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WORKING PAPER

WORKING WITH UNFAMILIAR PARTNERS: RELATIONAL EMBEDDEDNESS AND PARTNER SELECTION IN INTER-FIRM COLLABORATIONS

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While one stream of research in partner selection has emphasized stability in a firm's social network, another stream has emphasized the need to expand a firm's network. In order to reconcile these two perspectives, we explore transaction, partner and macro conditions that lead firms to work with unfamiliar partners. Using a unique hand-collected dataset, results from the formation of private equity investment syndicates demonstrate that firms are more likely to select unfamiliar partners for lower levels of primary and behavioral uncertainty and higher levels of competition. Our findings provide insights in conditions that lead firms to expand their social network.

Inter-firm cooperations are a widespread phenomenon. An important question that has received substantial attention is how firms select partner firms. Two major approaches have been used. First, from a resource dependence perspective (Pfeffer & Salancik, 1978) or a resource-based view (e.g. Barney, 1991), firms select partners with complementary skills and resources. Second, from a social embeddedness perspective, organizations reduce the uncertainty associated with inter-organizational exchange by working with partners with whom they have previous direct or indirect experience (Granovetter, 1985). A firm's existing network of relationships, therefore, plays an important role in the formation of future inter-firm collaborations (Chung, Singh & Lee, 2000; Gulati & Gargiulo, 1999).

One problem with the social embeddedness approach is that it provides few insights into conditions that lead firms to work with unfamiliar partners since it mainly stresses the risk associated with doing so and not the potential benefits to new knowledge (e.g. Baum, Rowley, Shipilov & Chuang, 2005; Beckman, Haunschild & Phillips, 2004). From this perspective, a firm's existing network defines its context for action. As such, firms are constrained with respect to the potential partners they are able to cooperate with. New relationships often crystallize among existing partners producing relatively stable, local networks. While working with existing partner firms may be easier, it may lead to strategic myopia in the long run. Identifying circumstances that lead to the establishment of new inter-firm relationships is important since networks influence organizational performance (McEvily & Zaheer, 1999).

Our central research question, therefore, concerns the circumstances that induce firms to overcome the risk and uncertainty associated with pursuing collaborative relationships with unfamiliar organizations. As such, we help to explore boundary conditions to the social embeddedness approach to partner selection in inter-firm collaborations and extend previous research that examines the conditions that lead firms to work with unfamiliar partners (Beckman et al., 2004; Podolny, 1994). Following suggestions by Brass et al. (2004), we use

a multi-level approach to obtain more fine grained insights into the mechanisms driving partner change. Specifically, we develop and empirically test hypotheses with respect to micro and macro conditions under which previous partner experience becomes less important for the selection of partners, encouraging firms to pursue network expansion strategies. Importantly, our conceptual framework represents a cross-level moderator model in which interaction effects between variables at different levels of analyses are examined (Klein & Kozlowski, 2000).

At the micro level, we focus on the uncertainty associated with the transaction in which firms participate. Uncertainty is an important driver of partner selection (Beckman et al., 2004; Podolny, 1994). The social embeddedness approach, however, has typically assumed a nontrivial degree of uncertainty underlying each transaction. An important but neglected question is how transactional uncertainty influences whether firms rely on existing partners in inter-firm collaborations. To examine transactional uncertainty, we employ transaction cost theory and distinguish between primary uncertainty at the level of the underlying transaction or event in which firms participate and behavioral uncertainty at the level of the partners involved in a transaction (Williamson, 1985).

At the macro level, we investigate whether the extent of market competition influences the role of previous partner experience in the selection of partners in inter-firm collaborations. In general, the social embeddedness approach has neglected the role of competition. Traditional neo-classical economics has typically assumed that competition reduces the impact of social relations on the decision taken by rational, self-interested economic actors.

The empirical context of our paper is the formation of one particular form of inter-firm collaboration, namely equity investment syndicates in the management buyout market in the

UK between 1993 to 2002.[1] Syndicated investments are a common feature of venture capital and later stage private-equity backed buyout investments both in the US and in Europe (Sorenson & Stuart, 2001; Wright & Lockett, 2003). We construct a unique three-level dataset involving data from: (1) the state of the overall private equity market, (2) the private equity firms active in this market and (3) the deals that these private equity firms syndicate. There are two main benefits associated with our empirical approach. First, unlike most other studies on the formation of inter-firm collaborations that only include information on the collaborating actors involved (Gulati & Gargiulo, 1999), using different levels of data offers a more fine-grained view of the rules that drive partner selection. Second, investment syndicates are a relatively homogeneous type of transaction which enables us to avoid many of the problems associated with controlling for the heterogeneity across different inter-firm collaborative arrangements.

The rest of this paper is organized as follows. First, we provide our theoretical framework and related hypotheses. The following section outlines the research setting of our study, the data and method used in the analyses. Next, we present the results from the empirical analyses. Finally, we discuss our findings, conclude and outline potential avenues for future research.

THEORETICAL FRAMEWORK AND HYPOTHESES

Social embeddedness scholars have argued that an established network of inter-organizational relationships helps to reduce uncertainty and the problem of information asymmetry associated with inter-organizational collaborations (Granovetter, 1985; Gulati & Gargiulo, 1999; Rangan, 2000). The networks of relationships in which firms are embedded provide access to timely and reliable information about the quality and trustworthiness of potential partners. They constitute an important mechanism to reduce informational

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[1] We use the term buyout to refer to management buyouts as well as related transactions such as buy-ins, buy-in and buyout combinations (so-called BIMBOs), or investor-led buyouts.

asymmetries with respect to potential partners (Rangan, 2000). One major source of information about potential partners provided through a firm's network is relational embeddedness or a firm's direct experience with partner firms through previous inter-firm collaborations (Gulati & Gargiulo, 1999). A natural solution to reduce the hazards associated with inter-organizational collaboration is to rely on previous partners. This strategy offers several benefits. First, as direct relationships provide firms with experience-based knowledge about current and future partner firms, informational asymmetries will be mitigated and the search cost of identifying potential partners will be lower (Gulati, 1995b). Second, previous partner experience will lead to enhanced levels of trust (Gulati, 1995a; Podolny, 1994). Trust can reduce the transaction costs involved with screening potential partners, writing contracts and monitoring partners ex-post. Prior studies have consistently shown that firms prefer to work with existing exchange partners (Chung et al., 2000; Gulati, 1995b; Stan & Rowley, 2002).

Previous studies using the embeddedness approach have generally assumed a non trivial degree of uncertainty underlying each transaction without explicitly taking into account different sources of uncertainty (Chung et al., 2000; Gulati, 1995b; Gulati & Gargiulo, 1999). However, the role of previous social relations between two economic actors appears to decline with lower levels of overall market uncertainty (Beckman et al., 2004; Podolny, 1994). In this paper, we differentiate between two forms of uncertainty at different levels of analyses which are derived from the transaction costs economics literature: primary uncertainty at the level of the underlying transaction in which firms participate and behavioral uncertainty at the level of the partners involved in a transaction (Williamson, 1985).

Further, an important but neglected question in the literature is how competitive pressures influence the role of embeddedness. After all, from an economic perspective, the identity and

quality of exchange partners are immaterial (Hayek, 1945). Therefore, we address the impact of competition on the role of embeddedness for partner selection.

Primary Uncertainty and the Role of Relational Embeddedness

Primary uncertainty can be defined as uncertainty surrounding the underlying transaction or event in which firms participate. Primary uncertainty may cause problems of communication and coordination and, consequently, adversely impact the final execution of transactions. Relational embeddedness is likely less important for partner selection if the underlying transaction has lower levels of primary uncertainty. First, the higher the level of primary uncertainty associated with the underlying transaction, the higher the probability that firms will have to adapt to unforeseen environmental conditions. The number of possible unexpected contingencies that may affect contracts between firms increases with the number of possible changes. Due to problems of bounded rationality, future contingencies are hard to stipulate and contracts will be incomplete. Consequently, the more likely it is that cooperation problems, or problems arising from opportunism, will emerge (Hill, 1990; Williamson, 1985).

Second, transaction cost theory also describes the problem of coordination, referring to the cost of aligning the actions of different partners to a transaction. Even when interests are aligned, coordination problems can arise due to the lack of shared and accurate knowledge about the decision rules that partners within a cooperative agreement will use (Milgrom & Roberts, 1992; Williamson, 1991). The costs are likely to be higher when primary uncertainty increases, as unexpected future contingencies will put greater demand on the joint decision making capability of the partners in an inter-firm collaboration.

One response to this source of uncertainty is to restrict exchange partners to those with whom one has had prior interactions in order to reduce potential transaction costs (Granovetter, 1985; Podolny, 1994). For lower levels of primary uncertainty, however, firms

will have the opportunity to involve less familiar exchange partners as cooperation and coordination problems are likely to be less severe. When the underlying event is characterized by lower levels of primary uncertainty, therefore, it is more likely that firms will pursue network expansion strategies and hence involve less familiar partners.

This discussion suggests that firms are more likely to work with unfamiliar partners when the underlying transaction is characterized by lower levels of primary uncertainty. Hence:

Hypothesis 1. The lower the primary uncertainty associated with the underlying transaction, the less important will be the role of relational embeddedness for the selection of partner firms in a cooperative arrangement.

Behavioral Uncertainty and the Role of Relational Embeddedness

A second major source of uncertainty derived from transaction cost economics is behavioral uncertainty (Williamson, 1985). Behavioral uncertainty arises from human action and refers to the effects of opportunism on transactions that are executed through incomplete contracts. Following Koopmans (1957), behavioral uncertainty also results from a lack of knowledge about the actions or decision rules of other economic actors.

Two informal mechanisms have been identified as being able to mitigate the problems of behavioral uncertainty: relational embeddedness and reputation (Dyer & Singh, 1998). Whereas relational embeddedness provides a firm with private access to information about an actor's behavior, a firm's overall reputation in the organizational community provides a public signal of an actor's behavior. If a firm has established a reputation in the organizational community, the need to rely on private information to assess a partner's behavior might be reduced. An important question then is to what extent does the role of relational embeddedness for partner selection decrease when a firm has an established

reputation? Alternatively, do reputation and relational embeddedness act as complements or substitutes?

There are several reasons why relational embeddedness is likely to be less important for the selection of partners firms when firms have established a strong reputation. First, the reputation of an exchange partner reduces the perceived risk of opportunism and hence problems of cooperation (Hill, 1990; Kreps, 1990; Mayer & Davis, 1995). Further, by collaborating with reputable partners, firms can reduce the transaction costs involved with ex-ante screening of potential partners and writing of contracts, and ex-post monitoring of partners. Second, the reputation of a firm helps to reduce potential coordination problems. Since a firm's reputation acts as an important signal of its overall effectiveness (Fombrun & Shanley, 1990), there will be less uncertainty regarding the decision rules that reputable exchange partners use when unexpected contingencies should arise.

These arguments indicate that the reputation of an exchange partner may be a substitute for direct experience with that partner. As such, the role of relational embeddedness for partner selection will be mitigated if exchange partners have established a reputation in the organizational community. Hence:

> *Hypothesis 2. The higher the reputation of a firm, the less important will be the role of relational embeddedness for the selection of partner firms in a cooperative arrangement.*

The Intensity of Competition and the Role of Relational Embeddedness

The social embeddedness approach has tended to neglect the role of competition for the selection of partners in inter-firm cooperation. Firms might take on the risk of collaborating with unfamiliar but potentially important firms if not doing so could lead them to compete against each other. After all, one important motive for inter-firm collaborations is to reduce

the intensity of competition (Park & Zhou, 2005; Pfeffer & Salancik, 1978). Brander et al. (2002) have suggested that the syndication of venture capital investments may be a mechanism to reduce the level of competition. Few studies, however, have actually considered the impact of the level of competition on the role of embeddedness for the selection of partners in cooperative agreements.

There are several reasons why relational embeddedness might decrease when competition for the underlying transaction is more intense. First, firms will enter a collaborative arrangement when the expected gains from collaborating are higher than the expected costs of forming and managing it. As competition harms the economic interests of competing firms, the benefits associated with inter-organizational exchange increase when firms are in direct competition. For highly competitive situations, the costs associated with working with unfamiliar partners might be lower than the potential benefits of working together. Macy and Skvoretz (1998) show experimentally how strangers are more likely to cooperate when the costs of refusing to work together increase. The expected costs of missing out on an interesting deal or the costs associated with bidding away expected returns increase the likelihood that firms will join with unfamiliar partners even when the likelihood of partner conflicts are higher. Second, Doz et al. (2000) suggest that firms were more likely to conduct a more open solicitation process in their search for partners when environmental interdependencies were high. This indicates that the importance of social ties is reduced when inter-firm cooperation is driven by resource interdependencies. Third, increased competition appears to reduce social norms (Roth, Prasnikar, Okuno-Fujiwara & Zamir, 1991). Relational embeddedness, therefore, may be less important for the selection of partners in collaborative arrangements when there is increased competition for a deal.

This discussion suggests that increased levels of competition will reduce the role of relational embeddedness as a driver of partner selection in inter-firm collaboration. Hence:

Hypothesis 3. The higher the level of competition associated with the underlying transaction, the less important will be the role of relational embeddedness for the selection of partner firms in a cooperative arrangement.

DATA AND METHODS

Research Setting: Syndication in the UK Private Equity Market for Management Buyouts

We investigate the selection of partner firms by studying the formation of investment syndicates in the buyout segment of the private equity market in the UK. The UK buyout market emerged in the mid 1980s. Equity investment syndicates are a common feature of the buyout market accounting for more than 25% of the deals during the 1990s (Wright & Lockett, 2003). Equity investment syndicates are a form of inter-firm alliance in which two or more firms co-invest in an investee firm (the buyout target) and share a joint pay-off. The buyout setting is a particularly fruitful arena for studying inter-firm collaborations as buyout investing is characterized by a considerable degree of uncertainty and therefore issues of inter-firm governance are especially important. Further, syndication has been an established practice in the buyout market for some time, which enables the use of longitudinal data. Additionally, syndicates are a relatively homogenous type of transaction which avoids issues of heterogeneity often found with other types of inter-firm collaborations.

There are several motives for syndication: portfolio diversification, window dressing, deal flow generation, improved investment selection, value adding and certification (Manigart et al., 2006). Each syndicate typically contains a lead firm and one or more non-lead firms, with an individual investor taking on both roles depending on the particular deal. Non-lead investors mainly rely on the lead investor to perform the task of managing and monitoring the underlying investment (Gorman & Sahlman, 1989). Consequently, non-lead members may suffer informational disadvantages compared to the lead investor. Further, lead investors

generally hold a larger equity stake as compared to non-lead investors in order to compensate them for their effort. Overall, this means that lead investors have more informal control through their privileged access to information and more formal control through their residual rights of control (Wright & Lockett, 2003).

Given the relatively long term and uncertain nature of private equity investments, the interests of the lead investor may not always coincide with the interests of non-lead investors. The uncertainty associated with the underlying investment combined with more formal and informal control by the lead investor could potentially lead to opportunism by the lead investor and hence create transaction costs for non-lead investors. Potential hazards of inter-firm cooperation in investment syndicates are exacerbated as buyout investments involve a lock-up period for all investors until a suitable exit route can be found (Wright, Robbie, Thompson & Starkey, 1994).

Data

To examine the hypotheses developed in the previous section requires the synthesis of different levels data. This study constructs a unique three-level dataset involving data from the state of the overall private equity market, the private equity firms active in this market and the buyout deals that these private equity firms are involved in.

The data are obtained from two major sources. First, buyout deals are identified through a hand collected database maintained by the Centre for Management Buyout Research (CMBOR). This database covers the entire population of buyouts in the UK from the beginning of the 1980s onwards. In order to enhance reliability, the CMBOR collects its data from a variety of sources so as to reduce common method bias.[2] The total sample consists of 369 syndicated buyout transactions that occurred between 1993 and 2002 in the UK.

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[2] Most importantly, a semi-annual survey is conducted with organizations such as banks and private equity companies investing in buyouts. All participants in the market respond to this survey, enabling a comprehensive

Second, as CMBOR only collects transaction specific data, complementary data on the characteristics of the private equity investors involved in these transactions and on the state of the overall private equity market was gathered. Using the names of the private equity investors in each deal from the CMBOR database, we collected data on their characteristics through directories issued by the British Venture Capital Association (BVCA) and the European Venture Capital Association (EVCA).[3] Additional information sources were used to collect information when individual investor characteristics were missing, notably the Guide to Venture Capital in the UK and Europe and Venture Economics.

Variables

The unit of analysis is the syndicated buy-out transaction. For each syndicate, we look which investors were selected by the lead investor and which investors could potentially have been selected to participate but were not (cfr. infra). The dependent variable in our analyses is binary and equals 1 if for a particular deal the lead investor selects a certain private equity investor as a syndicate member and 0 if it does not.[4] The independent variables measure relational embeddedness, primary uncertainty, the reputation of the lead investor, and the level of competition. Control variables are added.

Relational embeddedness. Relational embeddedness is operationalized by counting the number of previous syndicates in which the pair of firms had jointly participated in the five years preceding the year of the buyout transaction and one of these firms acted as lead

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picture of the population to be obtained. This data collection method enables private information on full details of individual financing structures to be obtained. This data is further completed with data from the business press.

[3] The directories issued by the BVCA cover two yearly periods for 1994-1995, 1997-1998, 1999-2000 and 2001-2002. The directories of EVCA are yearly.

[4] This approach assumes that the lead investor initiates the deal and decides which partners will be selected to join the syndicate. This is in line with observed practice in the private equity industry. If the lead investor was not explicitly mentioned, the investor with the largest equity investment was assigned the lead role. Previous research has generally found that lead investors on average hold larger equity stakes compared to non-lead investors (Wright and Lockett, 2003).

investor (Gulati & Gargiulo, 1999).[5] A five-year moving window is used to calculate our measure of relational embeddedness based on the average lifespan of a syndicate relationship.[6] In order to have reliable network information for the start of our sample period, we include information on syndicate relationships for the period 1988-1992. We take the logarithm of this variable as research has indicated a non-linear relationship between relational embeddedness and the probability that firms will collaborate (Chung et al., 2000).

Primary uncertainty. In syndicate arrangements, primary uncertainty is the possibility that different eventualities at the level of the underlying investee company influence the economic outcome of the transaction. We use three measures to capture different dimensions of the primary uncertainty associated with a buyout transaction. Our first measure is the logarithm of the total deal value. Uncertainty associated with the underlying transaction is expected to decrease the larger the size of the transaction as small firms likely suffer from the liability of smallness (Aldrich & Auster, 1986). Since smaller firms are more vulnerable to shocks in the economic environment, the uncertainty associated with the underlying transaction will be higher. Second, more public information will be available on larger companies involved in buyout transactions mitigating potential problems of information asymmetry and reducing uncertainty (Berger & Udell, 1998).

Our second measure of primary uncertainty addresses uncertainty associated with the agency risk posed by the management of the buyout company. Agency risk varies inversely with the management ownership (Jensen & Meckling, 1976). Increased management stockholdings have usually been associated with performance improvements in the years following the buyout. In buyouts, it is more difficult for management to obtain a substantial

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[5] By excluding transactions in which none of these firms acted as lead investor, we do not count relations between non-lead investors of a syndicate. After all, previous research has indicated that non-lead investors mainly interact with the lead investor (Wright & Lockett, 2003).

[6] Our data indicate that the average time to exit for a syndicated investment lies between 3 and 4 years for exited deals. This figure, however, is influenced by right censoring problems as we do not know all the realized exits. Therefore, we used an average of five years. We tested the sensitivity of this assumption by using a moving window of 4 years and 6 years. The results stay the same.

stake of the equity in larger transactions, given that managers are wealth constrained. The absolute investment made by management may, therefore, be a better predictor of agency risk (Kaplan & Stein, 1993). Therefore, the absolute amount invested by management is used as an indicator of the uncertainty posed by the management of the company. We log transformed this variable. A higher value indicates a lower level of primary uncertainty.

Our third measure is the leverage of the underlying deal. Higher leverage in a deal is associated with lower overall uncertainty. First, high leverage signals the potential for future cash flow generation to service high debt levels. Highly levered transactions are therefore characterized by less operational or market uncertainty. Second, leverage is positively associated with the liquidation value of assets, lowering the downside risk associated with failure (Williamson, 1988). Finally, the disciplinary effect created by high debt levels in a buyout reduces agency risk (Jensen, 1986). Our last measure of uncertainty is therefore the total amount of senior secured debt as a percentage of total financing used to structure the buyout transaction. A higher value points to a lower level of primary uncertainty.

Reputation. We focus on the reputation of the lead investor as the lead investor is the most prominent actor in a syndicate (Wright & Lockett, 2003). Two measures are used to capture the reputation of the lead investor. First, the logarithm of the number of previous investments. In the private equity market, firms mainly gain a reputation by building up a track record of previous investments (Gorman & Sahlman, 1989). Therefore, reputation is measured by counting the number of investments by the lead investor from the beginning of the 1980s when the market began to develop until the year prior to the investment. Second, we use the logarithm of the number of times a private equity firm acted as lead investor in an investment syndicate This measure is related to the reputation measure used for investment banks in underwriting syndicates (Megginson & Weiss, 1991). This measure was calculated from the start of the observation period onwards i.e. the beginning of the 1980s.

Intensity of competition. We use two different measures to capture the intensity of competition. First, we measure competition for a specific deal (deal competition). The intensity of competition for a particular deal is proxied by counting the number of investors active in the year of the buyout that invested in the same industry as the company involved in the buyout in the five previous years. Firms with previous experience in a particular industry are more likely to be aware of potential deals and will also be more inclined to invest (Sorenson & Stuart, 2001). The number of competitors is an important determinant of the level of competition in an industry (Porter, 1980). We distinguish between 35 different industries. We divided the number of firms with previous experience by the number of buyout transactions in that particular industry in the year of the buyout. A higher value indicates a higher potential level of competition.

Second, similar to Gompers and Lerner (2000), we measure overall industry competition by the total funds raised for buyout investment in the year preceding the buyout transaction. The EVCA yearbook only has detailed information on the total funds raised in the UK for buyout transaction from 1998 onwards. For the period 1993 to 1997, we estimated the funds that will be allocated to buyout investments by multiplying the total private equity funds raised by the percentage that was actually invested in buyouts in the years the funds were raised. These figures were inflation adjusted to control for nominal price increases.

Control variables. Several control variables are included with respect to the relation between the lead investor and the potential partner, characteristics of the potential partner and characteristics of the lead investor.

First, previous research has shown that structural embeddedness is an important driver in the formation of inter-firm cooperations (Gulati & Gargiulo, 1999). Structural embeddedness refers to the number of shared partners from previous ties between partner firms. For each pair of firms in our sample, we calculate the number of partner firms shared based on the syndicate relationships of the five years preceding the year of the buyout transaction. Further

status similarity is an important driver of inter- organizational exchange (Gulati & Gargiulo, 1999; Podolny, 1994). Therefore, we include a variable that captures the similarity in status for a pair of firms. To calculate this measure, we take the ratio of the smaller to the larger Bonacich (1987) centrality score of the two firms. The status similarity measure is based on the syndicate relationship in the five years preceding the buyout transaction. Status similarity is expected to have a positive effect on the selection of partners in a syndicate arrangement. Further, we include a variable that captures the effect of reciprocity in exchange behavior (Chung et al., 2000). To measure reciprocity, we divide the number of deals in which the lead investor was invited by a potential partner to participate in a syndicate by the number of deals in which the potential partner was invited as syndicate member by the lead investor in the three years preceding the year of the buyout transaction. The higher this value, the more likely firms will be selected to join a syndicate.

Another driver of the formation of inter-firm collaborations is resource interdependencies (Brander, Amit & Antweiler, 2002; Pfeffer & Salancik, 1978). We expect firms who are more specialized with respect to the industry of the buyout company to be selected as partner firms. We include industry specialization of potential partner firms as a control variable. Industry specialization is measured by the proportion of previous buyout investments a potential partner firm has in the industry of the buyout company in the five years preceding the year of the buyout. We distinguish between 35 industries. The higher this figure, the more likely a firm will be selected to join a syndicate. We also include a variable that captures the geographical specialization of a potential partner with respect to the geographical region of the buyout company. A distinction is made between 12 different regions in the UK. We take the proportion of investments a firm has in the region of the buyout company in the five years preceding the buyout investment. The coefficient of this variable is expected to be positive. [7]

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[7] We also used an absolute measure to capture the industry and geographical experience of a potential partner firm by counting the number of investments a firm had in the industry or region of the buyout company in the

We also control for other characteristics of potential partner firms. We include the logarithm of the total funds managed by a partner firm since if syndication is mainly driven by financial considerations, potential partner firms with larger funds will be more likely to invest. We also include an interaction between the logarithm of the value of the deal and the logarithm of the size of the funds managed by a potential partner firm. The coefficient of this interaction term is expected to be positive: the larger the size of the deal, the more important will be the size of the funds managed by a potential partner. Two measures that capture the reputation of a potential partner firm, namely the logarithm of the number of times acted as lead and the logarithm of the number of previous investments are included. The effect of reputation on the probability that a firm will be selected to join a syndicate is unclear. On the one hand, more reputable firms might be more visible and therefore more attractive as syndicate partners. On the other hand, more reputable firms might be less inclined to invest as a non-lead investor as they prefer to act as lead or sole investor (Manigart et al., 2006). We further include a measure that captures the activity level of a potential partner firm in a specific year as more active investors are more likely to be invited to join as a syndicate member. Therefore, we include the number of investments in the year of the buyout a potential partner firm was involved in. The higher this variable, the more likely a potential partner firm will be selected to join an investment. Additionally, we introduce a variable that indicates whether potential partner firms are originally from the UK as other rationales might drive the formation of syndicates with international partner firms.

Following Chung et al. (Chung et al., 2000), we include a set of control variables for the lead investor initiating the transaction. First, we include the main effect of the two measures of reputation discussed earlier namely the logarithm of the number of times acted as lead and the logarithm of the number of previous investments. More reputable firms will be more

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five years preceding the buyout investment. These variable are highly correlated with the overall reputation variables however. The results are similar if we use these variables in the analyses.

attractive as syndicate partners and therefore other investors might be more willing to join as a non-lead investor. We also include the size of the funds under management as larger private equity firms might need less partners to close a deal.

Further, we control for the size of a syndicate in order to handle the common actor effect in network analyses (Lincoln, 1984). Lastly, in order to control for unobserved temporal factors that may influence the formation of syndicate relationships, we include dummy variables for each year. Such factors could capture the overall network configuration which might have an impact on the formation of inter-firm cooperations.

Method

The method used is similar to Chung et al. (2000) who study the formation of investment syndicates in the market for public equity offerings. The buyout transaction is the unit of analysis. As such, we assume that each lead investor considers its partner firms for a specific deal. The dependent variable is the probability that a specific partner firm will be selected given that a lead investor was already assigned. For each investment we have a lead investor, the investors that joined as syndicate members and the investors that did not join the syndicate which constitute the risk set. Figure 1 illustrates our empirical approach. We use three criteria to select the risk set or investors that did not join the syndicate but could potentially have been interested to invest. First, in order to exclude investors that invest only occasionally, we include those investors who made at least 5 buyout investments either as sole investor or as syndicate member between 1993 and 2002. Second, we restrict our risk set to private equity investors that invested in buyouts in the UK in the same year of the buyout transaction and therefore expressed their willingness to invest in a particular year. Third, we only included investors that showed a propensity to invest in syndicated investments. Therefore, the risk set of potential investors is also restricted to firms who at least invested once as syndicate member in the two years preceding the year of the buyout transaction.

Since the dependent variable is a binary outcome, we employ logistic regression to analyze the determinants of partner selection in a syndicate arrangement. A value of 1 indicates that a firm was selected to join as a non-lead investors in a particular buyout transaction whereas a value of 0 indicates that a potential partner firm was not selected.[8] The general model takes the following form of equation 1:

Selection as non-lead member = f(relational embeddedness, control variables)   (1)

Hypotheses 1, 2 and 3 are tested by adding interaction terms to model 1. The interaction terms enable us to investigate the conditions under which relational embeddedness will be more and less important in partner selection. The model estimated is presented in equation 2:

Selection as non-lead member = f(relational embeddedness (RE), primary uncertainty*RE, reputation index lead investor*RE, intensity of competition*RE, control variables)   (2)

One potential problem with this approach is that the selection of partner firms across deals is not independent. This problem of independence, however, is directly tested by including variables that capture relational embeddedness, structural embeddedness and reciprocity in opportunity exchange (Chung et al., 2000; Podolny, 1994). Further, in order to correct for dependence among outcomes of syndication decisions by the same buyout investor, we used generalized estimating equations to analyze the data (Diggle, Liang &

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[8] As the total number of 1s is less than 5% of the total number of observations, we also used rare events logistic regression (King & Zeng, 2001) to estimate our model. The results stay the same however.

Zeger, 1994). This method gives efficient estimates of the coefficients and robust standard errors.

There are missing values for some of the explanatory variables, particularly those relating to financial measures which are not always available in the CMBOR database for reasons of confidentiality. We adopt the traditional method of dealing with missing values by applying complete case analysis. The remaining sample is not a completely random sub-set of the full dataset. T-tests indicate that the only significant difference between deals in the sample and the population average is that those included in the sample are on average smaller. Further, we also lose some observations due to missing variables at the level of the private equity investors. T-tests indicate that the only significant difference between characteristics of the investors included in the sample and the overall population average is a higher proportion of the investors included in the sample have an office in the UK. As we employ logistic regression, listwise deletion is problematic only when the probability of missing data depends on both the dependent and independent variables (Allison, 2002). There are no reasons to suspect that missing values in this dataset are related to both the dependent and the independent variables. Note that in order to compute the embeddedness variables, the reputation variables and the experience variables, the full dataset is used.

Insert Table 1 about here

Sample description

The sample consists of 212 private equity backed buyout transactions in which 51 private equity firms participated as lead investor and 57 private equity firms participated as non-lead investor. For each year, we combine the lead investors who were active in that year with all the potential partner firms in the risk set of that year. As such, we have a total of 5697 different yearly dyads. The summary statistics for the characteristics of the yearly dyads and

the private equity firms in our sample are shown in Table 1. These statistics represent averages of the years in which the private equity firms and dyads were included in the sample. The private equity firms included in our sample had on average 0.67 previous ties with other private equity firms included in the sample. There is considerable variation in the sample with a maximum number of direct ties between two firms of 45 and a minimum of 0. The cumulative number of previous investments by lead investors in our sample is on average 149 (median = 61). As the standard deviation indicates, there is a huge difference between the private equity firms in the sample. The most active investor was cumulatively involved in 2166 investments in the year prior to the investments it made in 2002. The number of times a lead investor has acted as lead in the years preceding the investment is 28 (median = 16) with a minimum of 0 and a maximum of 313.

The average number of shared partners between private equity firms in the sample is slightly less than 3 with a maximum of 28 and a minimum of 0. The status similarity measure is on average 0.43 while the reciprocity variable is slightly more than 1. The average proportion of investments a potential partner had in the industry of the buyout investment is 12%. For geographical specialization this figure is 11.5%. These figures suggest that most funds are diversified both at the level of the industry and the level of the geographical region. The potential partner firms have on average £676 million (median = £255 million) under management whereas lead investors have on average £847 million (median = £250 million) under management. The standard deviations for these two figures indicate that there is considerable variation among the private equity firms in our sample. Both the overall number of previous investments and the number of times acted as lead by potential partner firms are lower compared to lead investors. Potential partner firms had on average cumulatively invested in 114 (median = 48) buyouts in the year preceding the buyout transaction and had on average cumulatively acted 22 (median = 11) times as lead investor. The average potential partner had 8 (median = 4) investments in the year of the buyout transaction. In total 88% of

the potential partner firms had an office in the UK.

The summary statistics for the investments included in the analyses are shown in Table 2. The mean value of a deal is a little higher than £45 million with a huge range of values as indicated by the standard deviation. The largest deal is worth £825 million, while the smallest deal is worth only £375,000. The average absolute amount invested by the management totals £430,000 with a minimum of £10,000 and a maximum of almost £6.7 million. The average leverage, i.e. senior debt to total enterprise value, of the deals is 52%. The sample includes unleveraged transactions as well as highly leveraged transactions. Our deal competition variable is almost 1.5. The average size of a syndicate equals 2.4 with a minimum of 2 investors and a maximum of 7 investors.

As our two reputation variables, the number of previous investments and the number of times acted as lead investor, are highly correlated ($r > 0.95$) we combine them into one single reputation index for use in the regression analyses (Cohen, Cohen, West & Aiken, 2003). To calculate this reputation index, we convert each of the measures into z scores and take the average of these z-scores. As such, we use a reputation index for both the lead investor and the potential partner firms in our analyses. The correlation matrix is presented in Table 3. The correlations between all the other variables used in the regression analyses are below 0.70 and do not pose multicollinearity problems.

RESULTS

Table 4 presents logistic estimates for the effects of factors influencing the selection of partners in syndicate partnerships. The dependent variable takes a value of 1 when a partner is selected as non-lead member in a syndicate and 0 otherwise. All the models are statistically significant and have reasonable r-squares. The p-values reported are two tailed significance tests. To limit the size of the tables, we do not show the effect of the year dummies.

Insert Table 4 about here

Model 1 is a baseline model which includes all the control variables. The independent variables of interest are added in the other models. The size of the syndicate has a positive coefficient and is highly significant across all models. Surprisingly, the number of shared partners, status similarity and reciprocity are not statistically significant even though they all have the expected sign. The coefficients of industry and geographical experience of potential partner firms are significantly positive in all our models supporting the resource dependence perspective. The interaction between the size of the funds managed by a potential partner firm and the size of the deal is positive and highly significant across all of our models as expected. Private equity firms with more funds are more likely to be selected for larger deals. The more active a potential partner firm is in a given year, measured by the number of investments in the year of the buyout, the more likely it will be selected to participate in a transaction. Lastly, private equity firms that manage a larger amount of funds are less likely to select different partners in a syndicate arrangement.

In model 2, the main effect of relational embeddedness is introduced. As expected, the coefficient is positive and highly significant. Lead investors are more likely to select firms with whom they have previous experience. The r-square increases from 0.105 to 0.126 by adding this variable to the model. Hypotheses 1, 2 and 3 are tested in models 3 to 6 by

including different interaction terms. Except for model 3, chi-square tests show that adding the interaction terms improves the fit of the models significantly.

Model 3 introduces the interaction terms between relational embeddedness and the three indicators of primary uncertainty. All the coefficients have the expected sign but only one of them is marginally significant namely the interaction with the absolute amount invested by the management. These results provide weak support for hypothesis 1.

Model 4 includes the interaction between relational embeddedness and the reputation index of the lead investor. The sign of this interaction term is negative, as expected, and highly significant. As the reputation index represents a z score with an average of 0, the coefficient of the main effect of the number of direct ties between the lead investor and a potential partner shows the effect for a lead investor with an average reputation. This indicates that for investors with an average reputation, there is still a positive effect of the number of direct ties on the probability that a partner will be selected to join a syndicate. The effect decreases for investors with a higher than average reputation. These results suggest that relational embeddedness is less important for the selection of partners when firms have established an above average reputation thereby supporting hypothesis 2.

In model 5, we introduce the interaction between relational embeddedness and the level of competition for the deal. Only the deal specific competition variable has the expected sign and is highly significant supporting hypotheses 3. The industry competition variable is not statistically significant.

Lastly, in model 6 we introduce all the interaction terms to test the robustness of our results. This model shows that some of the coefficients of the interaction terms that were previously not significant turn out to be significant. More specifically, the effect of the interaction terms between relational embeddedness and primary uncertainty, as measured by the size of the deal and the absolute amount invested by management, have the expected sign and are significant. These results provide support for hypothesis 1. The other results stay the

same.

DISCUSSION AND CONCLUSION

In this study, we sought to extend previous research on partner selection by examining micro and macro conditions under which the role of relational embeddedness or direct partner experience is less important for the selection of partners in inter-firm cooperations. Specifically, we investigated the role of primary and behavioral uncertainty and the extent of competition and how this influences partner selection. Relying on transaction costs economics, we distinguished between two different sources of transactional uncertainty: primary and behavioral uncertainty (Williamson, 1985). Our main theoretical argument is that relational embeddedness is less important for the selection of partner firms when the underlying transaction is characterized by lower levels of uncertainty. Further, this study also argued that the role of relational embeddedness for partner selection will be reduced for higher levels of competition. We tested our propositions by looking at the formation of one particular form of inter-firm collaboration namely equity investment syndicates in the buyout segment of the private equity market in the UK.

In line with previous studies (Chung et al., 2000; Gulati & Gargiulo, 1999; Stan & Rowley, 2002), our results consistently show that firms are more likely to select partners with whom they have previous experience providing support for the social embeddedness approach. Our findings, however, show that the role of previous partner experience for partner selection is contingent on the uncertainty associated with the transaction. We found support that lower levels of primary uncertainty, as measured by the size of the transaction and the absolute amount invested by the management of the buyout company, reduced the need to rely on existing exchange partners. Further, we also found strong support that the lower the extent of behavioral uncertainty associated with an exchange partner, as measured by its reputation, the less important was previous partner experience for the selection of

partner firms. Lastly, we found evidence that higher levels of competition for the underlying transaction prompted firms to work with less familiar partner firms.

Implications

This study contributes to the existing management literature in several ways. First, most of the existing literature on the formation of inter-firm cooperations have typically assumed that uncertainty leads to the formation of embedded transactions. This approach, however, provides few insights in the forces driving partner and network change. In their search for exchange partners, firms are confronted with two competing forces. On the one hand, firms prefer to work with existing exchange partners in order to reduce the search costs of locating partners and to reduce partner uncertainty. One the other hand, firms might look for opportunities to increase the reach of their social networks. How can firms manage these two competing demands? Our results suggest that firms manage this trade-off by using different selection criteria depending on the situation. Specifically, our results show that firms are more likely to pursue collaborative strategies with more unfamiliar partners when there is less primary or behavioral uncertainty. As such, we help to sketch boundary conditions to the social embeddedness approach to partner selection and add to recent literature that examines factors driving partner change (Baum et al., 2005; Beckman et al. , 2004).

Second, the approach taken in this paper is that the risk of opportunism differs among exchange partners and hence the hazards associated with inter-firm cooperation will depend on the behavioral uncertainty associated with an exchange partner. Transaction cost economics has traditionally assumed that either all economic actors have a tendency to behave opportunistically or that it is impossible to distinguish between those that have good intentions and those that have bad intentions (Williamson, 1985). A more behaviorally oriented approach, however, rejects this assumption and assumes that the tendencies to behave opportunistically differ among economic actors. Our results show that the reputation

of an exchange partner mitigates behavioral uncertainty and hence reduces the need to rely on private information through previous relationships. Similar to Shane and Cable (2002), these results indicate that reputation and previous direct partner experience act as substitutes. In line with Barney and Hansen (1994), the findings of this study also suggest that the reputation of an exchange partner constitute an important resource that helps to reduce transaction costs in economic exchanges by increasing a partner's trustworthiness.

Third, previous research has emphasized how inter-firm collaborations can be used to respond to competitive pressures. For example, Park and Zhou (2005) suggested how firms might involve themselves in inter-firm cooperation despite weak alliance gains in order to respond to the actions of rival firms. Few studies, however, have actually looked at how competition influences the selection of partner firms. Our study provides evidence that higher levels of competition lead firms to take on more risk and hence work with more unfamiliar partners. This might help to explain the high failure rate among inter-firm cooperations. Future research should look more deeply into how the competitive environment shapes the formation of inter-firm cooperations.

Fourth, from a methodological point of view, our results clearly show that by using a cross-level moderator model, we are able to obtain a more fine-grained picture of the drivers of partner selection in inter-organizational collaborations. As such, we add to a recent stream of literature that helps to bridge the micro-macro gap by using multiple levels of analyses (Almeida & Phene, 2004). Whereas most previous studies on partner selection only look at attributes of the actors involved in a collaborative arrangement, our study shows that by combining different levels of analyses we are able to get a better understanding of the factors driving partner change.

Implications for Management

The results of this study should encourage managers to reconsider the current scope of their inter-firm collaborations and to develop their decision processes in seeking to extend them. Our finding that firms should adopt different decision criteria for selecting partners according to the nature of uncertainty, may help managers choose between familiar and unfamiliar partners. Our finding that reputation and prior direct partner experience act as substitutes suggests that firms who have established a reputation in the organizational community can more easily form new partnerships. This could ultimately lead to a competitive advantage for these firms, for example in terms of negotiating the terms of the collaboration. Our finding that higher levels of competition lead firms to take on more risk and work with more unfamiliar partners suggests a need for some managerial caution in such contexts. In particular, such contexts may subsequently create a need to deal with problem cases. In deciding on corrective action in such circumstances may be more difficult to obtain agreement when dealing with unfamiliar partners. However, leaders of collaborations may be able to benefit from their higher reputations to persuade partners of the appropriate course of action.

Limitations and Future Research

This study has limitations that suggest a number of avenues for extending and enhancing future research. First, we used the reputation of an exchange partner to assess the behavioral uncertainty associated with an exchange partner. One concept that is highly correlated in our sample with the reputation of a firm is a firm's overall network centrality. Therefore, it is difficult to distinguish among the effects of these different concepts empirically. By using more fine grained measures, future research could try to investigate whether these two mechanisms act as complements or substitutes. Robinson and Stuart (2005), for example, show that networks are essential to communicate an actor's reputation in the biotechnology

industry. Therefore, both the reputation of a firm and its position in the overall network structure might be important to reduce the extent of behavioral uncertainty.

Second, a limitation of the context we have studied is that firms in a private equity syndicate are less involved with the management of the underlying company whereas previous research on alliances has focused on alliances in which the contribution of partner firms is more crucial (Gulati & Gargiulo, 1999). In line with previous studies on the formation of inter-firm collaborations, however, our results also show that relational embeddedness and resource interdependencies are an important driver for the selection of partner firms in private equity syndicates. Therefore, we have confidence that our results also apply to other forms of inter-firm cooperations which future research could examine.

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TABLE 1

Characteristics of the Private Equity Firms in the Sample

	N	Mean	S. D.	Min.	Max.
Relational embeddedness [a]	5697	0.67	2.30	0	45
Reputation variables lead investor					
# previous investments[b]	183	149.34	377.75	1	2166
# times lead investor[b]	183	27.69	56.37	0	313
Control variables					
# shared partners[a]	5697	2.80	3.17	0	28
Status similarity[a]	5697	0.43	0.30	0	1
Reciprocity[a]	5697	1.03	0.32	0.25	5
Industry specialization potential partner (%)[b]	333	12.06	9.10	2.82	100
Geographical specialization potential partner (%)[b]	333	11.50	3.68	0	35.61
Funds under management potential partner[c]	333	676.04	1301.32	3	10577
Funds under management lead investor[c]	183	846.65	1624.50	1.4	10577
# previous investments potential partner[b]	333	114.29	308.95	2	2190
# times lead investor potential partner[b]	333	22.30	46.94	0	318
# investments potential partner in year buyout[b]	333	8.00	19.41	1	171
Dummy potential partner located in UK (%)[b]	333	88.59	31.84	0	1

[a] These statistics are calculated by taking the mean of the values for each dyad year in the years the dyad was included in the sample.

[b] These statistics are calculated by taking the mean of the values for each firm in the years they were included in the sample.

[c] The amounts are expressed in £ million.

TABLE 2

Characteristics of the Buyout Transactions in the Sample[a]

	Mean	S. D.	Min.	Max.
Primary uncertainty variables				
Value deal[b]	45.22	114.42	0.37	825.00
Absolute amount invested by management[b]	0.43	0.79	0.1	6.7
Leverage (%)	52.22	20.71	0	95.85
Intensity of competition				
Deal competition	1.38	1.54	0	20.2
Control variables				
Size syndicate	2.40	0.90	2	7

[a] N=212

[b] The amounts are expressed in £ million.

TABLE 3

Pearson Correlations[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Relational embeddedness	1.00																
2. Log value deal[1]	-0.07*	1.00															
3. Log absolute amount invested by management[1]	-0.05*	0.35*	1.00														
4. Leverage (%)	-0.03*	0.35*	-0.06*	1.00													
5. Deal competition	0.31*	0.00	0.03*	0.03*	1.00												
6. Industry competition	-0.12*	0.18*	0.28*	-0.01	-0.12*	1.00											
7. Size syndicate	-0.07*	0.43*	0.09*	0.15*	-0.01	-0.07*	1.00										
8. Reputation index lead investor	0.51*	-0.07*	-0.12*	-0.10*	-0.05*	-0.08*	-0.11*	1.00									
9. Log # shared partners	0.62*	-0.04*	-0.07*	0.03*	0.22*	-0.26*	-0.03*	0.45*	1.00								
10. Status similarity	0.09*	0.11*	0.07*	0.11*	0.14*	-0.07*	0.05*	-0.27*	0.44*	1.00							
11. Reciprocity	0.05*	-0.04*	-0.02	0.03*	0.11*	-0.02	-0.02	-0.11*	0.12*	0.09*	1.00						
12. Industry specialization potential partner (%)	-0.25*	-0.06*	-0.02	-0.05*	-0.15*	0.00	-0.03*	0.04*	-0.31*	-0.25*	-0.03*	1.00					
13. Geographical specialization potential partner (%)	0.00	0.00	0.01	0.00	-0.02	0.01	0.03*	-0.01	0.01	0.02	-0.01	0.00	1.00				
14. Log funds managed potential partner	0.31*	0.01	0.06*	0.02	0.18*	0.20*	-0.06*	-0.09*	0.39*	0.28*	0.19*	-0.36*	0.00	1.00			
15. Log funds managed lead investor	0.47*	0.23*	0.04*	0.03	0.02	-0.03*	-0.01	0.68*	0.46*	-0.16*	-0.10*	0.02	-0.03*	-0.07*	1.00		
16. Reputation index potential partner	0.47*	-0.02	0.04*	0.03*	0.28*	0.08*	-0.05*	-0.09*	0.50*	0.31*	0.20*	-0.49*	-0.01	0.69*	-0.07*	1.00	
17. # investments potential partner in year buyout	0.42*	-0.06*	-0.01	0.04*	0.35*	-0.04*	-0.06*	-0.08*	0.34*	0.13*	0.17*	-0.30*	-0.02	0.49*	-0.06*	0.72*	1.00

[a] (N=6178)

*p<0.05

TABLE 4

Logistical Regression using Robust Standard Errors[ab]

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Relational embeddedness			0.73***	(0.19)	1.21***	(0.38)	1.00***	(0.21)	1.04***	(0.30)	1.91***	(0.34)
Log value deal* relational embeddedness					-0.03	(0.08)					-0.14**	(0.05)
Log absolute amount invested by management* relational embeddedness					-0.60†	(0.36)					-0.46*	(0.18)
Leverage* relational embeddedness					-0.45	(0.45)					-0.26	(0.25)
Reputation index lead investor* relational embeddedness							-0.42**	(0.15)			-0.53***	(0.10)
Deal competition* relational embeddedness									-0.06***	(0.01)	-0.08***	(0.02)
Industry competition* relational embeddedness									0.00	(0.00)	0.00	(0.00)
Size syndicate	0.29***	(0.05)	0.29***	(0.05)	0.19***	(0.05)	0.32***	(0.05)	0.29***	(0.05)	0.23***	(0.06)
Log # shared partners	0.05	(0.23)	-0.19	(0.19)	-0.23	(0.19)	-0.25	(0.18)	-0.21	(0.18)	0.20	(0.14)
Status similarity	0.06	(0.38)	-0.11	(0.37)	-0.02	(0.45)	0.09	(0.36)	-0.08	(0.40)	-0.26	(0.20)
Reciprocity	0.10	(0.24)	0.10	(0.16)	0.07	(0.18)	-0.04	(0.15)	0.12	(0.13)	0.19	(0.46)
Industry specialization potential partner	2.36*	(1.08)	2.50**	(0.91)	2.66*	(1.04)	2.21*	(0.87)	2.41**	(0.91)	-0.11*	(0.14)
Geographical specialization potential partner	2.67***	(0.37)	2.45***	(0.36)	2.42***	(0.37)	2.39***	(0.35)	2.42***	(0.37)	2.05***	(1.00)
Reputation index potential partner	-0.12	(0.20)	-0.32	(0.25)	-0.31	(0.31)	-0.30	(0.24)	-0.38	(0.25)	2.27	(0.37)
Log funds managed potential partner	-0.13	(0.10)	-0.12	(0.10)	-0.19*	(0.11)	-0.11	(0.09)	-0.10	(0.10)	-0.37†	(0.31)
Interaction log funds managed potential partner * log value deal	0.04***	(0.01)	0.04***	(0.01)	0.07***	(0.02)	0.04***	(0.01)	0.04***	(0.01)	-0.21***	(0.11)
# investments potential partner in year buyout	0.81***	(0.18)	0.67***	(0.19)	0.73**	(0.24)	0.59***	(0.18)	0.74***	(0.20)	0.07**	(0.02)
Dummy potential partner located in UK	0.19	(0.34)	0.30	(0.35)	0.47	(0.41)	0.30	(0.34)	0.24	(0.35)	0.69	(0.23)
Reputation index lead investor	-0.16	(0.33)	-0.62†	(0.32)	-0.77*	(0.37)	-0.63*	(0.27)	-0.51†	(0.31)	0.42*	(0.39)
Log funds managed lead investor	-0.21***	(0.08)	-0.20*	(0.09)	-0.20†	(0.12)	-0.20*	(0.09)	-0.14†	(0.08)	-0.67†	(0.32)
P-value of log likelihood test	<.0001		<.0001		<.0001		<.0001		<.0001		<.0001	
R-Square	0.105		0.126		0.132		0.144		0.143		0.164	

[a] N=6178, dependent variable equals 1 if potential partner is selected, 0 otherwise.

[b] Year dummies are not reported here.

† $p<0.10$

*$p<0.05$

**$p<0.01$

***$p<0.001$

FIGURE 1

Empirical Model