>
<td>Fund size^2</td>
<td>−0.065**</td>
<td>−0.060*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Fund size^2)</td>
<td>(0.039)</td>
<td>(0.037)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fund number</td>
<td>−0.047*</td>
<td>−0.061**</td>
<td>0.255***</td>
<td>−0.062**</td>
<td>0.162*</td>
</tr>
<tr>
<td>(Fund number)</td>
<td>(0.025)</td>
<td>(0.028)</td>
<td>(0.099)</td>
<td>(0.030)</td>
<td>(0.111)</td>
</tr>
<tr>
<td>Fund number^2</td>
<td>−0.015***</td>
<td>−0.011**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Fund number^2)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of funds raised in state-year</td>
<td>0.005</td>
<td>0.004</td>
<td>0.005</td>
<td>0.005</td>
<td>0.004</td>
</tr>
<tr>
<td>(Number of funds raised in state-year)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td><strong>Firm-level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No deals in previous 5 years (0/1)</td>
<td>−1.70**</td>
<td>−1.56**</td>
<td>−1.37*</td>
<td>−1.41*</td>
<td>−1.26*</td>
</tr>
<tr>
<td>(No deals in previous 5 years)</td>
<td>(0.725)</td>
<td>(0.736)</td>
<td>(0.731)</td>
<td>(0.753)</td>
<td>(0.762)</td>
</tr>
<tr>
<td>Does not invest own capital (0/1)</td>
<td>−0.534</td>
<td>−0.346</td>
<td>−0.482</td>
<td>−0.428</td>
<td>−0.299</td>
</tr>
<tr>
<td>(Does not invest own capital)</td>
<td>(0.378)</td>
<td>(0.380)</td>
<td>(0.370)</td>
<td>(0.362)</td>
<td>(0.372)</td>
</tr>
<tr>
<td>Network status</td>
<td>0.243**</td>
<td>0.156</td>
<td>0.118</td>
<td>0.757***</td>
<td>0.231</td>
</tr>
<tr>
<td>(Network status)</td>
<td>(0.107)</td>
<td>(0.115)</td>
<td>(0.119)</td>
<td>(0.306)</td>
<td>(0.347)</td>
</tr>
<tr>
<td>(Network status)^2</td>
<td>−0.064**</td>
<td>−0.020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Network status)^2</td>
<td>(0.029)</td>
<td>(0.031)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>−4.09***</td>
<td>−4.43***</td>
<td>−4.96***</td>
<td>−4.32***</td>
<td>−5.01***</td>
</tr>
<tr>
<td>(Constant)</td>
<td>(0.587)</td>
<td>(0.597)</td>
<td>(0.643)</td>
<td>(0.612)</td>
<td>(0.627)</td>
</tr>
<tr>
<td>Wald chi-square</td>
<td>41.89</td>
<td>70.01</td>
<td>50.22</td>
<td>44.84</td>
<td>79.45</td>
</tr>
<tr>
<td>Log pseudo-likelihood</td>
<td>−217.06</td>
<td>−210.28</td>
<td>−212.85</td>
<td>−215.56</td>
<td>−207.60</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>(13)</td>
<td>(14)</td>
<td>(14)</td>
<td>(14)</td>
<td>(16)</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.094</td>
<td>0.123</td>
<td>0.112</td>
<td>0.101</td>
<td>0.134</td>
</tr>
</tbody>
</table>

* p < .10; ** p < .05; *** p < .01; two-tailed tests for control variables and one-tailed for hypothesis tests.

Robust standard errors are in parentheses. All models include unreported year fixed effects.

represented by a placement agent first increases and then decreases with fund number (p < .01). So placement agents are likely to represent firms that previously raised several funds but are less likely to represent firms that previously...
Constraints on Control Benefits

raised many funds. Model 4 includes the squared term for firm status. Consistent with hypothesis 1c, there is an inverted U-shaped relationship between firm status and placement agent representation \( (p < .05) \). Placement agents tend to represent firms of higher status but do not represent the firms at the top of the status hierarchy. These models demonstrate that the likelihood of a placement agent representing a venture capital fund first increases and then decreases with each of the three quality indicators.

Model 5 presents results of a saturated model. Consistent with hypotheses 1a and 1b, the inverted U-shaped relationships between representation and both fund size \( (p < .10) \) and fund number \( (p < .05) \) are robust to simultaneously estimating all three curvilinear effects of a firm's perceived quality. Although the firm-status variable exhibits the predicted inverted U-shaped effect, the coefficients are not statistically significant. Therefore the results presented in table 3 strongly support hypotheses 1a and 1b but offer only limited support for hypothesis 1c. Inverted U-shaped relationships are observed between the likelihood that an organization is represented by a broker and both firm size and firm experience. Given the high correlations among the three firm-level quality indicators and the cross-sectional nature of the data, it is unsurprising that the three curvilinear effects are not robust to a saturated model. Over time, higher-status firms tend to raise more and larger funds.

Figures 2a, 2b, and 2c represent the effects of fund size, fund number, and firm status on the baseline predicted probability of representation. These graphs depict changes in the likelihood of representation for a balanced-stage venture fund closed in 2001 by a firm that invests its own capital, holding all other covariates at mean levels. The horizontal axes represent observed values of fund size, fund number, and firm status. The vertical axes represent the multiplier of the baseline likelihood of representation, which is the predicted likelihood of representation when the key independent variable is set at its mean (and its corresponding squared term). I used the \texttt{simqi} command in Stata 10.1 (Tomz, Wittenberg, and King, 2003) to generate predicted probabilities and divided these probabilities by the baseline to form the curves; note that the multiplier equals one at the independent variable’s mean in each of the graphs. The corresponding coefficients for figures 2a, 2b, and 2c are in models 2, 3, and 4, respectively, of table 3.

Although the theoretical predictions concern only the functional form of the relationships, and no prediction was made about the inflection points, the non-monotonic nature of the hypothesized effects becomes evident in the right tail of each independent variable’s distribution. This observation is most true for the firm-status variable. Rather than the predicted inverted U-shaped relationship between status and representation, it is possible that status exhibits diminishing, positive marginal effects on a firm’s likelihood of representation and not a curvilinear effect. Together, these graphs indicate that placement agents tend to represent funds of high perceived quality but that the highest-quality funds forego representation. Given that only a small percentage of funds are represented

\[ \text{Constraints on Control Benefits} \]

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\[ \text{Although the theoretical predictions concern only the functional form of the relationships, and no prediction was made about the inflection points, the non-monotonic nature of the hypothesized effects becomes evident in the right tail of each independent variable’s distribution. This observation is most true for the firm-status variable. Rather than the predicted inverted U-shaped relationship between status and representation, it is possible that status exhibits diminishing, positive marginal effects on a firm’s likelihood of representation and not a curvilinear effect. Together, these graphs indicate that placement agents tend to represent funds of high perceived quality but that the highest-quality funds forego representation. Given that only a small percentage of funds are represented} \]
Figure 2a. Effect of fund size ($100M) on likelihood of representation.

Figure 2b. Effect of fund number on likelihood of representation.

Figure 2c. Effect of firm status on likelihood of representation.
Constraints on Control Benefits

Results of Matching Models

The empirical focus of the matching models is how a broker’s reputation moderates constraints on the control benefits of brokerage. I analyzed the likelihood of a realized match for 1,804 possible venture-fund–placement-agent dyads involving 58 placement agents and 64 venture capital funds raised by 62 U.S. firms between 2001 and 2006. Table 4 presents summary statistics and pairwise correlations for all variables included in the dyadic analyses of venture-fund–placement-agent matching. On average, the funds in this subsample are $215M funds raised by firms raising their sixth venture capital fund; approximately 70 percent of the funds in this subsample are in the upper half of the status distribution. Hypothesis 2a predicted a positive interaction effect of fund size and placement agent reputation on the likelihood that a focal placement agent represents a focal venture, hypothesis 2b predicted a similar positive interaction of fund number and reputation, and hypothesis 2c predicted a positive interaction effect of firm status and placement agent reputation.

Model 6 in table 5 presents the effects of the control variables. Bank placement agents are less likely to represent venture funds than are boutique placement agents (bank placement agents tend to represent more buyout funds than venture capital funds). More reputable placement agents tend to represent more funds at any given point in time, although the coefficient on the reputation variable is not statistically significant at conventional levels. The control for autocorrelation is marginally significant ($p < .10$) and negative. Because nearly all venture funds are represented by only one placement agent, and most placement agents represent only a few funds each year, a realized match drastically reduces (but does not eliminate) the possibility of another match being realized.

Model 7 presents a test of hypothesis 2a. The coefficient on the interaction term of fund size and a placement agent’s
reputation is positive and significant \( p < .01 \). More reputable placement agents tend to represent larger funds. For example, an increase of one standard deviation above the mean reputation value (from 11.2 to 29.0 votes) produces a 22.4 percent increase in the likelihood that a focal placement agent represents a $215 million fund (the average fund size in the represented subsample). Model 8 includes the interaction term of fund number and placement agent reputation. Consistent with hypothesis 2b, the coefficient on the interaction term is positive and significant \( p < .05 \). More reputable placement agents tend to represent the funds of firms with more fundraising experience. For example, an increase of one standard deviation above the mean reputation value produces a 22.0 percent increase in the likelihood that a focal placement agent represents a firm raising its sixth fund (approximately the average for the represented subsample of funds).

Table 5

<table>
<thead>
<tr>
<th>Variable</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
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<td><strong>Fund and firm</strong></td>
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<tr>
<td>Early stage fund (0/1)</td>
<td>0.006</td>
<td>0.033</td>
<td>0.022</td>
<td>0.048</td>
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<tr>
<td></td>
<td>(0.311)</td>
<td>(0.308)</td>
<td>(0.313)</td>
<td>(0.315)</td>
<td>(0.312)</td>
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<td>Late stage fund (0/1)</td>
<td>0.019</td>
<td>0.071</td>
<td>0.024</td>
<td>0.003</td>
<td>0.041</td>
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<td></td>
<td>(0.369)</td>
<td>(0.381)</td>
<td>(0.372)</td>
<td>(0.375)</td>
<td>(0.381)</td>
</tr>
<tr>
<td>Fund size ($100M)</td>
<td>0.008</td>
<td>-0.106</td>
<td>0.010</td>
<td>0.021</td>
<td>-0.051</td>
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<tr>
<td></td>
<td>(0.102)</td>
<td>(0.152)</td>
<td>(0.103)</td>
<td>(0.101)</td>
<td>(0.137)</td>
</tr>
<tr>
<td>Fund number</td>
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<td>0.007</td>
<td>-0.045</td>
<td>0.007</td>
<td>0.014</td>
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<tr>
<td></td>
<td>(0.046)</td>
<td>(0.048)</td>
<td>(0.061)</td>
<td>(0.045)</td>
<td>(0.057)</td>
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<td>Network status</td>
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<td>0.000</td>
<td>0.001</td>
<td>-0.092</td>
<td>-0.081</td>
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<td>(0.061)</td>
<td>(0.061)</td>
<td>(0.064)</td>
<td>(0.059)</td>
<td>(0.061)</td>
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<tr>
<td>Number of funds raised in state-year</td>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
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<tr>
<td><strong>Placement agent</strong></td>
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<tr>
<td>Bank placement agent</td>
<td>-1.29**</td>
<td>-1.40**</td>
<td>-1.38*</td>
<td>-1.53*</td>
<td>-1.54*</td>
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<tr>
<td></td>
<td>(0.586)</td>
<td>(0.651)</td>
<td>(0.708)</td>
<td>(0.831)</td>
<td>(0.844)</td>
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<td>Reputation (survey votes)</td>
<td>0.021</td>
<td>-0.003</td>
<td>-0.012</td>
<td>-0.010</td>
<td>-0.025</td>
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<td>(0.013)</td>
<td>(0.019)</td>
<td>(0.020)</td>
<td>(0.017)</td>
<td>(0.027)</td>
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<td><strong>Dyadic interaction terms</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fund size ($100M) × Reputation</td>
<td>0.009**</td>
<td>0.007*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
<td></td>
<td></td>
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<tr>
<td>Fund number × Reputation</td>
<td>0.005***</td>
<td></td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network status × Reputation</td>
<td>0.008***</td>
<td></td>
<td>0.007***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean value of ( Y_{ij} ) for all dyads with i or j</td>
<td>-26.5**</td>
<td>-27.2**</td>
<td>-26.7**</td>
<td>-28.1***</td>
<td>-27.7***</td>
</tr>
<tr>
<td></td>
<td>(11.5)</td>
<td>(11.0)</td>
<td>(11.1)</td>
<td>(10.6)</td>
<td>(10.4)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.37</td>
<td>-1.14</td>
<td>-1.10</td>
<td>-1.11</td>
<td>-1.05</td>
</tr>
<tr>
<td></td>
<td>(0.958)</td>
<td>(0.964)</td>
<td>(0.946)</td>
<td>(0.918)</td>
<td>(0.936)</td>
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<tr>
<td>Wald chi-square</td>
<td>23.97</td>
<td>30.10</td>
<td>23.20</td>
<td>25.83</td>
<td>77.93</td>
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<tr>
<td>Log pseudo-likelihood</td>
<td>-269.39</td>
<td>-266.31</td>
<td>-267.03</td>
<td>-263.68</td>
<td>-262.50</td>
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<tr>
<td>Degrees of freedom</td>
<td>(14)</td>
<td>(15)</td>
<td>(15)</td>
<td>(15)</td>
<td>(17)</td>
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<tr>
<td>Pseudo R²</td>
<td>0.037</td>
<td>0.048</td>
<td>0.046</td>
<td>0.058</td>
<td>0.062</td>
</tr>
</tbody>
</table>

* \( p < .10 \); ** \( p < .05 \); *** \( p < .01 \); two-tailed tests for control variables and one-tailed for hypothesis tests.

* Coefficients are adjusted for rare events bias. Standard errors are clustered by placement agent. All models include unreported year fixed effects.
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Last, the results of model 9 support hypothesis 2c, as the coefficient on the interaction term of firm status and placement agent reputation is positive and significant ($p < .01$). More reputable placement agents tend to represent the funds of higher-status firms. For example, an increase of one standard deviation above the mean reputation value produces an 18.0 percent increase in the likelihood that a focal placement agent represents the average firm, in terms of status, in the represented subsample.

Model 10 presents results of a saturated model. Here, all three interaction effects are in the predicted direction, with statistically significant coefficients for the status and reputation interaction term ($p < .01$) and marginally significant coefficients for the fund size and reputation interaction term ($p < .10$). The coefficient for the fund number and reputation interaction term is not statistically significant. As in the representation analyses, inclusion of interaction terms involving three highly correlated variables and their interaction with the same reputation variable compromises the identification of separate effects for each indicator of firm quality. Again, because firms of greater perceived quality tend to occupy high-status positions in the industry co-investment network, raise larger funds, and raise more funds over time, it is difficult to isolate the effects of any one indicator of firm quality, but the results presented in table 4 are generally consistent with hypotheses 2a, 2b, and 2c. More reputable brokers tend to represent organizations of greater perceived quality.

Potentially Unobserved Illegal Brokerage

In the spring of 2009, New York Attorney General Andrew Cuomo began investigating allegations that top aides to the New York State comptroller steered state pension fund investments to certain private equity funds in exchange for “finder fees.” The U.S. Securities and Exchange Commission and other state attorneys general offices later became involved, and separate but similar probes were opened in New Mexico and California. At the heart of these investigations is the question of whether the fees earned by the firms and individuals accused of wrongdoing were illegal kickbacks or compensation for legitimate marketing services. For example, the central figure in the New York case, Henry Morris, was affiliated with a placement agent known as Searle and Co.; allegedly, Morris received finder fees of over $15 million between 2003 and 2006 because the New York deputy comptroller told fundraising firms to hire Morris if they wanted to manage New York pension money (Karmin and Lattman, 2009). Because audiences often generalize from such instances to similar organizational forms (Jonsson, Greve, and Fujiwara-Greve, 2009), the legitimacy of all placement agents has been damaged by these allegations. Some state legislatures and pension funds have proposed outright bans on investments in funds represented by placement agents.

To gauge the extent to which the results reported here might be influenced by illegal fundraising practices, I obtained documents released by the New York State Comptroller.
and the New Mexico Educational Retirement Board. These documents listed approximately 150 instances in which firms represented by placement agents are thought to have received investments from state pension funds, legally or illegally. Most of the funds listed in these two documents are hedge funds and private equity funds (e.g., buyout), but seven venture capital funds were also included (all are included in the data analyzed here). The median figures for these seven funds are $124 million in capital raised by a firm on its fourth fund and in its eighth year of operations; three of the funds are in the top half of the status distribution, and the other four are in the bottom half. The placement agents that represented these funds are not mentioned in recent news articles detailing the investigations; all seem to be operating legally. One venture fund was represented by the most reputable bank placement agent in this study, Credit Suisse First Boston; the other six were represented by placement agents that did not receive any votes in the 2005 Private Equity International survey of general and limited partners. Given that venture capital funds tend to be much smaller than other private equity funds, most of the illegal transactions probably involve non-venture funds (e.g., buyout funds, hedge funds). The finder fees on a $150 million venture capital fund pale in comparison to those earned on a $2 billion buyout fund. Although the available evidence indicates that kickbacks are not prevalent in venture capital fundraising, institutional investors and venture capitalists are probably regularly introduced by third parties. Such informal brokerage is, of course, not observed in this study but it is legal—many economic exchanges are embedded in social relationships (Granovetter, 1985).

Based on this supplementary analysis and my assumption about brokers’ reluctance to accept bribes in return for representing low-quality actors, I suspect that, relative to the transactions observed in this study, illegal fundraising probably involves less-reputable placement agents and firms of lower perceived quality. If unregistered placement agents (or other informal brokers) tend to represent firms of lower perceived quality than registered placement agents, then this study might overstate the perceived quality of the typical venture fund represented by placement agents. In other words, the true inflection points in figures 2a, 2b, and 2c might actually align with smaller funds raised by less-experienced and lower-status firms. Perhaps the ongoing investigations will produce data that enable future studies of illegal or informal brokerage in venture capital fundraising.

DISCUSSION AND CONCLUSION

In many markets, resource providers face uncertainty about the organizations seeking resources from them. Entrepreneurial opportunities exist for brokers to mediate that uncertainty by leveraging privileged access to information and facilitating transactions between those providing and those seeking resources. Brokers’ opportunities to leverage the control benefits of their structural positions are constrained by the willingness of actors to pay for representation. The analyses reported here indicate that a broker’s reputation mitigates
Constraints on Control Benefits

constraint, but only to a degree: it is uncommon for a broker to represent the highest-quality actors in this market, and not even the most reputable brokers dare represent the lowest-quality actors.

Curvilinear effects of an actor’s quality on the likelihood of representation by a broker is consistent with Marsden’s (1983: 693) insight that “in a system of exchange in which actors limit their potential exchange partners, . . . trade need not reach the equilibrium point defined by interest dependency.” The brokers in this study could likely increase their returns to brokerage by representing actors that are less costly to represent or actors that are willing to pay more for representation, but continued occupation of a brokerage position is contingent on maintaining a reputation for facilitating valuable exchanges. On the demand side of the market for brokerage services, the returns to brokerage are constrained by a broker’s ability to add value greater than its representation fees. On the supply side, a broker’s need to sustain its reputation with actors seeking and those providing resources constrains the returns to brokerage. These insights yield important implications for future research on the trade-offs that actors face in realizing the returns associated with their structural positions (Reagans and Zuckerman, 2008; Gargiulo, Ertug, and Galunic, 2009).

In the market studied here, in which brokers are paid for their services, variance in returns appears to be determined more by the cost of providing brokerage services than by representation fees. Although most placement agents charge a standard fee, some funds are probably less costly to represent than others. This implies that a placement agent’s returns to brokerage likely increase with the perceived quality of the firms represented. Future research might separate these revenue and cost components to further illuminate the determinants of the returns to brokerage. Such inquiries would be consistent with prior research on status that demonstrates how higher-status organizations face lower marketing costs than lower-status organizations and that this advantage enables high-status organizations to accept lower payments than competitors (Podolny, 1993). Similarly, high-status organizations also tend to realize greater returns to investments in quality inputs than do low-status organizations (Benjamin and Podolny, 1999). Disaggregating the cost and revenue components of the returns to brokerage seems a promising line of inquiry.

This study is not without its limitations. Primarily, I treated all market actors as equally at risk for representation, conditional on fund and firm variables that account for varying propensities to seek representation. Studies that directly observe attempts to obtain representation would offer more direct evidence of the brokerage process. Efforts to obtain such data would likely be both theoretically and empirically rewarding. Yet another avenue for future research might be to investigate variance in the rate of brokered transactions across markets. By focusing on one market, this study offers no empirical insights into sources of variance across markets in terms of the rate of brokered exchanges. Yet anecdotal evidence abounds. For example, nearly all initial public
offerings are mediated by underwriters, but few venture capital fund offerings are mediated by placement agents. Both transactions involve raising capital but differ greatly in terms of the frequency of brokered transactions. Future research might investigate varying rates of brokerage across markets that differ in terms of uncertainty and other market characteristics.

More broadly, this study advances the insight that the positions that actors occupy in markets’ social structures are the outcome of a negotiated process. This process has received limited attention from network researchers but is critical to advancing our understanding of how actors arrive at network positions (Stuart and Sorenson, 2007; Hallen, 2008; Zaheer and Soda, 2009) and how network structures evolve (Gulati, 1995; Walker, Kogut, and Shan, 1997; Gulati and Gargiulo, 1999; Aldrich and Kim, 2007; Sorenson and Stuart, 2008). The advantages of various structural positions are well documented; work that further clarifies the processes that determine actors’ network positions and the properties of networks seems critical for those interested in network evolution and the causal effects of social capital.

The information benefits of bridging structural holes present entrepreneurial opportunities to brokers, but constraints on their control benefits limit the profit potential of those opportunities. Constraint depends in part on the demand for brokerage services but also on a broker’s need to maintain a positive reputation and, by extension, a valuable but tenuous and demanding structural position (Ryall and Sorenson, 2007; Buskens and van de Rijt, 2008; Gargiulo, Ertug, and Galunic, 2009). If the returns to brokerage are maximized when brokers represent either the actors that are least costly to serve or the actors that are willing to pay the most for representation, then constraints on brokers’ control benefits limit the returns to brokerage. This insight implies that the substantial returns to brokerage are extracted from only a fraction of the structural holes that brokers can potentially bridge. Alternatively, brokers’ returns are not driven by the most lucrative opportunities available in the market but, rather, by the most readily negotiated exchanges. Whether driven by a small fraction of opportunities or by those of only moderate profitability, the returns to brokerage are that much more impressive. Future research on the constraints brokers face and the processes by which those constraints are negotiated appears quite promising.

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