

Marrocu, Emanuela; Boschma, Ron; Paci, Raffaele

Conference Paper

Symmetric and asymmetric effects of proximities. The case of M&A deals in Italy

54th Congress of the European Regional Science Association: "Regional development & globalisation: Best practices", 26-29 August 2014, St. Petersburg, Russia

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Marrocu, Emanuela; Boschma, Ron; Paci, Raffaele (2014) : Symmetric and asymmetric effects of proximities. The case of M&A deals in Italy, 54th Congress of the European Regional Science Association: "Regional development & globalisation: Best practices", 26-29 August 2014, St. Petersburg, Russia, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/124214>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Symmetric and asymmetric effects of proximities. The case of M&A deals in Italy

Ron Boschma,^{*,#} Emanuela Marrocu^{**} and Raffaele Paci^{**}

^{*}Center for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University

[#]Urban and Regional research centre Utrecht (URU), Utrecht University

^{**}CRENoS, University of Cagliari

January 2014

Abstract (max. 100)

This paper investigates the effect of geographical, industrial, organizational and institutional proximity on the probability that any two firms located in Italy engage in a M&A deal. Within a logistic rare event framework, we investigate 4,261 actual deals completed over the period 2000-2011 and around 3.8 million potential deals. We find robust evidence that all forms of proximity have a positive effect, especially industrial relatedness. Moreover, we find evidence that proximities generate asymmetric effects on M&A deals, depending on the location of bidders and targets and on whether some specific individual characteristics are featured by the acquirer or by the target firm.

Keywords: M&A, geographical proximity, industrial relatedness, rare events models, asymmetry

JEL: G34, R12, C21

Acknowledgments: The research leading to these results has received funding from the European Union Seventh Framework Programme FP7-SSH-2010-2.2-1 (2011-2014), under grant agreement n° 266834 SEARCH project. We would like to thank Marta Foddi and Stefania Cotzia for the excellent work in preparing the database.

1. Introduction

Economic interactions among firms are likely to be influenced by geographical proximity. The proximity literature (Rallet and Torre, 1999; Boschma, 2005; Boschma and Frenken, 2010; Balland et al., 2013a) has remarked that other dimensions of similarity among economic agents (like cognitive, industrial, institutional and organizational dimensions), in addition to geographical proximity, can play a role in shaping their relationships. A rapidly growing number of studies have investigated how the different proximities among agents affect different types of economic exchanges, like research collaborations (e.g. Singh, 2005; Autant-Bernard et al., 2007; Ponds et al., 2007; Broekel and Boschma, 2012; Usai et al., 2013), regional knowledge spillovers (Basile et al., 2012; Paci et al., 2014), co-inventor networks (Cassi and Plunket, 2012; Ter Wal, 2013), trade and FDI flows (Lankhuizen et al., 2011) and temporary innovative projects (Balland et al., 2013b).

Another crucial aspect, recognized in the International Business literature but so far overlooked by economists and geographers alike, is that proximities may also generate asymmetric effects on agents' behavior. In a seminal paper on the effects of cultural distance on international business, Shenkar (2001) called attention for the 'illusion of symmetry'. In geographical space, the distance between point A and point B is identical to the distance from B to A. However, this might not be the case when other dimensions of distance – like cultural or institutional distance – are considered. As pointed out by Shenkar (2001), the cultural distance perceived by a Dutch firm investing in China is not the same distance faced by a Chinese firm investing in the Netherlands. In a multidimensional framework, spatial distance may turn out asymmetric, if other relevant factors, like social or institutional capital, which are specific to the local level, are not included.

In this paper, we investigate the symmetric and asymmetric effects of proximities on a particular form of inter-firm relationships, that is, mergers and acquisitions (M&A). There exists quite a number of studies on the determinants of M&A partnering that either implicitly or explicitly follow a proximity framework (e.g. Rodríguez-Pose and Zademach, 2003; Böckerman and Letho, 2006; Eun and Mukherjee, 2006; Grote and Ueber, 2006; Schildt and Laamanen, 2006; Chakrabarti and Mitchell, 2013; Ragozzino, 2009; Di Guardo et al., 2013; Ellwanger and Boschma, 2013). We aim to make two contributions to this literature.

The first objective is to apply a comprehensive proximity framework on M&A that accounts for the effect of four forms of proximity (geographical, industrial, organizational and institutional) on M&A partnering within one country, where other studies have restricted themselves to a limited number of proximities. By means of a logistic rare event model, we assess the role of these four proximities on the probability that any two firms located in Italy engage in a M&A deal over the period 2000-2011. We investigate 4,261 actual deals completed over the period 2000-2011 and

around 3.8 million potential ones. The econometric analysis shows that the probability of carrying out an acquisition is positively influenced by all dimensions of proximity between bidder and target companies, especially industrial relatedness.

The second objective of the paper is to investigate whether proximities can generate asymmetric effects on M&A deals, as suggested by the International Business literature. In our analysis, we assess whether the effect on the probability of carrying out a M&A deal is the same when the acquirer is located, say, in Milan and the target in Naples, with respect to the case where the acquirer is located in Naples and the target in Milan. We thus provide an additional contribution by offering evidence on sizeable asymmetric effects for the geographical, industrial and institutional dimensions of proximity. We find evidence in Italy that proximities may generate asymmetric effects on M&A deals depending on the location of bidder and target and on whether some particular individual characteristics are featured by the acquirer or by the target firm.

The structure of the paper is as follows. In Section 2, we discuss the literature on proximities and M&A deals. In Section 3, we present the database on M&A deals in Italy. Section 4 introduces the empirical model and describes how the different measures of proximity are operationalized. Econometric issues are discussed in Section 5. The estimation results of the baseline model together with some robustness tests are presented in Section 6. In Section 7, we extend the model to deal with the issue of asymmetric effects of proximities. Section 8 concludes.

2. Symmetric and asymmetric proximities in M&A

M&A represent one of the most important tools available to implement firms' strategic goals, such as increasing market size, entering in new markets, lowering production costs and acquiring new competencies (Caves, 1982; Teece, 1982; Dunning, 1988; Helfat et al., 2007). There is a huge literature on the determinants of M&As, as well as an increasing number of studies on M&A partnering that adopt, either implicitly or explicitly, a proximity framework (e.g. Böckermann and Letho, 2006; Eun and Mukherjee, 2006; Grote and Umber, 2006; Schildt and Laamanen, 2006; Chakrabarti and Mitchell, 2013; Di Guardo et al., 2013; Ellwanger and Boschma, 2013).

Geographical proximity is considered as one of the most important driving forces behind M&A (e.g. Ragozzino, 2009; Ellwanger and Boschma, 2013). In M&A partnering, information is crucial not only for the identification of potential partners but also for the success of the due diligence process (Chakrabarti and Mitchell, 2013). The risk of adverse selection, i.e. the selection of a "bad" target, is more likely to be mitigated when potential partners are geographically close (Schildt and Laamanen, 2006). Firms also possess a cognitive bias towards their own local environment, or what Huberman (2001) called familiarity. While familiarity can be regarded as an

irrational or unconscious factor, bidders may also choose a proximate target rationally. In these cases, target search and identification explicitly involve a spatial element (Laulajainen, 1988). Strategic reasons to select a proximate target may be easing price competition (Levy and Reitzes, 1992), the possibility to share common assets after the acquisition, and the capacity to monitor and lower implementation costs (Böckerman and Lehto, 2006). Moreover, geographical proximity may also drive M&A when potential targets with a favored profile are spatially clustered. Therefore, we expect that bidders select targets that are geographically closer than the average target.

But geographical proximity is unlikely to be the main and sole driver of M&A. Apart from individual features of firms, other forms of proximity may also influence M&A partnering. The acquisition of a potential target involves a prolonged and costly search process, while bidders' managerial resources are clearly bounded by physical, cognitive and monetary constraints. Thus the acquirer obviously limits the extent of its potential targets according to several dimensions of proximity, geographical proximity being just one of those. The idea is that in the search process, the acquirer will evaluate only a very small proportion of the total population of potential targets, preferring, on average, those who are more proximate in terms of geographical location, technological relatedness, organizational resemblance and institutional factors.

Next to geographical proximity, the M&A literature has provided evidence that industrial or technological relatedness has a significant impact on partnering (see e.g. Ahuja and Katila, 2001; Schildt and Laamanen, 2006; Hussinger, 2010; Ellwanger and Boschma, 2013). The main reason to acquire a company from the same or a similar industry is the possibility to realize synergy effects. M&A research has extensively addressed the role of synergies that stems from related resources, such as similar products, technologies and resources (e.g. Chatterjee, 1986; Sirower, 1997; Seth et al., 2000; Homberg et al., 2009). If these resources are shared or efficiently combined, related acquisitions can benefit from economies of scope and scale. If companies can benefit from acquiring supplementary or complementary industries, partnering likelihood is expected to increase. If both firms are active within the same industry, their managers are more likely to know each other and to exchange information, which would affect the target identification phase (Chatterjee et al., 1992). During the due diligence phase, bidders have an advantage when assessing industrially related targets because its value can be more easily determined.

Other proximity dimensions have also been investigated in M&A studies. Social proximity, as embodied in directorship interlocks, has been reported as a key determinant of acquisition decisions, especially within regions where these social networks are more likely to occur (Okazaki and Sawada 2011). The effects of cultural and institutional proximity have also been taken up in M&A studies, but this concerns primarily international M&A deals across countries (Chapman,

2003). International acquisitions are influenced by differences in the institutional and cultural national frameworks, financial and exchange rates conditions, and prospects of entry in new foreign markets (Rossi and Volpin, 2004; Ragozzino, 2009; Di Guardo et al., 2013). Our paper focuses on domestic M&A instead, in order to assess the role of proximities within a more homogeneous national context. There are a number of studies on domestic M&A deals in Germany (Grote and Umber, 2006), Finland (Böckermann and Letho, 2006), the Netherlands (Ellwanger and Boschma, 2013) and the US chemical industry (Chakrabarti and Mitchell, 2013) that have generated valuable insights, especially on the role of geographical proximity. However, these studies on domestic M&A have accounted only for one or two proximities, and therefore, lack a comprehensive proximity framework as proposed by Boschma (2005). This is crucial, as some forms of proximity may act as substitutes or complements when explaining M&A partnering within one country.

In this proximity framework, there is a strong assumption that economic relationships are symmetric, as if the effect of proximity works equally in both directions. This seems to be at odds with economic reality, in which economic activities are unevenly distributed across space. In fact, economic reality shows that asymmetric forces shape the mobility of goods, people and knowledge across space, as is observable in unequal international trade, brain drain and unbalanced capital flows (Balland et al., 2012). M&A deals are no exception to that rule. If one looks at the inter-regional patterns of M&A deals, one can clearly observe a bias: some (mainly core) countries and regions are more active as acquirers, while other (mainly peripheral) countries and regions contain more targets of M&A deals. Overall, M&A activity reinforces core-periphery patterns, as high-level corporate functions and corporate control concentrate more in a number of core regions (see e.g. Markusen, 1985; Chapman, 2003; Rodríguez-Pose and Zademach, 2003). M&A activity in banking has also led to a huge increase in the spatial concentration of banking in a few financial centres (Colombo and Turati, 2012; Boschma and Hartog, 2013; Burgstaller, 2013).

In other words, the proximity framework so far has rendered the direction of these economic flows as almost irrelevant (Balland et al., 2012). Interestingly, this issue of asymmetry has been taken up in the International Business literature in a seminal paper by Shenkar (2001). Shenkar heavily criticized the use of the concept of cultural distance for creating an “illusion of symmetry”, or what Zaheer et al. (2012) referred to as “a concept without direction”. While in geographical space, the distance between A and B may be identical to the distance from B to A, this might not be the case when other dimensions of distance - like cultural or institutional distance - are considered. Shenkar (2001) pointed out that the cultural distance perceived by a Dutch firm investing in China is not the same distance faced by a Chinese firm investing in the Netherlands. In a study on expatriates, Selmer et al. (2007) concluded that German expatriates assigned to the US were better

adjusted than US expatriates assigned to Germany. Håkanson and Ambos (2010) argued that managers from a country with a well-defined regulatory environment and transparent governance structures experience huge difficulties in countries with weak formal institutions. By contrast, managers from countries with weak institutional structures may not experience the same difficulties in countries with more developed and transparent institutions that are easier to understand. Another example of asymmetry in the study by Håkanson and Ambos (2010) concerns the size of countries and their political and cultural influence. For instance, despite sharing the same language, Belgian newspapers and other media are more likely to report on developments in France than the other way around, which creates asymmetry in the perceived distance between the two countries.

In sum, the International Business literature clearly shows that the effects of proximity on economic relationships between territories cannot be studied regardless of direction. Having said that, in a very recent paper Shenkar (2012) concluded himself that there are still not too many empirical studies on asymmetry in the International Business literature. This is certainly true for the proximity literature in economic geography. And to our knowledge, this issue of asymmetric proximity has not been taken up, at least not explicitly, in studies on the geography of M&A flows. This paper will make a first attempt to explore in a proximity framework whether there is evidence of asymmetry when explaining domestic M&A deals in Italy.

3. The database on M&A deals in Italy

Data on M&A deals in Italy over the period 2000-2011 are retrieved from the databank SDC Platinum (Thomson Reuters) and the criteria for the data base selection are reported in Table 1. We started with 11,303 announced M&A deals in Italy, of which 44% involved a foreign firm which were excluded from the analyses. Among the remaining 6,367 domestic transactions, 19% have been eliminated because they were not completed over the period considered. Next, we have done an extensive search on the web to find the exact location of the bidder and target companies when this information was missing. In this way, we could identify the location of 1,427 out of 1,621 missing cases for the targets, and 859 out of 1,086 for the acquirers. Finally, we eliminated 468 deals in which the acquirer could not be individually identified, as was the case for creditors, investment groups, shareholders and undisclosed acquirers. After carrying out this procedure, we ended up with a total of 4,261 domestic M&A deals. These show an increasing trend until 2008 and a sharp decline afterwards, due to the worldwide crisis.

Looking at the geographical composition of the transactions, we found that the large majority of both acquirer and target firms are located in the North of Italy (Table 2), while less than 10% of the deals involve Southern companies. Interestingly, the share of Southern companies is

much higher when they act as target (8.8%), rather than bidder (4.9%), suggesting the existence of spatial asymmetric effects in the likelihood of carrying out a deal.

Table 3 shows the distribution of the bidder and target firms by status. Considering the acquirers, the most relevant group consists of private firms; the latter accounts for 41% of the total, followed by subsidiaries (31%) and listed companies (24%).¹ The picture slightly changes when we look at the targets: subsidiaries firms are more frequently acquired (43%), while listed firms are rarely involved in M&A deals as targets (8.6%). Considering the firms status it is also interesting to notice that around 55% are independent firms and that around 10% of them are foreign owned.²

The sectoral composition of the M&A transactions, based on the Standard Industrial Classification (SIC) divisions, is reported in Table 4. The largest number of acquisitions is performed by companies in the financial and insurance sector (37.5%), which can be largely explained by the important consolidation process carried out by the domestic banking system. A high share of acquisition is also reported by the manufacturing sector (24.8%). It is interesting to remark that the sectoral ranking is reversed when we look at the target side, with 22.7% and 30.9% of the firms operating in the finance and manufacturing sectors, respectively. A relevant share of deals is also reported in the transport and communication industry (16.7%) and in the personal and business services (18%).

These descriptive elements indicate substantial differences in the distribution of spatial, organizational and industrial features when comparing the set of acquiring firms with that of target firms. This points to possible asymmetric effects on the probability of accomplishing a deal depending on firm's location and on whether some individual characteristics are featured by the acquirer or by the target firm. This issue of asymmetry will be discussed in depth in Section 7.

4. The empirical model

Our aim is to assess the effect that geographical closeness, industrial relatedness, organisational and institutional similarity exert on the probability that any two Italian firms engage in a M&A deal. Thus, the general form of our empirical model is:

$$Prob(M\&A) = f(spatial, industrial, organizational, institutional proximities, firm's controls) \quad (1)$$

¹ According to the SDC definition, a company is *Private* when its shares are not traded on a public exchange market and when it is owned by individuals (or family) or has a parent company owning less than 50% of the assets. On the other hand, a *Subsidiary* is an entity with a parent company owning at least 50% of the assets, and it is not publicly traded on a stock exchange market.

² Since we are considering only companies located in Italy, we define a firm as *foreign owned* when its ultimate parent company (which should own at least 50% of the firm) is based in a country different from Italy.

In this section, we discuss the rationale for including the four dimensions of proximity, as well as describing in detail how they are operationalized. The complete lists of the variables along with their definitions are reported in the Appendix.

4.1 The dependent variable

The observational unit in our model is represented by dyads of firms. The dependent variable is constructed as a binary variable, which takes value 1 when an M&A deal was set up between any two companies and 0 when a pair of firms could have engaged in a deal but did not. We refer to the latter as “potential” pairs.

The set of potential pairs is constructed by considering as bidders only actual acquiring firms and as targets any target that was involved in deals completed one year before and up to one year after each actual deal. This three-year time window seems realistic given the span of the M&A decision process and adequate enough to ensure a sufficient number of observations. This criterion implies that the actual deals considered are those observed over the period 2001-2010, the information related to 2000 and to 2011 is used to identify the potential targets related to M&A occurred in 2001 and 2010, respectively. We thus analyse 3,574 real deals and around 3.8 million potential ones. Given the proportion of firm pairs actually involved in the transactions (0.094%), it is evident that M&A deals are rare events. Therefore, the econometric analysis is based on the logistic framework for rare events suggested by King and Zeng (2001, 2002), which is outlined in Section 5 along with the discussion on some relevant estimation issues.

4.2 Proximity dimensions

Geographical proximity. As discussed before, M&A deals may be affected by geographical closeness since it diminishes information asymmetries and thus reduces the transaction costs usually incurred to complete the deal. For each M&A deal, geographical proximity is measured by the inverse of the distance in kilometres (*Inv_dist*) between the locations of the bidder and target firms.

As an alternative, spatial closeness between firms has been also accounted for by constructing a set of five mutually exclusive dummy variables computed on the basis of the co-location of the bidder and target firms.³ More precisely, the dummy *ID_intra_city* takes value 1 if both firms are located in the same city; in such a case, the two companies are characterized by the highest degree of co-location, which is expected to increase the probability of engaging in a M&A. The dummy *ID_intra_lls* takes value 1 when the two firms are located in the same local labour system (LLS), while it is equal to 0 if they are located in different LLS or if they are co-locate at a

³ Italy is divided into 20 regions, 103 provinces, 686 LLS and 8101 municipalities.

lower spatial level (i.e. the municipality). Similarly, the dummies *ID_intra_prov* and *ID_intra_reg* take value 1 if the firms are located in the same province or region, respectively. Finally, the dummy *ID_inter_reg* takes value 1 when the bidder and target are located in different Italian regions, this set of cases represents the reference group in the estimation analysis; therefore the other dummies are expected to capture to what extent the probability of observing a M&A deal increases as the degree of co-location becomes closer.

In Table 5, we report the number of M&A deals for each hierarchical spatial scale identified by the set of dummies described above. We notice that almost 60% of total domestic deals in Italy takes place among firms located in different regions. Interestingly, the share of M&A completed among firms located in the same city (22%) appears also to be relevant.

Industrial proximity. As explained in Section 2, we expect that firms operating in the same sector or related sectors exhibit a higher probability of partnering in a M&A deal. Following Ellwanger and Boschma (2013), we construct five mutually exclusive binary variables to account for the degree of industrial proximity. They are computed on the basis of the primary economic activity reported in the SDC database at the 4-digit SIC code for both the bidder and the target.⁴ More precisely, the dummy *ID_intra_SIC4* takes value 1 if both the acquirer and the target firms operate in the same 4-digit SIC industry. The dummy *ID_intra_SIC3* takes value 1 when the highest degree of industrial relatedness is at the 3-digit SIC industry group and it is equal to 0 when the two firms operate in different Industry groups or are related at a finer industrial disaggregation (i.e. the SIC4 industry level). With the same procedure, we also computed the dummies *ID_intra_SIC2* and *ID_intra_SIC1* for the 2-digit SIC Major group and the 1-digit SIC Division, respectively. Finally, the dummy *ID_inter_SIC1* takes value 1 for the cases in which the companies involved in the M&A transaction operate in different divisions (i.e. conglomerate agreements); such cases identify the reference group for industrial relatedness.

Table 5 shows that firms pairs exhibiting the lowest degree of industrial relatedness are very frequent in the sample of actual deals (that is, 36.4% of the cases). As we have remarked in the previous section, such cases are very often represented by bidders operating in the financial services division that acquire manufacturing division targets. At the same time, it is interesting to notice that the group with the strongest sectoral affinity is rather common (35.9%), which is consistent with the on-going process of concentration of domestic market shares to exploit economies of scale.

Organisational proximity. The economic exchange among companies can be facilitated by the common membership to the same group or organization because it generates a shared set of

⁴ The Standard Industrial Classification is organized in 10 Divisions (1-digit classification), 83 Major groups (2-digit), 410 Industry groups (3-digit) and 965 Industries (4-digit).

rules, procedures, routines, which tend to reduce uncertainty and opportunistic behaviour among members (Kirat and Lung, 1999). As in Balland et al. (2013b), we measured organizational proximity by means of the dummy variable *ID_intra_group*, which is equal to 1 if the bidder and target firms have the same ultimate parent company, implying that they belong to the same corporate group. In our sample, this concerns only 11% of total actual M&A deals.

Institutional proximity. The probability that two firms perform an M&A deal can be also influenced by a common institutional background that reduces information asymmetries and transaction costs. Following Ponds et al. (2007), we proxy the institutional closeness by means of a dummy variable based on the status of the two companies. More specifically, the dummy *ID_status* takes value 1 if the two firms have the same institutional status (both listed on a stock exchange, or private, or subsidiaries, or government bodies). In our sample, this happens in 38% of the actual cases (see Table 5). As an alternative, we also computed two more specific measures of institutional closeness, *ID_listed* (3.8% of observed deals) and *ID_private* (21%), which takes value 1 when the bidder and target are both listed or both private companies, respectively.

4.3 Individual firms' characteristics

In our regression models, we also include a wide array of controls to account for various individual characteristics of the firms, which are likely to be correlated with the proximity measures discussed above. More specifically, for each firm we include information on its status, organization, ownership nationality, geographical location and main sector of activity. Regarding the status, we have computed four dummies to account for the firm being publicly traded on a stock exchange market or a private company (that is a company owned by a relatively small number of shareholders, often a family in Italy), or a subsidiary or a governmental organisation. We have also included a dummy taking value 1 when the bidder or the target is an independent firm (i.e. when the ultimate parent company corresponds with the company itself), and a dummy to account for foreign-owned companies. Regarding the location of each firm, we control for it by including dummies according to the firm being located in one of the three macro-areas of the country, the North, Centre or South of Italy. Finally, we included ten mutually exclusive dummies on the basis of the firm's main economic activity, as indicated by its 1-digit Division SIC code.

Following Mitchell and Shaver (2004) and Chakrabarti and Mitchell (2013), for acquiring firms, we also account for their previous experience in carrying out M&A transaction by including a dummy variable taking value 1 for bidders that were involved in deals completed in the three years preceding the focal acquisition. In our sample, nearly 28% of the acquirer firms exhibit such feature. Experiential learning may positively affect the success of the acquisition because it

improves the target selection capabilities of the acquirers as they become more skilful in gathering and processing information and in distinguishing among different types of acquisitions (Haleblian and Finkelsten, 1999).

5. Estimation issues

The analysis of the effects of proximities on the probability that two firms perform a M&A deal is carried out within the logistic framework for rare events. As stated above, this entails creating the dependent variable (Y) taking value 1 for pairs of firms (3,574) that actually completed the deals during the period 2001-2010 and 0 for dyads of firms (around 3.8 millions) that could have engaged in the transaction process but did not.

Comparing the high number of potential pairs with the one related to actual deals (0.094%), it is evident that firm acquisitions are rare events. When the number of zero observations is overwhelmingly larger than the positives, the logit model severely underestimates the probability of occurrences. Following King and Zeng (2001, 2002), we apply the choice-based or endogenous stratified sampling approach, which requires selecting all the observations for which $Y=1$ (the “cases”) and randomly (independently from the explanatory variables) selecting the observations for which $Y=0$ (“controls”). It is important to emphasize that selecting on the zeros permits to reduce data collection efforts because only a small part of such observations contribute to the information content of the explanatory variables. However, data selection based on Y induces bias and therefore it is necessary to apply the appropriate statistical corrections in order to obtain consistent and efficient estimators. The most applied ones are based on prior correction and on the weighting method, both of which require prior knowledge of the population proportion of positive observations.

In addition to bias induced by the endogenous stratified sampling, we have also to deal with another potential source of bias. This might be related to the sample selection of the actual M&A observations. The selection problem may arise because the decision to undertake a M&A deal as a mode of firm growth might be driven by the fact that the acquirer knows its proximate potential targets. In order to attenuate the possible selection bias, we apply the independence in conditional-mean approach by including in our models a wide range of firm’s characteristics (firm’s status, organization, foreign ownership, operating division and geographic location). Once we control for these individual firm features, we expect that the decision to select a specific target is independent of higher-level firm growth decisions.⁵

⁵ The same approach is adopted by Chakrabarti and Mitchell (2013).

The empirical specification for the probability of observing a M&A transaction is formalized on the basis of the cumulative logistic distribution as follows:

$$Prob(Y_{ij} = 1|X_{ij}, W_i, W_j) = \frac{1}{1+e^{-(X_{ij}\beta_1+W_i\beta_2+W_j\beta_3)}} \quad (2)$$

where Y_{ij} is the response variable taking value 1 if a deal was completed between acquirer i and target j and zero otherwise; the matrix X_{ij} includes the variables which measure inter-firm proximity along the geographical, industrial, organizational and institutional dimensions, discussed in the previous section. The individual control variables pertaining to the acquirer or the target firm are gathered in the W_i and W_j matrices.

Model (2) is estimated by performing the sequential procedure suggested in King and Zeng (2001) for selecting the zero observations.⁶ More specifically, we considered several random samples, by starting with the one with a proportion of 0.5 for the ones/zeros observations (i.e. each actual pair is matched with just a random control) up to the sample with the 0.1 proportion. Comparing the estimation results across the different sample sizes we noticed that we get no further efficiency gains, signalled by a reduction in the standard errors magnitude, for ones/zeros proportions smaller than 0.2 (i.e. 1 actual pair matched with 5 randomly drawn potential pairs). This was the case for both the prior correction and the weighting estimation method.⁷ For the same sample size, we found that overall the estimated coefficients did not differ substantially across the two alternative correction approaches, thus signalling the absence of any clear misspecification problem. We interpret this result in favour of our highly parameterized specification, which simultaneously accounts for four different proximity dimensions and for a wide set of firm characteristics that control for possible sources of heterogeneity.⁸ For these reasons, in the next section, we focus the discussion on the evidence provided by models based on the prior correction method, estimated on the sample of 1:5 actual:potential pairs (21,444 observations).

6. Empirical results

6.1 The baseline model

In column 1 of Table 6, we report our benchmark model, where only the geographic dimension of proximity is considered, while in column 2, we present our baseline model with the whole set of the

⁶ All estimations are carried out by the ReLogit software by Tomz et al. (1999).

⁷ For a thorough discussion on the correction methods refer to King and Zeng (2001).

⁸ Results on model comparisons across correction methods and different sample sizes are available from the authors upon request.

four different proximities.⁹ The comparison of these two specifications shows that, although geographic closeness is a fundamental determinant of M&A deals, it is by no means a substitute for the other proximities. As a matter of fact, while the coefficient of spatial nearness decreases slightly (from 0.257 in model 1 to 0.231 in model 2), all the other proximities exhibit the expected sign and are highly significant. Moreover, they contribute to increase the probability of observing a deal from 0.09% (model 1) to 0.13% (model 2). This indicates that proximities act as complements rather than substitutes, thus underlining the importance of simultaneously accounting for the multi-dimension notion of proximity, as recommended by French School of Proximity (Kirat and Lung, 1999; Torre and Gilly, 2000) and Boschma (2005). Our results on the complementary role played by proximities confirm previous evidence found for domestic M&A (Ellwanger and Boschma, 2013). These findings are also in line with contributions in other related fields, like in the case of regional knowledge spillovers (Basile et al., 2012; Paci et al., 2014), inter-firm knowledge flows (Autant-Bernard et al., 2007; Usai et al., 2013) and trade and FDI flows (Lankhuizen et al., 2011).

Focusing on the baseline specification (model 2), the increasing magnitude of the coefficients of the four indicators of industrial relatedness shows that the probability of completing an M&A deal is strongly dependent on the degree of industrial similarity between the bidder and the target firms. With respect to the reference group that includes the least related firms (those operating in different SIC divisions), the smallest coefficient (0.95) is found when the highest level of industrial relatedness is the division level (same 1-digit SIC code), whereas the largest coefficient (4.08) is found when both firms operate in the same industry (same 4-digit SIC code). This result highlights the crucial relevance for the pair of firms involved in the transaction of having a common productive and knowledge base in order to mitigate the costs associated with information asymmetries on one hand, and to exploit synergies and economies of scale on the other hand. Italian domestic M&A, like Dutch M&A (Ellwanger and Boschma, 2013), are more likely to be driven by motives related to consolidation and enlargement of their existing productive base, rather than by diversification purposes.

Organizational proximity, measured in terms of membership to the same group, is also found to be relevant in determining M&A deals (as in Balland et al., 2013b). Its significant coefficient is similar in magnitude (4.34) to the one associated with the highest degree of industrial relatedness. Belonging to the same corporate group – having common rules, procedures, routines and sharing the same firm’s culture – facilitates the accomplishment of the deals because search and transaction costs are largely reduced.

⁹ Although the discussion of the regression results is mainly focused on the set of proximities, note that all specifications include acquirer and target firms’ individual controls for status (listed, private, government), independent organization, foreign ownership, SIC1 division, geographic location (North, South Italy).

Finally, institutional proximity also impacts positively on M&A deals in the case of listed firms. It is worth highlighting that, differently from other contexts (Cassi and Plunket, 2012; Usai et al., 2013), in the case of Italian domestic M&A, it is not sufficient to share the same ownership status,¹⁰ as a positive effect is associated only to the case of the most-publicly available information case of firm pairs. This is plausible, as when both firms are listed, information asymmetries between bidder and target – and thus search and transaction costs – tend to be lower. Conversely, in the other extreme case, when they are both private, information asymmetries are at their highest level and thus have a detrimental effect on the probability of observing a M&A deal. It is worth noting that the estimated coefficient for listed firms is in absolute terms almost twice (0.41 vs. -0.24) the one related to private firms.

6.2 Robustness checks

Before discussing in detail the effects exerted by the different kinds of proximities, we assess whether our baseline model provides robust evidence with respect to alternative indicators for geographical proximity, additional controls and sub-period analysis.

We first consider accounting for geographic closeness in an alternative way. In model 3 of Table 6, in place of the inverse of the distance, we included the four mutually exclusive dummy variables measuring co-location of acquiring and target firms at the regional, provincial, LLS and municipality level.¹¹ All indicators are positively and highly significant, confirming that being proximate in space is crucial for engaging in M&A transactions. An aspect worth noting is that, differently from what we found for industrial relatedness, in the case of geographical proximity the magnitude of the coefficients is not an increasing function of geographical closeness. More specifically, the highest coefficient is found at the provincial level (1.5), followed by the municipality (1.2), LLS (0.91) and regional (0.752) level. This kind of nonlinearity in space may be due to the province being the spatial level where firms are most likely to accrue the benefits of becoming larger thanks to agglomeration effects. These, in turn, might be associated with localization economies given that, as discussed above, the Italian companies tend to prefer acquiring similar firms. The high coefficient associated with the municipality level confirms

¹⁰ We also estimated a model including the most comprehensive institutional proxy, i.e. the dummy variable *ID_status* taking value 1 when the two firms involved in the deal have the same institutional status (both listed, or private, or subsidiaries, or government bodies). However, it turned out to be not significant. We then considered the model including the dummies for each of the four possible status, but the two dummies related to both firms being subsidiaries or government bodies were not significant. For parsimony, we report and discuss the model which includes only the most informative and significant status indicators, i.e. those associated with both firms being listed or private.

¹¹ We have also tried to include together the inverse of the geographic distance and the four spatial dummies. However, the municipality and the LLS indicators turn out to be not significant; as they are the variables accounting for the highest proximity degree their effect is likely to have been absorbed by the continuous distance variable.

evidence provided in Ellwanger and Boschma (2013) on M&A being affected by the existence of home-bias effects, due to the fact that acquiring firms tend to prefer their most proximate potential targets, with which they are more familiar and better informed on.

It is worth noting that the estimates of all the other coefficients are extremely robust with respect to the inclusion of the four spatial indicators instead of the continuous inverse distance variable. In model 3, the estimate probability is slightly smaller (0.12%) with respect to the baseline model (0.13%).

Column 4 of Table 6 reports the baseline model (2) augmented by the acquirer's experience in doing M&A deals in the past. We considered the period of the three years preceding the focal acquisition. Although the other coefficients remain mainly unchanged, the new variable is not significant at conventional levels; this was also the case when, for further robustness, we also considered a longer period of five years. Although acquiring experience is expected to facilitate the occurrence of the deals, its irrelevance in empirical studies has already been documented (Chakrabarti and Mitchell, 2013). Though it remains to some extent an unexpected result, it may be consistent – at least for the time span considered – with M&A being indeed rare events, so that firms that have already been engaged in such transactions in the past are not more likely to be involved again in the future. This issue is certainly important and requires further investigation.

Finally, we subject our baseline model to a further check of robustness by carrying out a sub-sample analysis. As discussed in Section 2, the number of completed deals exhibits an increasing trend until 2008 and a sharp decline afterwards, probably as a result of the worldwide economic crisis. To check whether the financial downturn occurred in the last two years of our sample might have affected the probability of observing domestic M&A in Italy, we split the sample in two sub-periods, 2001-2008 and 2009-10, and re-estimated the model in each sub-sample. The results are reported in the last two columns of Table 6. In general, the magnitude of coefficients does not change considerably across the two sub-periods and with respect to the baseline model, with the exception of institutional proximity, for which both status indicators are not significant in the second sub-period. Comparing the estimated probability, it turns out to be higher than the baseline one in the first sub-period, but smaller in the 2009-10 years. To test for the statistical significance of such differences, we carried out a Likelihood-Ratio test entailing model 2 under the null hypothesis and models 5 and 6 under the alternative hypothesis. It returned a value of 36.2 (p-value 0.642), which favouring model 2 allows us to rule out a significant structural change occurring in 2008.

On the basis of evidence discussed above, we can cautiously conclude that the results reported for the baseline model are quite robust. Therefore, in the next section, we present the proximities effects computed on the basis of model 2.

6.3 *Effects of proximities*

In this section, we discuss what the estimation of our baseline model implies in terms of how changes in the different proximity dimensions affect the probability of observing a domestic M&A deal in Italy. Therefore, we measure the increase in the estimated conditional probability for a given change in each explanatory variable in turn, keeping the other independent variables and the controls at their median values. Unless otherwise stated, such a change is considered with respect to the median value and it is equal to one standard deviation. This amounts to hypothesize what would happen if a given proximity indicator was one standard deviation higher for the whole sample.

Table 7 reports the results obtained with respect to the baseline model (model 2 in Table 6) and, just for the spatial binary variables, with respect to model 3. We recall that, when median values are attributed to all variables, model 2 yielded an estimated probability of observing a deal equal to 0.13%. The most remarkable result is that the largest effect on probability is associated with the highest degree of industrial relatedness *ID_intra_SIC4* which shows an expected percentage increase equal to 188% with respect to the baseline probability. All the other industrial proximities indicators yield sizeable probability increases, 43% for relatedness at the division level, 50% at the major group level, and 37% at the industry group level.

Effects induced by geographical proximity produce less remarkable enhancements in probability when compared to those caused by industrial affinity. Decreasing the geographical distance between the acquirer and the target firm by one standard deviation (approximately 230 km) increases the probability by 15% with respect to the baseline case. Similar effects are found for the spatial co-location indicators related to the provincial and the LLS territorial level. Among the geographical variables, the greatest contribution to probability is given by the municipality indicator (41%), confirming that proximity in space is very effective at very short distances.

A much more effective role is found to be played by organizational proximity, which may yield a percentage change in probability as high as 81%. This is the second most sizeable effect after industrial relatedness at the same industry level. This result confirms the crucial influence of membership and of sharing the same organizational rules on corporate decisions. On the contrary, institutional proximity plays a limited role. The both-listed indicator contributes to the increase of the baseline probability by a mere 6%, while a decrease of 9% is associated with the both-private indicator. This result is due to the fact that when the deals involve two private companies, the

search and the due diligence stages are very costly (Shen and Reuer, 2005), because information on the target is scarce and often opaque, difficult to obtain and to process. We recall that in our sample, 21% of actual deals occurred between private firms, while just 4% between the much more transparent listed companies.

7. Testing for asymmetric effects

Inspired by the management literature (Shenkar, 2001; 2012; Zaheer et al., 2012), we now assess whether proximity may have asymmetric effects on the response variable due to the relative position of the acquiring or target firm in the different proximities space. To clarify the matter, we start considering geographical proximity. The hypothesis we aim to test is that the relative firms' location may determine a different effect of geographical proximity, notwithstanding the fact that, obviously, geographical distance between the bidder and target firms is the same in both directions.

As exemplified in the introduction, geographical proximity may have a different effect for two deals occurring between two firms at the same distance, but in one case the acquirer is located in the North of Italy (say, Milan) and the target in the South (say, Naples), while in the second deal the two locations are switched. This issue is analysed by augmenting model 2 of Table 6 with two additional dummy variables. The first one (*ID_An_Ts*) assumes value 1 when the acquirer is in the Northern part of the country and the target is in the Southern part, while the second dummy (*ID_As_Tn*) takes value 1 in the opposite case. Our *a priori* expectation is that the first case should be associated with a higher probability of observing a deal. This stems from considering that in Italy Northern firms are on average larger, more innovative, more involved in dynamic and foreign contexts, and better endowed with financial assets. However, the results reported in the first column of Table 8 confute such an expectation. A negative and significant coefficient is associated with the *ID_An_Ts* dummy, while the second dummy is not significant indicating that the related case is not remarkably different from average behaviour.

This result may be explained by considering the role played by social and institutional distances in affecting inter-firm economic exchange (Habib and Zurawicki, 2002; Bénassy-Quéré et al., 2007; Hyun and Kim, 2010). Indeed, in the models discussed so far, due to lack of data, we could not include an indicator for social proximity between two firms. Social proximity here refers to having in common social capital, in its most general notion – strong ties, shared norms and trust – which is expected to reduce opportunistic behaviour and to facilitate coordination among actors (Knack and Keefer, 1997). Mostly important for the case of Italy, we are not controlling for the quality of institutions in the origin and destination regions. In the case of Italy, a vast empirical literature has documented the significant lower endowment of social capital in the South which is

systematically associated with lower economic outcomes, a more fragile civil environment and a lower quality of local institutions with respect to the Northern part of the country (Daniele and Marani, 2011; De Blasio and Nuzzo, 2010; Di Liberto and Sideri, 2011). Therefore, our indicator *ID_An_Ts* is reasonably capturing the lack of social proximity between companies and institutional distance between regions. For a Northern acquiring company, it is much more costly to target a Southern firm, because of low law enforcement, higher crime rates, inefficient and highly bureaucratic local government bodies, information transmitted through informal channels that only local actors know to access. It is worth noting that, according to our results, the benefits of being a better-endowed Northern company are not sufficient to counterbalance the negative aspects of operating in the South and, therefore, there is a lower probability to observe a completed M&A deal between a Northern acquirer and a Southern target.

In the second model of Table 8, we investigate a different source of asymmetries, in this case related to the industrial dimension. More specifically, we focus on the subset of deals in which the acquirer operates in the finance SIC division and the target in the manufacturing one, and the subset of deals in which the operating divisions are switched between bidder and target. We thus augment the baseline model with the corresponding dummy variables, analogously to what we did in the previous model for geographical proximity. With respect to the baseline case, the results indicate that it is significantly more likely that a finance firm acquires a manufacturing firm (coefficient estimated in 0.80), than the other way round (-0.83). This result is line with *a priori* expectations on the diversification aims that motivate acquisitions carried out by financial firms.

Finally, in the last column of Table 8, we report the model estimated to analyse possible asymmetries related to the status of the firms involved in the deal. Our results indicate that the probability is significantly higher (coefficient estimated in 0.79) when we consider the cases in which the acquirer is private and the target is a listed firm. The opposite cases (listed targets and private acquirers) do not depart significantly from the average behaviour. Our results confirm the crucial importance of publicly available information for selecting the target firm. As already discussed when reporting on the role of institutional proximity for the baseline model, the evidence on asymmetric status effects allows us to reaffirm that when firms are large and listed, more information on the organization and its performance are publicly available. This tends to increase the odds of carrying out a completed acquisition (Capron and Shen, 2007).

8. Conclusions

This paper investigated the effect of a comprehensive set of proximities – geographical, industrial, organizational and institutional – on the probability that any two firms located in Italy engage in a

M&A deal. Within a logistic rare event framework, we investigated 4,261 actual M&A deals completed over the period 2000-2011 and around 3.8 million potential M&A deals. The first main finding was that all proximity dimensions (geographical, industrial, organizational and institutional) had a positive effect on the probability of closing domestic M&A deals: the probability of an acquisition is positively influenced by all dimensions of proximity between bidder and target firms, but especially industrial relatedness. This finding also implies that geographical proximity is an important driver of M&A partnering, even after controlling for other forms of proximity.

The second main finding was that we found evidence of the asymmetric nature of proximity for its industrial, organisational and geographical dimensions: it was significantly more likely that a finance firm acquired a manufacturing firm than the other way around, the probability of making a M&A deal was significantly higher when the acquirer is private and the target is a listed firm than *vice versa*, and we found a lower probability of M&A deals between Northern acquirers and Southern targets. This latter finding of asymmetry may be attributed to the well-known institutional distance between the North and South of Italy where institutions are weak. These findings on asymmetry show that the effects of proximity cannot be investigated regardless of direction, an issue to which the proximity literature has drawn little to no attention so far.

This paper has explored from a proximity perspective whether there is evidence of asymmetry when explaining domestic M&A deals in Italy. The findings call for further investigations. First, we need more thorough theoretical explanations for why we expect particular asymmetric relations to occur, as this will clearly enrich our understanding of how proximities impact on economic relationships and regional development (see Balland et al., 2012). Second, we are in need of more empirical studies on M&A and other types of economic interactions that test systematically for these asymmetric effects. This would mean a next important step in the further development and refinement of the proximity approach in economic geography.

References

- Ahuja, G., Katila, R. (2001) Technological Acquisitions and the Innovation Performance of Acquiring Firms: A Longitudinal Study. *Strategic Management Journal*, 22: 197-220.
- Autant-Bernard, C., Billand, P., Frachisse, D., Massard, N. (2007) Social distance versus spatial distance in R&D cooperation: Empirical evidence from European collaboration choices in micro and nanotechnologies. *Papers in Regional Science*, 86: 495-519.
- Balland, P.A., Boschma, R., Frenken, K. (2012), On the asymmetric nature of proximity: Sources and consequences for knowledge dynamics, mimeo, Utrecht University.

- Balland, P.A., Boschma, R., Frenken, K. (2013a) Proximity and innovation networks: an evolutionary approach. In P. Cooke (ed.) *Re-framing Regional Development: Evolution, Innovation and Transition*. New York, NY: Routledge.
- Balland, P.A., de Vaan, M., Boschma, R. (2013b) The dynamics of interfirm networks along the industry life cycle: The case of the global video game industry, 1987-2007. *Journal of Economic Geography*, 13: 741-765.
- Basile, R., Capello, R., Caragliu, A. (2012) Technological interdependence and regional growth in Europe: Proximity and synergy in knowledge spillovers. *Papers in Regional Science*, 91: 697-722.
- Bénassy-Quéré, A., Coupet, M., Mayer, T. (2007) Institutional Determinants of Foreign Direct Investment. *The World Economy*, 30: 764-782.
- Böckerman, P., Letho, E. (2006) Geography of Domestic Merger and Acquisitions (M&As): Evidence from Matched Firm-level Data. *Regional Studies*, 40: 847-860.
- Boschma, R. (2005) Proximity and Innovation: A Critical Assessment. *Regional Studies*, 39: 61-74.
- Boschma, R., Frenken, K. (2010) The spatial evolution of innovation networks. A proximity perspective, in: R. Boschma and R. Martin (eds.) *The Handbook of Evolutionary Economic Geography*, Cheltenham: Edward Elgar.
- Boschma, R., Hartog, M. (2013) Merger and acquisition activity as driver of spatial clustering: the spatial evolution of the Dutch banking industry, 1850-1993, *Papers in Evolutionary Economic Geography*, no. 13.15, Utrecht University.
- Broekel, T., Boschma, R. (2012), Knowledge networks in the Dutch aviation industry: the proximity paradox. *Journal of Economic Geography*, 12: 409-433.
- Burgstaller, J. (2013) Bank office outreach, structure and performance in regional banking markets. *Regional Studies* 47: 1131-1155.
- Capron, L., Shen, J.C. (2007) Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal*, 28: 891-911.
- Cassi, L., Plunket, A. (2012) Research collaboration in co-inventor networks: combining closure, bridging and proximities. *MPRA working paper* n. 39481.
- Caves, R. (1982) *Multinational Enterprise and Economic Analysis*. Cambridge, UK: Cambridge University Press.
- Chakrabarti, A., Mitchell W. (2013) The Persistent Effect of Geographic Distance in Acquisition Target Selection, *Organization Science*, online before print, doi: 10.1287/orsc.1120.0811.
- Chapman, K. (2003) Cross-border mergers/acquisitions. A review and research agenda. *Journal of Economic Geography*, 3: 309-334.
- Chatterjee, S. (1986) Types of Synergy and Economic Value: The Impact of Acquisitions on Merging and Rival Firms. *Strategic Management Journal*, 7: 119-139.
- Chatterjee, S., Lubatkin, M. H., Schweiger, D. M., Weber, Y. (1992) Cultural Differences and Shareholder Value in Related Mergers: Linking Equity and Human Capital. *Strategic Management Journal*, 13: 319-334.
- Colombo, L.V.A, Turati, G. (2012) Why do acquiring banks in mergers concentrate in well-developed areas? Regional development and mergers and acquisition (M&As) in banking. *Regional Studies*, DOI: 10.1080/00343404.2011.65337.

- Daniele, V., Marani, U. (2011) Organized crime, the quality of local institutions and FDI in Italy: a panel data analysis. *European Journal of Political Economy*, 27: 132-142.
- De Blasio, G., Nuzzo, G. (2010) Historical traditions of civicness and local economic development. *Journal of Regional Science*, 50: 833-857.
- Di Guardo, M.C., Marrocu, E., Paci, R. (2013) The concurrent impact of cultural, political and spatial distances on international Mergers & Acquisitions. *Working Paper CRENoS* 2013/08.
- Di Liberto, A., Sideri, M. (2011) Past dominations, current institutions and the Italian regional economic performance, *Working paper CRENoS*, 2011/15.
- Dunning, J.H. (1988) The eclectic paradigm of international production: a restatement and some possible extensions. *Journal of International Business Studies*, 19: 1-31.
- Ellwanger, N., Boschma, R. (2013) Who acquires whom? The role of geographical proximity and industrial relatedness in Dutch domestic M&As between 2002 and 2008, *Papers in Evolutionary Economic Geography*, no. 18, Utrecht University.
- Eun, C.S., Mukherjee S. (2006) The Geography of M&A: Contours and Causes. *Working Paper*: 1-49.
- Grote, M.H., Umber, M.P. (2006) Home biased? A spatial analysis of the domestic merging behavior of US firms. Working paper series / Johann-Wolfgang-Goethe-Universität Frankfurt am Main, Fachbereich Wirtschaftswissenschaften: Finance & Accounting, No. 161, <http://hdl.handle.net/10419/23427>.
- Habib, M., Zurawicki, L. (2002) Corruption and foreign direct investment. *Journal of International Business Studies*, 33: 291-307.
- Håkanson, L., Ambos, B. (2010) The antecedents of psychic distance. *Journal of International Management*, 16: 195-210.
- Haleblian, J., Finkelstein, S. (1999) The influence of Organizational acquisition experience on acquisition performance: A behavioral perspective. *Administrative Science Quarterly*, 44: 29-56.
- Helfat, C., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., Winter, S. (2007) *Dynamic capabilities: Understanding strategic change in organizations*. Malden, MA: Blackwell Publishing.
- Homberg, F., Rost, K., Osterloh, M. (2009) Do synergies exist in related acquisitions? A meta-analysis of acquisition studies. *Review of Management Science*, 3: 75-116.
- Huberman, G. (2001) Familiarity Breeds Investment. *The Review of Financial Studies*, 14: 659-680.
- Hyun, H.J., Kim, H.H. (2010) The Determinants of Cross-Border M&As: The Role of Institutions and Financial Development in the Gravity Model. *The World Economy*, 33: 292-310.
- King, G., Zeng, L. (2001) Logistic regression in rare events data. *Political Analysis*, 9: 137-163.
- King, G., Zeng, L. (2002) Estimating risk and rate levels, ratios and differences in case-control studies. *Statistics in Medicine*, 21: 1409-1427.
- Kirat, T., Lung, Y. (1999) Innovation and proximity - Territories as loci of collective learning processes. *European Urban and Regional Studies*, 6: 27-38.
- Knack, S., Keefer, P. (1997) Does Social Capital have an Economic Payoff? A Cross-Country Investigation. *Quarterly Journal of Economics*, 112: 1251-88.

- Lankhuizen, M., de Groot, H.L.F., Linders, G-J.M. (2011) The Trade-Off between Foreign Direct Investments and Exports: The Role of Multiple Dimensions of Distance. *The World Economy*, 34: 1395-1416.
- Laulajainen, R. (1988) The Spatial Dimension of an Acquisition. *Economic Geography*, 64: 171-187.
- Levy, D. T., Reitzes, J. D. (1992) Anticompetitive Effects of Mergers in Markets with Localized Competition. *Journal of Law, Economics & Organization*, 8: 427-440.
- Markusen, A. (1985) *Profit Cycles, Oligopoly and Regional Development*. Cambridge, MA: MIT Press.
- Mitchell, W., Shaver, J.M. (2004) Who buys what? How integration capability affects acquisition incidence and target choice. *Strategic Organization*, 1: 171-201.
- Okazaki, T., Sawada, M. (2011) Interbank networks in prewar Japan: structure and implications. *Industrial and Corporate Change*, 21: 463-506.
- Paci, R., Marrocu, E., Usai, S. (2014) The complementary effects of proximity dimensions on knowledge spillovers, forthcoming in *Spatial Economic Analysis*.
- Ponds, R., van Oort, F., Frenken, K. (2007) The geographical and institutional proximity of research collaboration. *Papers in Regional Science*, 86: 423-444.
- Ragozzino, R. (2009) The effects of geographic distance on the foreign acquisition activity of US firms. *Management International Review*, 49: 509-535.
- Rallet, A., Torre, A. (1999) Is geographical proximity necessary in the innovation networks in the era of global economy?. *Geojournal*, 49: 373-380.
- Rodríguez-Pose, A., Zademach, H.M. (2003) Rising metropoli: the geography of mergers and acquisitions in Germany. *Urban Studies*, 40: 1895-1923.
- Rossi, S., Volpin, P. (2004) Cross-country Determinants of Mergers and Acquisitions. *Journal of Financial Economics*, 74: 277-304.
- Schildt, H.A., Laamanen, T. (2006) Who buys whom: information environments and organizational boundary spanning through acquisitions. *Strategic Organization* 4: 111-133.
- Selmer, J., Chiu, R., Shenkar, O. (2007) Cultural distance asymmetry in expatriate adjustment. *Cross Cultural Management*, 14: 150-160.
- Seth, A., Song K. P., Pettit, R. (2000) Synergy, Managerialism or Hubris? An Empirical Examination of Motives for Foreign Acquisitions of U.S. Firms. *Journal of International Business Studies*, 31: 387-408.
- Shen, J.C., Reuer, J. (2005) Adverse selection in acquisitions of small manufacturing firms: a comparison of public with private targets. *Small Business Economics*, 24: 393-407.
- Shenkar, O. (2001) Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *Journal of International Business Studies*, 32: 519-535.
- Shenkar, O. (2012) Beyond cultural distance: Switching to a friction lens in the study of cultural differences. *Journal of International Business Studies*, 43: 12-17.
- Sirower, M. L. (1997) *The Synergy Trap: How Companies Lose the Acquisition Game*. New York: The Free Press.
- Teece, D. (1982) Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization*, 3: 39-63.

- Ter Wal, A. (2013) The dynamics of the inventor network in German biotechnology: geographic proximity versus triadic closure. *Journal of Economic Geography*, forthcoming, doi: 10.1093/jeg/lbs063
- Tomz, M., King G., Zeng, L. (1999) RELOGIT: Rare Events Logistic Regression, Version 1.1 Cambridge, MA: Harvard University, October 1, <http://gking.harvard.edu>.
- Torre, A., Gilly, J.P. (2000) On the analytical dimension of proximity dynamics. *Regional Studies*, 34: 169-180.
- Usai, S., Marrocu, E., Paci, R. (2013) Networks, proximities and inter-firm knowledge flows, *Working Paper CRENoS* 2013/11.
- Zaheer, S., Schomaker, M.S., Nachum, L. (2012) Distance without Direction: Restoring Credibility to a Much-Loved Construct. *Journal of International Business Studies*, 43: 18-27.

Appendix. Variable definitions

Dependent variable

Y dummy = 1 if the two firms have completed a domestic M&A; = 0 otherwise

Interaction dummies between acquirer and target firm in each M&A deal

Spatial proximity

Inv_dist inverse of the distance in km between partners cities (log)
 ID_intra_city dummy = 1 if the highest degree of co-location is the city
 ID_intra_lls dummy = 1 if the highest degree of co-location is the local labour system
 ID_intra_prov dummy = 1 if the highest degree of co-location is the province
 ID_intra_reg dummy = 1 if the highest degree of co-location is the region
 ID_inter_reg dummy = 1 if are located in different regions

Technological proximity

ID_intra_SIC4 dummy = 1 if the highest degree of industrial relatedness is at SIC4
 ID_intra_SIC3 dummy = 1 if the highest degree of industrial relatedness is at SIC3
 ID_intra_SIC2 dummy = 1 if the highest degree of industrial relatedness is at SIC2
 ID_intra_SIC1 dummy = 1 if the highest degree of industrial relatedness is at SIC1
 ID_inter_SIC1 dummy = 1 if they operate in different divisions

Organisational proximity

ID_intra_group dummy = 1 if acquirer and target have the same ultimate parent company

Institutional proximity

ID_status dummy = 1 if acquirer and target have the same institutional status
 ID_listed dummy = 1 if acquirer and target are listed companies
 ID_private dummy = 1 if acquirer and target are private firms

Asymmetric interaction dummies between acquirer and target firm in each M&A deal

ID_An_Ts dummy = 1 if acquirer is located in the north and target in the south
 ID_As_Tn dummy = 1 if acquirer is located in the south and target in the north
 ID_Alis_Tpriv dummy = 1 if acquirer is listed and target is private
 ID_Apriv_Tlis dummy = 1 if acquirer is private and target is listed
 ID_Afin_Tman dummy = 1 if acquirer is in finance and target is in manufacturing
 ID_Aman_Tfin dummy = 1 if acquirer is in manufacturing and target is in finance

Acquirer experience

D_A_exp3 dummy = 1 if the acquirer has done other deals in the previous three years

Dummies for individual characteristics of acquirer or target firm

D_listed firm status is listed in the stock exchange
 D_private firm status is private
 D_government firm status is governmental organisation
 D_subsidary firm status is subsidiary
 D_indep firm is independent
 D_fo firm is foreign owned
 D_north firm is located in northern Italy
 D_centre firm is located in central Italy
 D_south firm is located in southern Italy
 D_division 1 - 10 firm economic activity in 10 divisions (see Table 4 for the list)

Source : Own calculations on SDC Platinum data (Thomson Reuters)

Table 1. M&A sampling criteria, 2000-2011

| | |
|------------------------------|-------|
| Total M&A announced in Italy | 11303 |
| international | 4936 |
| domestic | 6367 |
| domestic uncompleted | 1217 |
| domestic completed | 5150 |
| minus missing target city | 194 |
| minus missing acquirer city | 227 |
| minus undefined acquirer | 468 |
| M&A considered | 4261 |
| year 2000 | 363 |
| year 2001 | 349 |
| year 2002 | 213 |
| year 2003 | 319 |
| year 2004 | 285 |
| year 2005 | 396 |
| year 2006 | 396 |
| year 2007 | 407 |
| year 2008 | 464 |
| year 2009 | 386 |
| year 2010 | 359 |
| year 2011 | 324 |

Table 2. M&A deals per firms spatial location

| | Acquirer | | Target | |
|--------|----------|-------|--------|-------|
| | num. | % | num. | % |
| North | 3237 | 76.0 | 3035 | 71.2 |
| Centre | 814 | 19.1 | 852 | 20.0 |
| South | 210 | 4.9 | 374 | 8.8 |
| Total | 4261 | 100.0 | 4261 | 100.0 |

Table 3. M&A deals per firms status

| | Acquirer | | Target | |
|---------------|----------|-------|--------|-------|
| | num. | % | num. | % |
| Private | 1753 | 41.1 | 1944 | 45.6 |
| Subsidiary | 1346 | 31.6 | 1847 | 43.3 |
| Listed | 1050 | 24.6 | 367 | 8.6 |
| Government | 60 | 1.4 | 27 | 0.6 |
| Joint Venture | 52 | 1.2 | 76 | 1.8 |
| Total | 4261 | 100.0 | 4261 | 100.0 |

Note: private include also investors

Table 4. M&A deals per SIC division

| | Acquirer | | Target | |
|--|----------|-------|--------|-------|
| | num. | % | num. | % |
| A Agriculture | 16 | 0.4 | 16 | 0.4 |
| B Mining | 26 | 0.6 | 29 | 0.7 |
| C Construction | 85 | 2.0 | 77 | 1.8 |
| D Manufacturing | 1055 | 24.8 | 1317 | 30.9 |
| E Transp., Comm., Energy, Sanitary Serv. | 621 | 14.6 | 711 | 16.7 |
| F Wholesale Trade | 95 | 2.2 | 124 | 2.9 |
| G Retail Trade | 194 | 4.6 | 236 | 5.5 |
| H Finance, Insurance, Real Estate | 1597 | 37.5 | 969 | 22.7 |
| I Services (personal and business) | 542 | 12.7 | 768 | 18.0 |
| J Public Administration | 30 | 0.7 | 14 | 0.3 |
| Total | 4261 | 100.0 | 4261 | 100.0 |

Table 5. M&A deals for Acquirer-Target interaction dummies

| Variable | num. | % |
|---------------------------------|------|------|
| <i>Spatial proximity</i> | | |
| ID_intra_city | 934 | 21.9 |
| ID_intra_lls | 208 | 4.9 |
| ID_intra_prov | 119 | 2.8 |
| ID_intra_reg | 489 | 11.5 |
| ID_inter_reg | 2511 | 58.9 |
| <i>Technological proximity</i> | | |
| ID_intra_SIC4 | 1528 | 35.9 |
| ID_intra_SIC3 | 183 | 4.3 |
| ID_intra_SIC2 | 329 | 7.7 |
| ID_intra_SIC1 | 671 | 15.7 |
| ID_inter_SIC1 | 1550 | 36.4 |
| <i>Organisational proximity</i> | | |
| ID_intra_group | 468 | 11.0 |
| <i>Institutional proximity</i> | | |
| ID_same_status | 1631 | 38.3 |
| ID_listed | 164 | 3.8 |
| ID_private | 899 | 21.1 |
| <i>Acquirer experience</i> | | |
| D_A_exp_3y | 1182 | 27.7 |
| D_A_exp_5y | 1288 | 30.2 |

See Appendix for the definitions of the variables

Table 6. Determinants of the probability of M&A deals, baseline model and robustness

Logit models - prior correction for rare events

| | 1 | 2 | 3 | 4 | 5 | 6 |
|--|----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|
| | 2001-10 | 2001-10 | 2001-10 | 2003-10 | 2001-08 | 2009-10 |
| <i>Spatial proximity</i> | | | | | | |
| geographic distance (inverse) | 0.257 *** (0.009) | 0.231 *** (0.012) | | 0.245 *** (0.013) | 0.226 *** (0.013) | 0.256 *** (0.027) |
| same region | | | 0.752 *** (0.076) | | | |
| same province | | | 1.480 *** (0.161) | | | |
| same local labour system | | | 0.909 *** (0.117) | | | |
| same city | | | 1.213 *** (0.070) | | | |
| <i>Technological proximity</i> | | | | | | |
| same division (SIC1) | | 0.949 *** (0.065) | 0.948 *** (0.064) | 0.879 *** (0.072) | 0.932 *** (0.071) | 1.050 *** (0.152) |
| same major group (SIC2) | | 2.356 *** (0.095) | 2.349 *** (0.095) | 2.292 *** (0.105) | 2.394 *** (0.104) | 2.172 *** (0.244) |
| same industry group (SIC3) | | 2.827 *** (0.140) | 2.851 *** (0.140) | 2.939 *** (0.157) | 2.821 *** (0.152) | 2.776 *** (0.349) |
| same industry (SIC4) | | 4.083 *** (0.078) | 4.079 *** (0.078) | 4.218 *** (0.087) | 3.989 *** (0.086) | 4.464 *** (0.186) |
| <i>Organisational proximity</i> | | | | | | |
| same group | | 4.338 *** (0.253) | 4.307 *** (0.254) | 4.482 *** (0.285) | 4.242 *** (0.261) | 4.958 *** (1.114) |
| <i>Institutional proximity</i> | | | | | | |
| both listed | | 0.423 ** (0.197) | 0.412 ** (0.196) | 0.491 ** (0.228) | 0.555 *** (0.214) | 0.009 (0.531) |
| both private | | -0.240 *** (0.093) | -0.237 *** (0.093) | -0.189 * (0.102) | -0.312 *** (0.104) | 0.031 (0.211) |
| <i>Acquirer's previous experience - 3 years</i> | | | | | | |
| | | | | -0.030 (0.059) | | |
| Estimated probability $Y=1 X$ at median values (%) | 0.09 | 0.13 | 0.12 | 0.15 | 0.15 | 0.10 |
| Observations | 21444 | 21444 | 21444 | 18072 | 16974 | 4470 |

See Appendix for the definitions of the variables

Proportion of ones:zeros observations equal to 1:5

All models include a constant and acquirer and target individual controls for status (listed, private, government), independent organization, foreign ownership, SIC1 division, geographic location (North, South Italy)

Geographic distance is log-transformed

Robust standard errors in parenthesis. Significance level *** 1%, ** 5%, *10%

Table 7. Effects of proximities on the probability of M&A deals

All changes are equal to one standard deviation and are measured with respect to the median values

| From Model 2 Table 6: Prob (Y=1 X)=0.00127 | standard deviation | absolute effect | percentage change in probability |
|---|-------------------------------|----------------------------|---|
| <i>Spatial proximity</i> | | | |
| geographic distance | 230.2 | 0.00019 | 15.0 |
| same region* | 0.277 | 0.00027 | 21.3 |
| same province* | 0.108 | 0.00020 | 15.7 |
| same local labour system* | 0.170 | 0.00019 | 15.0 |
| same city* | 0.306 | 0.00052 | 40.9 |
| <i>Technological proximity</i> | | | |
| same division (SIC1) | 0.378 | 0.00055 | 43.3 |
| same major group (SIC2) | 0.173 | 0.00064 | 50.4 |
| same industry group (SIC3) | 0.112 | 0.00047 | 37.0 |
| same industry (SIC4) | 0.260 | 0.00239 | 188.2 |
| <i>Organisational proximity</i> | | | |
| same group | 0.137 | 0.00103 | 81.1 |
| <i>Institutional proximity</i> | | | |
| both listed | 0.145 | 0.00008 | 6.3 |
| both private | 0.412 | -0.00012 | -9.4 |

All effects are calculated by the Bayesian method and are significant at the 5% significance level

Proportion of ones:zeros observations equal to 1:5

* The effect is calculated on the basis of Model 3 in Table 6

Table 8. The asymmetric effect of proximities on the probability of M&A deals

Logit models - prior correction for rare events

| | 1 | 2 | 3 |
|--|-----------------------|-----------------------|----------------------|
| <i>Spatial proximity</i> | | | |
| geographic distance (inverse) | 0.227 *** (0.012) | 0.231 *** (0.012) | 0.231 *** (0.012) |
| <i>Technological proximity</i> | | | |
| same division (SIC1) | 0.948 *** (0.065) | 1.005 *** (0.069) | 0.948 *** (0.065) |
| same major group (SIC2) | 2.351 *** (0.095) | 2.385 *** (0.097) | 2.358 *** (0.095) |
| same industry group (SIC3) | 2.828 *** (0.140) | 2.842 *** (0.142) | 2.833 *** (0.140) |
| same industry (SIC4) | 4.083 *** (0.078) | 4.115 *** (0.081) | 4.081 *** (0.078) |
| <i>Organisational proximity</i> | | | |
| same group | 4.332 *** (0.253) | 4.331 *** (0.250) | 4.350 *** (0.253) |
| <i>Institutional proximity</i> | | | |
| both listed | 0.426 ** (0.197) | 0.418 ** (0.197) | 0.933 *** (0.264) |
| both private | -0.241 *** (0.093) | -0.238 *** (0.093) | -0.135 (0.107) |
| <i>Asymmetric effects</i> | | | |
| acquirer_north - target_south | -0.605 *** (0.171) | | |
| acquirer_south - target_north | 0.140 (0.233) | | |
| acquirer_finan - target_manuf | | 0.797 *** (0.112) | |
| acquirer_manuf - target_finan | | -0.827 *** (0.245) | |
| acquirer_private - target_listed | | | 0.795 *** (0.241) |
| acquirer_listed - target_private | | | 0.066 (0.133) |
| Estimated probability $Y=1 X$ at median values (%) | 0.13 | 0.15 | 0.13 |

See Appendix for the definitions variables

Period: 2001-2010. Observations: 21444

Proportion of ones:zeros observations equal to 1:5

All models include a constant and acquirer and target individual controls for status (listed, private, government), independent organization, foreign ownership, SIC1 division, geographic location (North, South Italy)

Geographic distance is log-transformed

Robust standard errors in parenthesis. Significance level *** 1%, ** 5%, *10%