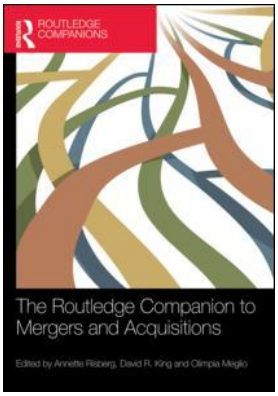

The Routledge Companion to Mergers and Acquisitions

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Assessing the effects of the network of strategic alliances on M&A decisions

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Part II
Contextual domain of M&A research

The second part of the companion focuses on "the contextual domain" and hosts six chapters. In this section, there are three conceptual and three empirical chapters covering an array of issues and employing a variety of field methods. Taken together, these chapters provide different ways in which the "contextual perspective" can be approached and understood.

One approach to the contextual domain covers classic topics in the context of mergers and acquisitions (M&As) such as leadership or employee engagement. Mergers and acquisitions are not extraordinary or isolated events in a company's life and represent a frequent means to pursue strategies for growth. In addition, their effects span over time, from a few months to many years, and these effects vary a great deal according to the phase or stage of the deal. Our intent is to understand how an acquisition influences enduring themes in organization and management studies.

Two chapters in this section follow this perspective. Kathleen Park investigates leadership issues in international mergers involving privatized or family companies from Arabic countries. She contends that these deals demand a particular finesse on the part of the leadership to coordinate the purchase and integration of companies across national and organizational cultural boundaries. She explores issues related to conflict and resolution in cross-border combinations. Her field research highlights that leadership conflict occurs within an individual leader as well as between leaders and followers. In the second chapter, Satu Teerikangas and Lisa Valikangas propose a conceptual analysis of employees' reactions using engagement. This leads them to propose a typology of engagement scenarios in an acquisition context, whether by nurturing individual action or by means of organizational support. They also provide an overview of how differing audiences' engagement dynamics differ in pre- and post-transaction phases.

A second approach to the contextual domain arises from enlarging the domain of analysis in acquisition research. This approach is followed in separate chapters by Laurence Capron and Olimpia Meglio. In her chapter, Laurence Capron focuses on the importance of investigating acquisitions as events belonging to the broader set of growth strategies that companies pursue over time. In so doing, she enlarges the domain of acquisition's decision-making process and includes other means to grow such as joint ventures or alliances. Acquisitions are viewed as one way to grow among many others that entails trade-offs related to resource and learning requirements. This enables a more nuanced view of how companies can both achieve

their exploitation–exploration balance and reach their optimal configuration of growth modes. Meanwhile, Olimpia Meglio enlarges the domain of analysis of acquisition performance. Specifically, she investigates the multidimensionality of acquisition performance through a stakeholder lens. The underlying idea is that the merging companies are not monoliths; rather, they host several stakeholders inside and outside their boundaries. These stakes are put at risk by an acquisition and exert an influence on acquisition performance over time. Acquisition performance is portrayed as a game played by several stakeholders, whose relative power influences outcomes.

A third approach to the contextual domain arises from the widespread idea that no two acquisitions are alike and that differences include social, geographical, and industry factors. Again, two chapters in this section investigate acquisitions in different contexts, thus contributing to fine-tuning our understanding of differences among acquisitions. Marco Testoni, Stefano Breschi, and Giovanni Valentini analyze the social context surrounding an organization that, in their view, may significantly influence the opportunity set that it perceives for acquisitions. Specifically, the chapter focuses on the effects of the network of strategic alliances on subsequent M&A decisions. They empirically test two competing hypotheses in the US semiconductor industry. The argument underlying these alternative hypotheses is that M&As and alliances are substitute inter-firm governance modes. In the other chapter, Lucia Piscitello, Roberta Rabellotti, and Vittoria Giada Scalera investigate the ownership choices by emerging market multinational enterprises (EMNEs) when they invest in Europe through M&As. They also consider the influence of motivations underlying EMNE international expansion. The deals under investigation focus on Chinese and Indian MNEs in high- and medium-tech industries. They conclude that EMNEs are less interested in acquiring control and prefer to keep the local partner for the sake of gaining knowledge. Additionally, EMNEs choose partial acquisitions in cases where there is high dissimilarity in terms of culture, industry, and knowledge base.

At the end of this transit stop in our journey in and around M&A, we have illustrated that mergers and acquisitions can no longer be seen as isolated events in a company's life. They need to be analyzed as a single step in the broader context of a corporate development portfolio. Each and every acquisition is in turn affected by several constraints or opportunities that arise from where the company is based or where the industry competes. These factors are some that shape an acquisition process. We still have much to learn before we start grasping all possible factors affecting acquisitions. An additional message that stands out in this section is the pervasiveness of acquisition on organizations. Seeing companies as constellations of relationships with external and internal stakeholders helps us to get a more nuanced understanding of several classic and new issues surrounding the phenomenon of acquisition.

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Assessing the effects of the network of strategic alliances on M&A decisions

Some empirical evidence from the US semiconductor industry

Marco Testoni, Stefano Breschi, and Giovanni Valentini

Introduction

Literature has increasingly recognized that firms are deeply embedded in networks of social and economic relations. These include client-supplier relationships, trade association memberships, relationships among individual employees, interlocking directorates, and prior strategic alliances (e.g. Gulati 1998). Importantly, this network of relationships can considerably influence firms' behavior (Uzzi 1996). The hypotheses developed in this chapter contend that this is true also for firms' acquisition strategy, and in particular that the opportunity set perceived by firms active in the market for corporate control is affected in important ways by their bundle of social relations. More specifically, in this study we will focus on the network of strategic alliances. Two competing hypotheses concerning the effect of the network of alliances on merger and acquisition (M&A) decisions are developed and tested. First, we argue that proximity within the alliance network structure increases the probability that two firms will engage in a merger or acquisition because of the informational advantages provided by network proximity. Second, we contend that two firms that are closer in the network have a lower probability of merging compared to more distant or disconnected firms. The argument underlying this alternative prediction is that M&As and alliances are substitute inter-firm governance modes. It follows that the presence of a network of alliances may make an M&A unnecessary. We test these competing hypotheses on a sample of firms from the US semiconductor industry and find support for the informational advantage hypothesis.

Literature review

Several studies have examined the relationship between strategic alliances and M&As. Inter alia, Reuer and Ragozzino (2008) found that an M&A between prior partners is more likely to be paid in cash, while an acquisition between firms without a prior collaborative relationship

is more likely to be made with a payment contingent on the post-acquisition performance of the target (i.e. using stock as payment). They interpret this result as a symptom of the fact that alliances can significantly reduce the information asymmetry between acquirer and target, thus reducing the risk of the transaction. Other researchers found that M&As between previously allied firms can perform better than other transactions. Indeed, alliances provide firms with "experiential capital" about the partner and can increase the merging firms' awareness of their compatibility or about potential problem areas (Dyer and Singh 1998; Porrini 2004; Zaheer *et al.* 2010). Thus, they are less likely to experience the post-acquisition problems that are detrimental to value creation (Porrini 2004). Overall, these studies provide arguments supporting the idea that an acquirer should have a preference for a target that has been a direct partner in the past.

Other scholars have studied directly the effect of alliances on the propensity to acquire. Yang *et al.* (2011) investigated whether some types of alliances have higher probability to lead to the acquisition of the partner than others. They found that *exploration* alliances (such as R&D agreements) are more likely to lead to the acquisition of the partner than *exploitation* alliances (such as marketing or licensing agreements). They argue that exploration alliances require close and continuous interaction that better exposes firms to partners' tacit knowledge base and enables a better understanding of the true value of the partner firm's resources. On the contrary, exploitation alliances have less need for deep interaction on knowledge creation and transfer. Moreover, exploration alliances are more dynamic than exploitation alliances and can generate more opportunities for future expansion that can be facilitated by the acquisition of the partner. Their result is in contrast with the study of Hagedoorn and Sadowski (1999), who analyzed technology alliances (R&D and technology transfer agreements) involving firms from several industries and found that the transition from partnership to acquisition hardly ever takes place. These studies, however, considered only M&As between firms that are or were partners in an alliance, and did not take into account the whole network of firms in an industry.

Lin *et al.* (2009) also contribute to this stream of literature by studying whether the position within the alliances' network structure may affect the propensity of a firm to acquire. They found evidence that in a developed institutional environment—such as the USA—the tendency to acquire is negatively associated with a firm's centrality in the alliances network and positively associated with its structural hole positioning, while in a less developed institutional setting—such as China—an opposite pattern is observed. This chapter builds on this study and complements it by shifting the analysis from a single firm focus—i.e. from the question "Who acquires?"—to a dyadic perspective—i.e. to the question "Who acquires whom?"

Highly relevant to our theory is the framework developed by Gulati (1995, 1998, and 1999) to study the dynamics of alliance formation. As the author illustrates, faced with uncertainty about a potential partner's capabilities and reliability, companies tend to resort to existing networks to discover information that lowers search costs and alleviates the risk of opportunism. Accordingly, Gulati (1995) shows that previously unconnected firms are more likely to enter into alliances if they have common partners or are less distant from each other in the alliances network. An interesting insight of Gulati's analysis is that the conditions of mutual economic advantage and of strategic interdependence are necessary but non-sufficient conditions for the creation of a partnership between two organizations. Indeed, while considerations about complementarities of resources are important, a firm's social connections are what allow it to identify new alliance opportunities and choose specific partners that possess such complementary assets. Coherently, Chakrabarti and Mitchell (2013) argued that. because distance reduces the information that the acquirer can collect about the potential target, acquirers prefer targets that are geographically proximate relative to the whole set of potential targets. In other words, this work evidenced that information availability significantly biases decision making in M&A. While Chakrabarti and

Mitchell (2013) measure information availability through geographical distance, our study tries to capture information availability by considering the network of strategic alliances.

Hypotheses

Informational advantage

M&As are complex events in a firm's life, and they may easily turn into a failure if not well managed. Their success depends upon several different factors, such as the characteristics of the acquirer, those of the target, and the features of their combination. Target-specific information such as internal strengths, weaknesses, knowledge base, and culture can help the acquirer in evaluating the target's resources and the realizable benefits of the M&A. The failure to rightly evaluate these characteristics can easily lead managers to formulate wrong expectations about the M&A outcomes and result in a value-decreasing operation (Chatterjee *et al.* 1992). Unfortunately, markets convey less (reliable) information concerning a firm's intangible and knowledge-related assets than about its physical capital. Indeed, while the latter is adequately represented in financial statements, knowledge is under-represented in publicly available information. "It is almost as if balance sheets are provided for some industries but not for others (since the primary assets of knowledge-intensive industries are systematically excluded)" (Coff 1999: 146). The main issue is that several of the qualitative aspects of a target are difficult to measure as an external observer. This is due to the tacit and contextual nature of knowledge that resides in individual employees' minds, organizational processes and routines. Coff (1999) identifies three different kinds of uncertainty about the target's knowledge-related assets: 1) uncertainty regarding the *quality of assets*, since these may include considerable tacit elements; 2) uncertainty about *what can be transferred*, since the transfer of knowledge and human capital is less predictable than tangible assets (for example, an acquisition may break implicit contracts and cause a voluntary turnover of key employees); and 3) uncertainty about the *prospects for synergy*, since the combined capabilities cannot be observed a priori. These informational problems are likely to be exacerbated in knowledge-intensive sectors where knowledge is complex and represents the main asset of a firm (Coff 1999; Zaheer *et al.* 2010). Our hypothesis is that these informational problems can affect first of all the selection of the target firm. In other words, a bidder may prefer to choose targets for which the informational problems are less severe.

Prior interaction experience with potential targets in alliances may offer a valuable mechanism through which information on the intrinsic characteristics of targets can be transmitted. Indeed, partnerships allow firms to share and combine their resources and capabilities and enable them to learn from each other. Thus, by exposing companies to internal processes of partners, alliances increase firms' awareness of targets' value in tacit resources and capabilities (Gulati 1995, 1998 and 1999; Dyer and Singh 1998; Porrini 2004; Reuer and Ragozzino 2008; Zaheer *et al.* 2010; Yang *et al.* 2011). The underlying logic is that alliances facilitate the creation of inter-personal links that allow an improved understanding of *who knows what* and *where critical expertise resides* within each firm (Dyer and Singh 1998). This mechanism may operate *directly*—i.e. firms have access to information about others with whom they have a partnership—but also *indirectly*. Indeed, a company embedded in a network may have access to information about a potential target—even though it is not directly linked to it—by asking other players in its network. The potential for information exchange through the network decreases as the distance between the two focal firms increases, and it is maximal when the social distance is equal to one—i.e. when the two firms are partners in an alliance. This is a reasonable assumption given the costs associated with indirect information access (Gulati 1995; Singh 2005; Sorenson *et al.* 2006). This line

of reasoning implies that, *ceteris paribus*, a bidder will be more likely to select a target that is closer in the network of alliances, because more information is available about it than about more distant firms. Thus, by selecting a closer firm, the acquirer attempts to reduce the information asymmetry and its associated risk.

Moreover, the information transmission channels of the network may also facilitate the discovery of favorable deals at the right time. Indeed, a firm embedded in a network is better positioned to take advantage of acquisition opportunities (such as the development of promising new technologies or the discovery of an undervalued target) that may arise in its immediate surroundings (Gulati 1999). This also increases the probability that a firm acquires a target in its surroundings. These effects are summarized in the *informational advantage* hypothesis.

> Hypothesis 1.a (H1.a): The closer firms are in the network of prior alliances, the higher the probability that they will engage in a merger or in an acquisition.

Given the heterogeneity in the types of alliances, it is straightforward to question if all types of alliances really drive the effect described in Hypothesis 1.a. In fact, alliances may be distinguished empirically according to their scope, such as: R&D, marketing, manufacturing, technology transfer, supply agreement, licensing, etc. Some researchers illustrated that not all typologies of collaborations are expected to have the same potential for knowledge exchange and learning (Anand and Khanna 2000a and 2000b; Porrini 2004; Lin *et al*. 2009; Zaheer *et al*. 2010; Yang *et al*. 2011). Some alliances—such as R&D, marketing,[1] manufacturing, and technology transfer agreements—require close and continuous interaction which better exposes firms to partners' tacit knowledge base and engenders more trust between the parties. It follows that such partnerships are more powerful knowledge transmission channels and are better suited for understanding intrinsic characteristics of targets than other types of cooperative agreements such as licensing, supply, and other types of agreements. Given this argumentation, it is predicted that these kinds of alliances are the actual driver of the *informational advantage* effect described in the previous hypothesis. Meanwhile, other types of partnerships that have less need for intensive interaction should have less power as devices for reducing the informational asymmetry. The literature includes among this second kind of collaborations: licensing agreements (Porrini 2004; Lin *et al*. 2009; Zaheer *et al*. 2010; Yang *et al*. 2011), supply alliances (Lin *et al*. 2009; Zaheer *et al*. 2010), equity only partnerships (Zaheer *et al*. 2010), and other less specific types of contracts (Lin *et al*. 2009).

> Hypothesis 1.b (H1.b): The effect predicted in Hypothesis 1.a will be more pronounced in a network defined by alliances that require close and continuous interaction between parties.

Substitution effect

There is an alternative and opposite effect that could influence the M&A decision of a firm. The underlying logic is that alliances can be considered substitutes to acquisitions as a way to get access to other firms' assets (Williamson 1991; Besanko *et al*. 2000). It follows that it might be superfluous for a firm embedded in a network to acquire other players in its surroundings. Moreover, through a partnership a company can gain access just to the resources that are actually needed, while excluding other unnecessary assets. By contrast, acquisitions do not allow disentangling desirable assets from unwanted ones (so-called "indigestible" assets) (Hennart and Reddy 1997; de Man and Duysters 2005). Therefore, not only might acquiring a partner be

superfluous, but it could also be harmful. Under this view, the presence of a network will actually decrease the probability that an acquirer will select a close target.

It is conceivable that this negative effect could operate between direct partners (i.e. a firm is less likely to acquire a direct partner since it already has access to some of its assets). However, it might also operate for indirect relationships. For example, a firm willing to have access to some assets of an indirect partner may find it less costly to be referenced by their common partner and sign a direct alliance with the other firm. Gulati (1995) documents that firms closer in the network have higher probability of signing an alliance. If alliances and M&As are substitutes, whatever makes an alliance more likely decreases the probability that an M&A occurs. Thus, if network proximity increases the likelihood of an alliance between two firms, it should also reduce the probability of a merger.[2] Given the decreasing value of indirect referrals and of knowledge transmission, the indirect effect linked with the *substitution effect*—as in the case of Hypothesis 1—is also expected to decrease its potential as the dyad is further apart in the network. We thus predict the following hypothesis:

> Hypothesis 2 (H2): The closer are firms in the network of prior alliances, the lower the probability that they will engage in a merger or in an acquisition.

Methods

In order to avoid cross-country and cross-sector heterogeneity, the hypotheses were tested by focusing on a single industry in one country: the US semiconductor industry was selected for the empirical investigation. The study considered M&As that occurred between 2003 and 2007; 2007 was selected as the final year in order to avoid including in the data the post-2008 financial crisis and its consequences on the M&A market.

The data collection started by selecting all the firms with primary SIC code 3674 (semiconductor industry), operating in the US and active during the period 2003–2007.[3] Data on companies' SIC codes and locations were obtained from *Orbis*. Additional information was found in *Thomson One Banker* and *Lexis-Nexis*. Financial data were retrieved from *Thomson Financial*. Data on alliances were obtained from *Thomson SDC Platinum*. For each period of analysis, the main explanatory variables were constructed from the network present at time *t-1*. Unfortunately, *Thomson SDC* provides information on the date of creation of the alliance, but the termination date is usually unavailable. According to Kogut (1988) the average duration of an alliance is no more than five years. Therefore, the network was drawn using a lagged five-year moving window for each year of analysis.[4] Data on M&As were obtained from *Zephyr* and from the *Thomson One Banker—Deals* database. We chose to focus on announcement dates instead of the dates in which the transactions effectively started since this study investigates the motives behind the M&A decision (Luypaert and Huyghebaert 2006). Therefore, we included all the M&As that were announced among the firms in the sample during the period 2003–2007.[5] Finally, patents data were obtained from the *NBER Patent Data Project* (Hall *et al.* 2001). We collected data on 267 firms and 103 M&As[6] during the period 2003–2007. The network included a total of 462 dyadic ties (arising from 347 alliances[7]) for the whole period 1998–2006. Table 6.1 shows the main characteristics of the alliances in the sample.

Manufacturing agreements are the most common type of alliances, followed respectively by R&D, licensing, marketing, and technology transfer agreements. Instead, supply agreement is a quite rare form of collaboration. A given alliance may be aimed at various purposes. This is the reason why the first section of Table 6.1 does not sum up to 100 percent. Moreover, one-quarter of the agreements cannot be labeled according to these categories. This evidence suggests that

Table 6.1 Characteristics of alliances

Scope	
Manufacturing agreement	34%
R&D agreement	21%
Licensing agreement	21%
Marketing agreement	14%
Technology transfer agreement	12%
Supply agreement	3%
Other	25%
Governance	
Joint ventures	6%
Strategic alliances (non-JV)	94%
Number of participants	
Two partners	80%
Three partners or more	20%

alliances are an extremely flexible form of inter-firm relationship, whose objective can vary greatly. Concerning the governance structure, the sample shows that 94 percent of the alliances are contractual agreements, while joint ventures involve just 6 percent of the sample.[8] Finally, Table 6.1 shows that alliances are predominantly a dyadic phenomenon: only one-fifth of the sampled collaborations involved more than two participants.

Since the unit of analysis is the dyads of firms, all the possible combinations of companies were considered. Reverse-ordered dyads were not included (i.e. if dyad *i+j* was included, dyad *j+i* was excluded).[9] By excluding missing values, we ended up having a total of 35,352 complete dyadic observations in the dataset.

Dependent variable

The dependent variable *M&A* is a dummy variable which equals one if the dyad announced a merger or an acquisition in that year and zero otherwise.

Independent variables

Unrestricted network distances

The main independent variable of this model is the distance between the two firms in the network of prior alliances. For each year of analysis, the network was drawn using the partnerships that were signed in the previous five years. In order to test hypotheses 1.a and 2, the networks were created without restrictions on the typology of alliances. The social distance between firms was calculated using an interactive matrix language (IML) procedure in *SAS*® and it is defined as the smallest number of nodes separating two firms.[10] For example, firms that have a direct partnership have a distance of 1, while firms that are separated from a common partner have a distance of 2. Four dummy variables were generated for each year: *distance_1, distance_2, distance_3*, and *distance_4* which were set equal to one if the distance was respectively 1, 2, 3, or 4

and zero otherwise. Since the aim of this research is to investigate whether social proximity has an effect on M&A decisions, the base group is identified in distances greater than 4 and in the absence of connections between firms.

Hypothesis 1.a would be supported if the dummy variables indicating a short distance between firms exert a positive effect on the probability of a merger. Conversely, Hypothesis 2 predicts a negative effect. Moreover, according to both the hypotheses, the coefficients of the dummy variables should decrease in their magnitude moving from *distance_1* to *distance_4*.

Restricted network distances

In order to test Hypothesis 1.b, *restricted* networks were generated by filtering the types of alliances. In particular, this specification of the model included just alliances that were coded as R&D, marketing, manufacturing, or technology transfer agreement. This reduced the total number of ties to 299. As in the case of the unrestricted network, four dummy variables were generated indicating the social distance calculated in the restricted networks.

Hypothesis 1.b predicts that the distance variables should increase in magnitude and significance when moving from the unrestricted to the restricted network. Moreover, the coefficients of the four dummy variables should be positive and their magnitude should progressively decrease when moving from the first to the last one.

Control variables

Asymmetry in firm size

This variable accounts for the fact that, if two firms are of equal size, it might be harder for one to acquire the other (e.g. Yang *et al.* 2011). Therefore, asymmetry is expected to exert a positive effect on the probability of an M&A. The variable *asymmetry in firm size* was calculated as the logarithm of the absolute value of the difference in total assets (in million USD) of the two firms.

Market relatedness

Market relatedness may affect the decision to acquire in different ways. For example, two firms competing in the same product markets may have more incentives to merge compared to non-competing firms, since they could more easily transfer routines across units, create economies of scale (Baum *et al.* 2000), and gain market power. Also, when two companies are direct competitors, other forms of collaboration are less likely to work because they are more likely to suffer from opportunistic behavior and because they are at higher risk of involuntary spillovers to partners (Miotti and Sachwald 2003; Lavie 2007). Finally, a company that acquires a target that operates in similar businesses may better evaluate the target's resources and capabilities. This may also affect acquisition integration and performance (Porrini 2004). Given these argumentations, the level of market relatedness is expected to be positively associated with the probability of an M&A. The variable *market relatedness* was calculated as the number of four-digit SIC codes that the two firms have in common, divided by the total number of codes covered by them together (Porrini 2004). It follows that, the closer the ratio is to one, firms are competing in a higher number of product markets.

Geographical proximity

Geographical proximity is another factor likely to affect the selection of the target. Firms may have a preference for close targets because of lower transportation and integration costs, easier transfer of routines, and higher potential for economies of scale (Baum *et al*. 2000; Grote and Umber 2007). Distance contributes also to increasing the costs that the acquirer must bear in order to monitor the newly acquired entity (Grote and Umber 2007). Finally, proximity enables interaction between individuals, which could facilitate the acquirer's evaluation of the tacit knowledge and the internal strengths and weaknesses of the target (Baum *et al*. 2000; Grote and Umber 2007; Lahiri 2010; Chakrabarti and Mitchell 2013). Previous studies analyzing the effect of geographical distance on M&As usually consider the distance separating the headquarters of the two firms (e.g. Grote and Umber 2007). Nevertheless, companies may have several different locations if one considers also branches and subsidiaries. For these firms, headquarter locations give just scant information about their geographical positioning. Therefore, we considered the whole geographical distribution of companies. The variable *geographical proximity* is calculated as the number of overlapping locations prior to the merger divided by the total number of locations covered by the two firms together. Firms' locations are defined by the headquarter city plus the cities in which the company had branches[11] prior to the merger (if this occurred).

Joint M&A experience

This variable controls for the number of M&As that the firms experienced in the past and accounts for two effects. First, it controls for the fact that firms may develop M&A capabilities through experience. For example, Hayward (2002) shows that organizations (provided that they are exposed to a variety of acquisition experiences) may learn from their past acquisitions. The development of these skills enables companies to obtain superior M&A performance in subsequent transactions. Applying this principle to our framework, we expect that greater M&A capabilities positively affect the propensity to engage in these transactions. Second, the number of past M&As may account for a tendency of the firm. On the acquirer side, a high number of past acquisitions may indicate that the company is pursuing a strategy of aggressive external growth. On the target side, it may indicate that the firm is divesting its activities. In both cases, the number of past M&As should be positively associated with the probability of an acquisition. The variable *joint M&A experience* was created for each year by summing the number of M&As that involved the two firms of the dyad in the previous five years. In particular, while the focus of the analysis is on M&As that occurred between US semiconductor firms, companies' *M&A experience* was calculated without imposing any restriction on the sector or country of origin of the companies involved.

Technological proximity

Technological distance between firms is another important factor that should be taken into account. For each company and for each year of analysis one vector was created representing the distribution of patents across the 37 technological categories defined by the US Patent and Trademark Office (USPTO). The vectors were created by considering the patents assigned in the previous five years. *Technological proximity* was then calculated by considering the angular separation of the vectors (see Jaffe 1989). This measure equals one if the two companies have identical patent distributions, and zero if they have no overlap in the classification of their patents. Several studies analyzed the effects of M&As on the subsequent innovative performance of

firms. This literature generally found that the relatedness of merging firms' knowledge bases is curvilinearly (inverted-U) related to the post-merger innovation output (measured in terms of number of patents). This non-linear relationship is due to the overlap of two contrasting effects. On the one hand, the closer the knowledge bases, the easier it is to absorb and integrate them into a single unit. Technical communication and learning is facilitated by the existence of shared languages, similar cognitive structures, and common skills (Ahuja and Katila 2001; Cloodt *et al.* 2006). If firms are technologically distant from each other, integration may be difficult and innovation performance is likely to decrease. On the other hand, if firms have very similar knowledge bases, they have less opportunity to learn something new from each other. Conversely, more diverse knowledge bases increase the potential to combine different knowledge elements: this improves the quality of the innovation process (Fleming 2007). It follows that a moderate level of knowledge relatedness should be optimal, since it provides the benefits of enhancing the variety of possible combinations, while maintaining the preconditions for a smooth integration (Ahuja and Katila 2001; Cloodt *et al.* 2006; Valentini and Dawson 2010). Given this curvilinear relationship between technological proximity and innovation performance, an acquirer willing to maximize its patent output should select targets moderately distant in the technological space. To account for this effect the variable *technological proximity* and its squared term are introduced in the model. We expect to observe the signs of an inverted parabola.

Total cash available

Most acquisitions rely on cash as a means of payment (Lin *et al.* 2009; Yang *et al.* 2011). Hence, a lack of cash may constraint the firm's ability to acquire. Consequently, the variable *total cash available* was included in the model. It was calculated as the sum of cash and equivalents (in million USD) of the two firms.

Year dummies

To control for unobserved heterogeneity across years, year dummies were also included in the model.

Additional network variables

Joint network centrality

The network variables considered so far focused on the effects of the social distance between firms on the probability of an M&A. However, other elements of the companies' positioning within the network might be relevant. For example, a high level of centrality in the network is usually associated with higher social visibility and prestige (Gulati 1998 and 1999; Ahuja *et al.* 2009). This may have a separate effect to that of distance on the probability of an M&A. Given that we are dealing with dyads of firms, the level of their joint centrality should be considered. Different effects may be expected on the likelihood of an acquisition. On the one hand, since centrality is associated with higher reputation, perceived trust, and visibility, high network embeddedness can decrease the informational asymmetry between two firms. This effect is independent from the fact that firms may be directly or indirectly connected between them. Also, network centrality may provide a signal of the quality of targets. This follows from the fact that it may be more costly for companies with poor quality resources to develop and sign such alliances (Spence 1974; Reuer and Ragozzino 2008). In a sense, joint network centrality

might be considered a thermometer measuring the level of information asymmetry of the dyad. Moreover, given the importance of the network of alliances (Lavie 2007), the firms' portfolio of connections may constitute a valuable asset to acquire. It follows that a high level of centrality could increase the value of the target. Finally, an acquirer which is centrally located in the network is more likely to obtain valuable information on M&A opportunities at the right time. These effects all point to a positive relation between the joint network centrality and the likelihood of an M&A. On the other hand, a high centrality may also decrease the probability of an M&A. Indeed, a company deeply embedded in a network may have access to the resources of all the firms that are in its surroundings. This may reduce the need to pursue an acquisition (Lin *et al*. 2009). In addition, the high level of prestige and trust facilitates the creation of subsequent alliances (Gulati 1998 and 1999; Ahuja *et al*. 2009). It follows that two centrally located firms may find it easier and less costly to sign an alliance instead of a merger in order to get access to the other firm's resources. In order to test these predictions, the variable *joint network centrality* was created. Each firm's centrality in the network of alliances signed in the previous five years was measured using Bonacich's (1987) eigenvector measure.[12] The *joint network centrality* variable was then calculated as the geometric mean[13] of the centrality scores of the two firms in the dyad (Ahuja *et al*. 2009).

Socially asymmetric dyad

Along with firms' joint centrality, the asymmetry in their level of embeddedness may also be relevant. Some studies illustrated that a high level of centrality is associated with higher status and bargaining power (e.g. Ahuja *et al*. 2009). This suggests that, if firms have similar centrality scores, they might have more power struggles during negotiations. On the other hand, dissimilar social status may lead to smoother transactions (Yang *et al*. 2011). To test this hypothesis, the variable *socially asymmetric dyad* was introduced. This is a dummy variable that equals one if one of the firms in the dyad has a centrality score higher than the mean score in the observation year while the other has a score lower than the mean (Ahuja *et al*. 2009).

Statistical approach

By considering the whole set of dyads, a very large amount of non-merging dyads are included in the sample, and just a few dyads actually engaged in a merger or in an acquisition. King and Zeng (2001) show that performing a normal logistic regression with rare event data can produce biased results and sharply underestimate the probability of rare events. Accordingly, we estimated our model using the rare events logistic regression procedure (Tomz *et al*. 1999; King and Zeng 1999, 2001).

Results

Tables 6.2 and 6.3 show the descriptive statistics, while Table 6.4 illustrates the main results of the regressions. Model 1 includes just the control variables, Model 2 introduces the distance dummies calculated from the unrestricted network, and Model 3 includes the distance variables calculated from the restricted network.

By observing the three models, we notice that the control variables have the expected signs and their significance is largely unchanged across the different specifications. Model 2 provides supporting evidence for the informational advantage hypothesis (H1.a). The coefficients of the dummy variables indicating the network distance are positive. Moreover, the likelihood

Table 6.2 Correlation matrix

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	M&A	1							
2	Distance_1	0.0271	1						
3	Distance_2	0.0206	-0.005	1					
4	Distance_3	0.013	-0.007	-0.017	1				
5	Distance_4	0.0044	-0.007	-0.017	-0.024	1			
6	Joint network centrality	0.0302	0.2596	0.5386	0.437	0.2139	1		
7	Socially asymmetric dyad	0.0168	0.0119	0.1054	0.1792	0.115	0.1834	1	
8	Asymmetry in firm size	0.0208	0.052	0.12	0.1444	0.1001	0.2063	0.4667	1
9	Market relatedness	0.0005	-0.006	0.0156	-0.011	0.0005	-0.005	0.0103	-0.003
10	Geographical proximity	0.001	0.0076	0.0163	0.0106	0.0056	0.0208	-0.005	-0.053
11	Joint M&A experience	0.0222	0.0666	0.1045	0.1178	0.1077	0.1935	0.2344	0.4763
12	Technological proximity	-0.005	-0.016	-0.037	-0.073	-0.038	-0.076	-0.207	-0.297
13	Sq. technological proximity	-0.006	-0.016	-0.038	-0.07	-0.04	-0.078	-0.184	-0.261
14	Total cash	0.0179	0.1163	0.1865	0.1471	0.0715	0.3241	0.4653	0.5865

		9	*10*	*11*	*12*	*13*	*14*
9	Market relatedness	1					
10	Geographical proximity	0.0674	1				
11	Joint M&A experience	-0.162	-0.021	1			
12	Technological proximity	0.0297	0.024	-0.1	1		
13	Sq. technological proximity	0.0322	0.0256	-0.1	0.9592	1	
14	Total cash	-0.041	-0.008	0.5695	-0.177	-0.166	1

Table 6.3 Descriptive statistics

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min.*	*Max.*
M&A	152385	0.0006759	0.0259898	0	1
Distance_1	177555	0.0082589	0.0905026	0	1
Distance_2	177555	0.0314845	0.1746234	0	1
Distance_3	177555	0.0660305	0.248336	0	1
Distance_4	177555	0.0699773	0.2551092	0	1
Joint network centrality	177555	0.1670297	1.200093	0	42.63272
Socially asymmetric dyad	177555	0.1155248	0.3196551	0	1
Asymmetry in firm size	55622	6.321174	2.112652	-4.60517	10.78475
Market relatedness	164100	0.4727148	0.299437	0	1
Geographical proximity	177555	0.0173201	0.085074	0	1
Joint M&A experience	172265	4.536882	6.126038	0	69
Technological proximity	91792	0.3611336	0.3029926	0	1
Squared technological proximity	91792	0.222221	0.2913637	0	1
Total cash	54598	1090.258	2350.081	0	27880

Table 6.4 Factors affecting the probability of an M&A between two firms

Variables	*Model 1*	*Model 2 (unrestricted network)*	*Model 3 (restricted network)*
Distance_1		3.07**	3.31***
		(2.47)	*(2.63)*
Distance_2		1.75**	1.64
		(2.06)	*(1.47)*
Distance_3		1.16	1.33
		(1.47)	*(1.23)*
Distance_4		0.71	1.31
		(0.69)	*(1.28)*
Asymmetry in firm size	0.40**	0.38***	0.39**
	(2.54)	*(2.61)*	*(2.54)*
Market relatedness	1.09*	1.03	1.03
	(1.68)	*(1.63)*	*(1.59)*
Geographical proximity	3.47***	3.46***	3.49***
	(3.43)	*(3.20)*	*(3.34)*
Joint M&A experience	0.07*	0.07*	0.07*
	(1.83)	*(1.72)*	*(1.81)*
Technological proximity	2.01	1.71	1.79
	(0.64)	*(0.54)*	*(0.56)*
Squared technological proximity	-2.20	-1.79	-1.89
	(-0.59)	*(-0.48)*	*(-0.51)*
Total cash	-0.00	-0.00	-0.00
	(-0.92)	*(-1.21)*	*(-1.21)*
Year 2007	-0.15	-0.10	-0.16
	(-0.24)	*(-0.15)*	*(-0.25)*
Year 2006	-0.38	-0.31	-0.35
	(-0.56)	*(-0.46)*	*(-0.51)*
Year 2005	-0.63	-0.55	-0.58
	(-0.83)	*(-0.72)*	*(-0.76)*
Year 2004	-0.07	-0.06	-0.06
	(-0.11)	*(-0.10)*	*(-0.10)*
Constant	-11.02***	-10.87***	-10.91***
	(-7.93)	*(-8.03)*	*(-7.91)*
N	35352	35352	35352

Notes: Dependent variable is a dummy variable which equals 1 if the dyad merged in that year and 0 otherwise
Z-values are in parenthesis
Two-tailed p-values: *** $p \leq 0.01$; ** $0.01 < p \leq 0.05$; * $0.05 < p \leq 0.1$

of acquisition progressively decreases in magnitude moving from *distance_1* to *distance_4*. The variables indicating a distance of one or two are positive and they are statistically significant at the 5 percent level, while *distance_3* becomes significant at the 15 percent level. Overall, these findings support the prediction that proximity in the network of alliances actually increases the likelihood of a merger or acquisition.[14]

In Model 3, the distance variables are built from the network of R&D, marketing, technology transfer, and manufacturing agreements. In this specification the variable *distance_1* increases in magnitude and significance. Nevertheless, by testing the equality of the coefficients

across specifications (Paternoster *et al*. 1998), we see that this increase is not statistically significant (z=0.14). Moreover, the other distance variables become non-significant. Overall, these findings do not support Hypothesis 1.b and indicate that both "strong" and "weak" alliances are relevant for transmitting information. In other words, once the intrinsic characteristics of the target have been observed and codified in transmittable information (Nonaka *et al*. 1996 call this process *externalization*), the information flows through the network regardless of the typology of ties.

As expected, *asymmetry in firm size* exerts a positive effect on the probability of an M&A and this effect is statistically significant across the three models. *Market relatedness* shows the expected sign but is statistically significant only in the first model. This result provides rather weak support for the prediction that the greater the overlaps in the product markets, the higher the probability of an M&A. The significance of *geographical proximity* shows that firms have higher chances of merging if they have similar geographical distributions (considering both headquarters and branch locations). Indeed, geographical proximity is likely to be associated with lower integration and monitoring costs, easier target screening and higher potential for economies of scale (Baum *et al*. 2000; Grote and Umber 2007; Lahiri 2010; Chakrabarti and Mitchell 2013). As predicted, the coefficient of *joint M&A experience* is also positive and statistically significant in the three models. This effect can be interpreted by considering that firms can develop acquisition capabilities through experience (Hayward 2002). Moreover, this variable controls for companies' possible strategies of external growth (for acquirers) and divestitures (for sellers). *Technological proximity* and its squared term assume the signs of an inverted parabola as expected; however, these variables are never significant. Given that we are considering a high-tech sector, technological factors are likely to be relevant for M&A decisions and the lack of significance of the *technological proximity* variable seems surprising. One possible way to interpret this result is to assert that our measure of technology is not able to adequately represent firms in the knowledge space (at least in this context). Another possibility could be that the informational opacity of firms in this industry makes it hard for acquiring firms to observe the knowledge base of all the possible firms in the industry and select the optimal one with respect to the technological parameter. Finally, *total cash* and the year dummies are never significant.

Table 6.5 introduces into the model the additional network variables. Models 4 and 5 add to the control variables, respectively, *joint network centrality* and *socially asymmetric dyad*. Model 6 introduces them simultaneously. Model 7 adds also the distance dummy variables.

In the four models, the signs and significance of the control variables remain substantially consistent with the base specification. In Models 4 and 5, we notice that the coefficients of *joint network centrality* are positive and significant. This evidence suggests that an acquisition between two centrally located firms is less likely to experience problems of information asymmetry. In addition, on the one hand a centrally located acquirer is more likely to obtain valuable information about M&A opportunities at the right time. On the other hand, a target's embeddedness into the network may be a valuable asset to acquire for a bidder. In Model 7, *distance_2* and *joint network centrality* both become non-significant. This is likely to be due to a problem of multicollinearity, as the two variables are correlated. This suggests that, if two firms are centrally located in the network, they have also good chances of being indirectly linked to each other. A joint test of these two variables shows that they are jointly significant at the 10 percent level. Given this correlation, we are not able to completely disentangle the effects operated by network centrality to that of indirect referrals. However, these two effects are likely to be deeply interlinked. Moreover, they all point to the informational advantages provided by the network. Finally, the variable *socially asymmetric dyad* is positive as expected, but it is never statistically significant.

Table 6.5 Adding the joint network centrality and socially asymmetric dyad variables

Variables	*Model 4 (unrestricted network)*	*Model 5 (unrestricted network)*	*Model 6 (unrestricted network)*	*Model 7 (unrestricted network)*
Distance_1				2.60***
				(3.76)
Distance_2				1.22
				(1.02)
Distance_3				0.74
				(0.7)
Distance_4				0.47
				(0.46)
Joint network centrality	0.13*		0.14**	0.07
	(1.93)		*(2.03)*	*(0.72)*
Socially asymmetric dyad		0.34	0.42	0.33
		(0.66)	*(0.90)*	*(0.72)*
Asymmetry in firm size	0.41**	0.37**	0.36**	0.36**
	(2.53)	*(2.53)*	*(2.54)*	*(2.56)*
Market relatedness	1.08*	1.07*	1.06*	1.02
	(1.71)	*(1.66)*	*(1.66)*	*(1.63)*
Geographical proximity	3.48***	3.48***	3.48***	3.47***
	(3.27)	*(3.41)*	*(3.26)*	*(3.18)*
Joint M&A experience	0.07*	0.07*	0.07**	0.07*
	(1.90)	*(1.91)*	*(2.05)*	*(1.87)*
Technological proximity	1.74	2.05	1.79	1.76
	(0.55)	*(0.64)*	*(0.55)*	*(0.55)*
Squared technological proximity	-1.85	-2.22	-1.86	-1.80
	(-0.50)	*(-0.59)*	*(-0.50)*	*(-0.48)*
Total cash	-0.00	-0.00	-0.00	-0.00
	(-1.13)	*(-1.02)*	*(-1.26)*	*(-1.17)*
Year 2007	-0.28	-0.14	-0.28	-0.16
	(-0.43)	*(-0.21)*	*(-0.42)*	*(-0.25)*
Year 2006	-0.45	-0.39	-0.47	-0.37
	(-0.64)	*(-0.56)*	*(-0.65)*	*(-0.51)*
Year 2005	-0.65	-0.63	-0.65	-0.57
	(-0.84)	*(-0.82)*	*(-0.84)*	*(-0.75)*
Year 2004	-0.07	-0.06	-0.06	-0.05
	(-0.11)	*(-0.10)*	*(-0.10)*	*(-0.08)*
Constant	-10.99***	-10.86***	-10.74***	-10.77***
	(-7.77)	*(-8.29)*	*(-8.21)*	*(-8.22)*
N	35352	35352	35352	35352

Notes: Dependent variable is a dummy variable which equals 1 if the dyad merged in that year and 0 otherwise
Z-values are in parenthesis.
Two-tailed p-values: *** $p \leq 0.01$; ** $0.01 < p \leq 0.05$; * $0.05 < p \leq 0.1$

Conclusions

This research found that two firms have higher chances to engage in an M&A if they are directly or indirectly linked in the strategic alliances' network, centrally located within this structure, have dissimilar sizes, experienced more acquisitions in the past, and are competing in close geographical markets. Moreover, it was highlighted that all the typologies of alliances are relevant for transmitting information.

This study contributes to the extant literature by showing that relational drivers may partly account for the selection of targets in the context of a corporate acquisition. These drivers add to the traditional economic and financial explanations for improving our understanding of the market for corporate control. One of the implications of this research is that economic and strategic motives constitute necessary but non-sufficient conditions for the occurrence of an M&A between two companies (Gulati 1995). By influencing the extent to which firms have access to information about potential targets, social networks can alter the opportunity set that firms perceive for acquisitions. In particular, by providing additional information on the target's intrinsic characteristics, the network helps to reduce the information asymmetry that a traditional due diligence process cannot solve. Moreover, alliances may also be the conduits for precious information about new acquisition opportunities. Similar to previous studies (e.g. Gulati 1995; Baum *et al.* 2000), this chapter shows that firms rely on past experiences and leverage previous knowledge to plan their actions. When facing the risks associated with an acquisition, the firm resorts to the knowledge accumulated through prior alliances in order to make decisions (Gulati 1995). Overall, this study shows that firms follow path-dependent trajectories: a company's M&A decision is affected by its previous collaboration decisions.

A caveat should be made concerning the generality of these results. The analysis tested two competing hypotheses. The *informational advantage* view predicts that proximity within the network of alliances increases the likelihood of an M&A. The *substitution effect* view instead predicts an opposite effect. The results show that the first hypothesis prevails. However, the prevalence of one pattern over the other may depend on the sector chosen for the analysis. In a high-tech sector—such as the semiconductor industry—where knowledge represents the main asset of firms, problems of informational asymmetry are exacerbated (see Coff 1999) and the value of network links as knowledge-transmission mechanisms are maximal. Moreover, in a knowledge-intensive sector characterized by turbulence and constant innovation, alliances may communicate information regarding new technological discoveries and consequently information about new acquisition opportunities. Instead, in a less knowledge-intensive industry in a late stage of its life cycle, these effects may be lowered and a different pattern may be observed. This distinction helps to reconcile the results of this study to those of Lin *et al.* (2009). As was illustrated in the literature review, these authors found that, in the USA, the higher the centrality of a firm in the network of collaborations, the lower the probability that it will choose to acquire. Their evidence seems to be more consistent with our substitution effect hypothesis. Despite the difference in the empirical approach (i.e. Lin *et al.* 2009 assume a single-firm focus while we adopted a dyadic perspective), the contrast in the findings may also be driven by differences in the empirical setting chosen for the analysis, with the other sample using data encompassing the whole electronic and electric equipment macro-industry (SIC code 36), while we focused just on the semiconductor industry (SIC code 3674). Their sample is quite heterogeneous and it includes sectors at different stages in their life cycle. The prevalence of a substitution effect in their sample might be due to an over-representation of firms in low-growth industries, where innovation is less frequent and knowledge is more codified.

Also the observed patterns captured by the other control variables may be specific to the semiconductor industry. For example, we found that geographical proximity increases the probability of an M&A, while we found only partial support for the prediction that overlaps in product markets increase this probability. In other empirical settings different patterns may be observed: for instance, a tendency to exploit M&As to diversify geographically or with respect to product markets may be observed. Overall, repeating our analysis in different sectors could shed additional light on the factors that determine the prevalence of one pattern over the other and considerably improve our understanding of the M&A market.

Finally, this study presents some limitations that pose the basis for further research. For instance, the analysis focused on the probability of a merger or an acquisition between the dyad *i-j*, without distinguishing between the possibility of *i* acquiring *j*, *j* acquiring *i*, or *i* and *j* merging. This represents just a first approximation of the reality. Despite the simplicity of this symmetric approach, the model produced significant results consistent with the predictions. Further research should develop a methodology to empirically distinguish between the case of a merger and an acquisition and adopt a directional approach for the case of an acquisition. However, the most relevant limitation of a study that tries to explain the probability of an acquisition as a function of past alliance links is the possibility of endogeneity. As far as unobserved factors affect both firms' preferences for collaboration partners (at time *t-1*) and acquisition targets (at time *t*), a spurious result can be obtained.[15] In order to reduce this concern, we tried to include all the factors that are likely to affect both acquisitions and partnerships. Such factors include geographical, product market, and technological proximity, as well as firm size. Despite these efforts, endogeneity could still be a concern for this study and further research should attempt to overcome this limitation.

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Notes

1 As described in the literature review, Yang *et al*. (2011) include marketing agreements among the "weak" types of partnerships, which they call *exploitation* alliances. Conversely, in our main model we include marketing agreements among the "strong" types of alliances (i.e. those that imply close interaction between partners). This is in line with other previous studies (e.g. Porrini 2004; Lin *et al*. 2009; Zaheer *et al*. 2010). Excluding marketing agreements from the cluster of "strong" alliances leaves our results substantially unchanged.

2 If the specific asset needed from an indirect partner concerns knowledge or some specific capabilities, an additional possibility arises. Let us say that firm A needs to gain access to some know-how possessed by C, and firm A is connected to B, while B to C. Since alliances allow firms to learn from their partners (Anand and Khanna 2000a), through time B may have learned the needed capabilities from C. It follows that eventually A can directly obtain them from B. This also reduces the incentives of the focal firm to acquire (or sign a direct alliance with) the third one.

3 Conglomerate companies were included in the initial sample if they satisfied simultaneously the following two criteria: they had at least 3674 as the secondary SIC code; and they had a subsidiary with 3674 as the primary SIC code. Similarly, foreign companies were included if they had a subsidiary in the US with primary SIC code 3674. Financial and patent data for these companies were included only if data specific to the semiconductor subsidiary were available.

4 Given that some firms engaged in an M&A during the years analyzed, their corresponding nodes in the network were merged into a single node if the target was completely acquired.

5 None of the announced deals in the final sample was eventually withdrawn.
6 The sample includes also acquisitions of single business units or divisions of another company (while the parent remained independent).
7 Some alliances involved more than two parties. In these cases it was assumed that each participant had a direct relation with all the other partners. Hence, multiple alliances were converted into dyadic relationships.
8 These data are in line with the findings of Hagedoorn and Sadowski (1999): These authors reported that joint-ventures are less likely than other contractual agreements in knowledge-intensive sectors characterized by rapid technological change. Indeed, industries characterized by a high rate of innovation are expected to require more organizational flexibility leading to a general preference for contractual agreements.
9 The risk set was adjusted for each year in order to take into account the companies that were completely acquired by others: dyads including these firms were excluded in the years following the acquisition as they were non-feasible combinations.
10 Implicit in this model is the assumption that information flow takes the shortest path between two agents. This assumption seems reasonable given the decreasing potential of indirect information transmission and the costs associated with indirect information access (Gulati 1995; Singh 2005; Sorenson *et al*. 2006).
11 While branches—as defined by *Orbis*—generally are direct extensions of the business of the headquarters, subsidiaries are sometimes operating in different businesses. For this reason we opted to exclude the subsidiaries' locations for computing the *geographical proximity*.
12 For each period of analysis and for each firm, this measure was calculated using *UCINET 6* software package (Borgatti *et al*. 2002). We considered the normalized centrality measures.
13 Alternatively, the arithmetic mean was also computed. This produced similar results.
14 An assumption underlying the dyadic analysis is that observations in each year are independent from each other (Gulati 1995). This assumption is questionable since the presence of the same company in various dyads in the same year can lead to interdependence. This problem is also known as "common-actor effect" (Lincoln 1984) and can lead to inefficient parameter estimates. In order to test this concern, additional models have been estimated using the *cluster* option provided by the Relogit procedure in *Stata*®. This allows the estimation of a model when observations are interdependent within a cluster, but independent between clusters. These additional regressions present minimal changes in the statistics. This can be a sign that results are robust for interdependence across dyads.
15 For example, some authors proposed that, when deciding to acquire, firms can choose a more conservative strategy and use an alliance as a first step towards an M&A in order to pre-test the potential fit between the two firms (Mitchell and Singh 1992; Bowman and Hurry 1993; Mody 1993; Porrini 2004). If we consider alliances as a first step for M&As, we are assuming that the decision to acquire a given firm logically precedes the acquisition announcement. In this case, the selection of the target would occur when the alliance is signed and not at the time of the acquisition. Specifically, these authors provide supporting arguments for being concerned about endogeneity when considering M&As between firms that signed a direct partnership (i.e. dyads of firms with a network distance of one). Indeed, that alliance might be a "test" for a subsequent acquisition.

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