The Concurrent Impact of Cultural, Political, and Spatial Distances on International Mergers and Acquisitions

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Abstract
The paper explores the concurrent effects of cultural, political, and spatial distances on M&A flows occurring between any two countries belonging to the whole European Union (27 States) or to the European Neighbors group (16 States) over the period 2000-2011. By employing zero-inflated negative binomial specifications, entailing both a binary and count process, we adequately model the two different mechanisms which may generate zero observations in the cross-border bilateral deals. Zeros may be due to either the lack of any transactions or unsuccessful negotiations. We find robust evidence that the multi-dimensional distance between two countries negatively affects the probability that they will engage in M&A deals, while the recurrence rate of these deals is positively related to population, gross domestic product, and technological capital and negatively related to geographical distance.

Keywords
Cross-border M&As, cultural and political distances, geographical distance, European Union, European neighboring countries, zero-inflated models

JEL: F23, G34, C31

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1. Introduction

International economic exchanges among firms and countries can take different forms, like trade, mergers and acquisitions, greenfield investments, joint ventures, and strategic alliances. The entry mode into the foreign markets can vary according to several elements related to a wide array of characteristics of products, firms, markets, countries of origin and destination. Economies of scale, factors and transport costs, physical distance, degree of competition, final consumer markets, financial conditions, technological opportunities are just few examples of factors widely studied by the literature as determinants of cross-borders exchanges.

While the role of spatial distance is by now undisputed, increasing attention is being devoted, by both economics and management scholars, on how international transactions are affected by distances between the origin and the destination countries in terms of "intangible" factors, like culture and institutions (e.g. Kogut and Singh, 1988; Tihany et al., 2005; Rossi and Volpin, 2004; Portes and Rey, 2005; Guiso et al., 2009). We intend to contribute to this literature by focusing on cross-border merger and acquisition (M&A) deals and investigating how they are influenced by the concurrent effects of cultural, political, and spatial distances.

In the last two decades, international M&A activities rose at an unprecedented pace, which has been attributed to such factors as market globalization and increasing competition. In this context, M&As are strategic tools that firms use to achieve economies of scale and gain market shares, establish a transnational bridgehead without excessive start-up costs, gain access to a foreign market, and circumvent government regulations. Opportunities notwithstanding, entering or expanding existing operations in foreign markets through M&A transactions presents a series of risks and challenges for both the bidder and target, which are systematically influenced by various forms of distance between the two parties. The literature on international M&As shows that distances, embodied in cultural, political, and physical dimensions, have an important effect on the development of firms strategy (Sleuwaegen, 1998; Coeurdacier et al., 2009). The degree of similarity between countries based on their legal, economic, administrative, political, and cultural institutions are important factors that affect M&A strategy. The underlying assumption is that firms have a greater opportunity to benefit from forms of institution-based capital (e.g., political connections, cultural familiarity, and financial standards) when the cross-national institutional distance between the home and host countries is small since it decreases the overall transaction costs.

Researchers have emphasized how different distances may influence the success of the post-acquisition and integration process (Birkinshaw et al., 2000; Chakrabarti et al. 2009), but we know

surprisingly little about how the same distances affect firms' decision on whether undertaking acquisition activities.

To address these challenges, in this paper we explore the concurrent effect of cultural, political, and spatial distances on both the probability and the intensity rate of cross-border M&A deals. It is worth remarking that by studying the influences of different distances within the same model we improve on previous studies, which in most cases have favored one specific kind of distance over the others, because in this way we provide estimated effects not biased by the omission of relevant distance dimensions.

Our sample data refers to a set of 43 countries encompassing the 27 member countries of the European Union (EU) and the 16 countries that border the EU to the east or south, constituting the European neighboring countries (ENC). Our choice to focus on M&As involving firms from the EU and ENC is based on two main reasons. First, thus far, the existing literature on M&A activity has primarily examined the EU and North American markets (Coeurdacier et al., 2009; Moschieri and Campa, 2009), overlooking the ENC despite that the M&A market value in Eastern Europe tripled between 2004 and 2006 (PriceWaterHouseCoopers, 2006). Second, the EU and ENC are characterized by substantial differences in terms of cultural and political issues, and therefore, they represent a challenging scenario to investigate the determinants of M&As.

Our analysis employs firms level data on the number of completed cross-border M&As among 43 countries over the 2000-2011 period, thus considering 1,806 pairs of potential transactions. This enables us to provide a general picture on the factors that affect the bilateral M&A interactions between two countries. The econometric analysis, conducted within a traditional gravity model framework, being applied to count data has the advantage of allowing us to investigate the determinants of the rate of recurrence of M&A events regardless of their monetary values. Indeed, for managers and policy makers the occurrence of frequent, small deals has different implications than occasional large transactions that involve the acquisition of, say, an oil company or a bank.

An important - although often neglected - characteristic of the country pair data in trade, FDI and other bilateral international exchanges is the high percentage of zeros. These may be either the result of the absence of bilateral transactions between any pair of countries or the unsuccessful outcome of a count process. To deal with such a case we employ the zero-inflated negative binomial specification, which allows for the simultaneous modeling of the two different processes that generate the zero observations.

To our knowledge, this is the first study that models the simultaneous impact of cultural, political, and spatial distances on M&As in a bilateral country-pair setting using a two-process

model. Using the zero-inflated model, we explore how those distances affect the probability that two countries choose to be involved in bilateral deals and the rate of recurrence of the actual transactions. Moreover, it may be the case that some country pairs perceive each other to be so distant and dissimilar in terms of culture, institutions, rule of law, political stability, and democratic systems that they do not even consider engaging in M&A deals. A noteworthy example of the existence of historical and political barriers is given by Israel and the nearby Muslim countries. The costs of "becoming closer" to begin the interaction process are substantially larger than the benefits of any possible deal that the countries end up having no relationships at all, regardless being close in space. Once the countries do not perceive such cultural distance as a barrier and engage in transaction activities, they are modeled using the standard gravity variables, such as population, GDP level and growth, technological level, and geographical distance.

The paper proceeds as follows. In the next section, we provide a description of the features of the M&A count data included in our sample; we then present a selected review of the background literature related to our study to clarify how our contribution is positioned within the current academic debate on M&A transactions and the role of geographical proximity and other measures of closeness. Therefore, in the fourth section, we present how we operationalized these notions of distance for our sample of countries and discuss their main characteristics. The empirical setting and methodology are presented in the fifth section, along with a brief description of the explanatory variables. Next, we present the results of the econometric analysis, while their main implications of this study are discussed in the concluding section.

2. M&A FLOWS BETWEEN THE EU AND ITS NEIGHBORING COUNTRIES

As mentioned in the previous section, the main aim of this paper is to explore the impact of cultural, political, and spatial distances on M&A deals in the 27 EU countries and the 16 ENC. Following the most recent enlargements in 2004 and 2007, the eastern borders of EU shifted drastically, reaching countries characterized by extremely diverse economic, cultural, social, and political conditions with respect to the EU. Similar differences are exhibited by the ENC on the Mediterranean sea, which have always produced concerns with respect to international relationships, given their political instability. As a consequence, the EU, as an alternative to further enlargements, has attempted to develop an integrated policy (the European Neighbouring Policy, ENP) towards the non-candidate countries, which adjoin the EU's eastern and southern borders (Commission of the European Communities, COM 373, 2004; Dodini and Fantini, 2006).

It is useful to distinguish between two strands of the broader ENP: the eastern regional program, which includes six countries on the eastern border (Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine) and the southern regional program concerning the 10 countries on the southern border (Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, and the Palestinian Territories).[1] It is worth noting that Russia, although not formally associated with the ENP, has a specific policy instrument to guide strategic partnerships with the EU, which has goals and funding instruments that are similar to those of the ENP; for this reason, Russia is included in our sample from the ENC-East.

Data were retrieved from the SDC Platinum database, which contains information on M&A deals and is updated daily using over 200 English and foreign language sources. To obtain a representative sample for the full set of 43 countries, we consider a period of 12 years and thus select transactions between January 1, 2000 and December 31, 2011. The resulting full matrix, which also includes domestic deals, contains 1,849 pairs of potential transactions for which the target and acquirer company are based in one of our 43 countries and includes a total of 111,035 completed transactions.

Note that domestic deals account for a substantial majority (an average of nearly 80%) of all completed deals. This information, although quite raw, is very revealing with respect to how various distances, which have a less magnitude within the same country, are relevant factors affecting the number of cross-border deals, as transaction costs are an increasing function of the different types of distance. A thorough analysis of such effects is expected to provide novel and insightful evidence on the factors that shape international relationships among increasingly integrated economies. For this reason, our empirical investigation focuses on the cross-border sample, which comprises 1,806 possible country pairs with a total of 23,391 completed deals. Moreover, we are also interested in modeling the factors that affect the rate of recurrence of M&A events once the bilateral channel between two countries is operating. The analysis of the determinants of the actual number of transactions gives useful information on how intensively two countries are interacting and on how policies, such as the ENP, are effective in offsetting existing tangible and intangible barriers.

Table 1 presents a general picture of the aggregate number of M&As for the 2000-2011 period sorted by the four groups of countries included in our sample: the 15 old member states of the EU (EU15), the 12 new accession countries (EU12), ENC-East, and ENC-South. The first two columns report the number of M&As for the target and acquirer countries, respectively. In the

[1] The Palestinian Territories are not considered in the empirical analysis since they do not register any M&A deal over the period.

subsequent columns, we report the corresponding data for the cross-border deals. The final columns refer to domestic deals, confirming, although with varying degrees, the relevance of national M&As for all subgroups of countries. Recent contributions (Rodriguez-Pose and Zademach, 2003; Chakrabarti and Mitchell, 2013) have emphasized that domestic deals are highly dependent on country-specific factors and thus have to be modeled in a different manner than cross-border deals by focusing on subnational determinants.

If we focus on the ENC, the most active M&A markets are Russia and Ukraine in the east and Israel in the south. Excluding those countries, the number of deals involving the ENC is low, especially when the ENC act as acquirers. Among the ENC-East group, Ukraine is the "new star" in attracting investments (PriceWaterHouseCoupers, 2006) and represents the leading target country for cross-border M&As. Moreover, Ukraine, bordering both the EU and Russia, is characterized by a strong willingness to cooperate although with an asymmetric interdependence with respect to the EU (Melnykovska and Schweickert, 2008). Among the ENC-South group, Israel is the main target country in terms of the number of M&As. Despite its geographical location, Israel is part of the Western economy and has a high gross domestic product (GDP) per capita, comparable to that of the wealthiest EU countries.

The relevance of historical, cultural, political, and geographical links in influencing cross-border M&A deals becomes evident if we look at the top acquirer/target nations for each country. France is the most important acquirer partner in Algeria, France and Spain in Morocco, the United Kingdom in Azerbaijan, Italy in Libya, and Arab Emirates in Egypt. An analogous pattern is exhibited by Russia and the other countries belonging to the former Union of Soviet Socialist Republics which show a high degree of interaction. Israel represents a peculiar case, as it is distanced from its neighboring countries for historical and political reasons. The largest number of M&A deals for Israel are shared with spatially distant countries, such as the United States and UK, with which the existing bonds are more cultural and financial in nature due to the significant presence of Jewish residents in those countries, often holding leading positions in key economic and financial institutions.

As mentioned in the Introduction, the countries included in our sample exhibit substantial heterogeneity, as they are highly diverse along the cultural, political, and geographical dimensions. The existence of remarkable dissimilarities across countries can reasonably be considered the primary cause of the large number of observed zero values, which amount to 55.3% of all possible cross-border pairs. If we look at the percentage of zeros across groups of countries, it appears that the lowest value (3.3% of the total possible country interactions) is found for activities within the EU15. This low number of zero is revealing, as the EU15 can be considered the most homogenous

among the groups of countries considered. This group is followed by the EU15–EU12 groups (17.8%) and the EU15–ENC-East groups (39.1%). At the other extreme, the highest number of zero observations is found for the EU12–ENC-South groups (97.2%). These figures suggest that the number of zeros is increasing in the sizes of the distances between groups of countries. In the empirical section, we specifically address this issue by adopting an estimation framework that allows us to properly account for the existence of excess of zeros in the data. Note that previous studies have overlooked this relevant aspect of cross-border transactions.

3. RELATED LITERATURE

Given the long history of research in the area of international exchanges, any claim of comprehensiveness in the literature review would be foolhardy. Thus, in this section, we consider only those contributions directly related to our research questions and that have analyzed M&A transactions by specifically investigating the role of country distances, such as geography, culture, institutional quality, and risk, between the home and target countries (see Table 3). First, it is beneficial for our review to distinguish between contributions that examine the M&A deals aggregated at the country (or regional) level and those based on firm-level data.

Green and Meyer (1997) propose an analysis conducted at the aggregate country level for the year 1993 to examine international M&A deals worldwide, distinguishing between high- and low-tech industry transactions. Using a Poisson model, they find that socioeconomic and risk conditions in both buyer and target countries are important in explaining cross-border M&As. Surprisingly, geographical distance is not included among the regressors, although the authors acknowledge its role in influencing international transactions.

Di Giovanni (2005) considers cross-border M&A value flows in the 1990-1999 period for a broad set of 193 countries and estimates a simple gravity model using a Tobit specification that controls for possible bias caused by censored data. The results indicate that geographical distance negatively affects the value of international deals, which are also influenced by GDP and financial variables. Firms also tend to invest more in countries with which they trade more and with which they share a common language. In a similar vein, Hyun and Kim (2010) analyze bilateral M&As in 101 Organisation for Economic Co-operation and Development (OECD) and developing countries worldwide over the 1989-2005 period. By estimating a Tobit model, they show that market size and a common language have positive and significant effects, while distance is negatively related to cross-border M&As. Moreover, high-quality institutions in the host country play a relevant role in attracting international M&As, thus confirming that low corruption and widely enforced laws

generate a favorable environment for foreign investors. Interestingly, the level and variability of the real exchange rate are never significant determinants of international deals.

Coeurdacier et al. (2009) analyze cross-border M&As in the manufacturing and service sectors for a sample of 31 European and OECD countries for the 1985-2004 period. They include GDP, the degree of capitalization, the presence of a common language, and trade integration as controls for country characteristics. Geographical distance is found to have a non-significant impact on cross-border M&As, potentially because the sample consists primarily of developed countries, where the information costs measured by geographical distance are less important. Moreover, the quality of institutions, proxied by civil liberties, in the host country is only found to be an important determinant of foreign M&As in the manufacturing sector.

The role of institutional governance in the host country is specifically analyzed by Hur et al. (2011) for 165 countries worldwide over the 1997-2006 period, controlling for the size of economies, openness to trade, technological advancement, and financial market development. They demonstrate that the low institutional quality in developing countries is one of the causes of their relatively poor ability to attract international M&A inflows. Note that the authors do not consider the bilateral flows between each possible pair of countries, and therefore, geographical distance cannot be included in their analysis.

The contribution by Ragozzino (2009) is based on firm-level data and focuses on 608 international deals made by US companies worldwide in the 1993-2004 period. Ragozzino demonstrates that acquirers prefer shared-ownership deals in remote locations and full ownership in proximate locations due to the presence of asymmetric information. Moreover, he finds that if cultural distance and political risk are high, firms seek higher ownership stakes in more distant locations than in closer ones.

The role of spatial proximity between acquirer and target firms in domestic M&A deals is the key issue in country-specific contributions, as cultural and political differences are clearly less relevant within a particular country. More specifically, Rodrıguez-Pose and Zademach (2003) examine domestic M&As in Germany over the 1990-1999 period and find that the spatial clustering of M&A transactions depends on the regional level of agglomeration (measured by GDP and population), as well as on the concentration of political power in the region. The geographical distance between the acquirer and target firms appears to play a distinctive role only when it is estimated in conjunction with agglomeration, while it is insignificant when considered on its own. Other features of the local economy, such as R&D investment, human capital, and unemployment, play a negligible role in determining M&A flows.

Chakrabarti and Mitchell (2013) consider the case of domestic transactions in the US chemical industry for the 1980-2003 period. They model the M&A data as a binary process taking the value of one if any potential pair of firms actually announces a deal in a given year and zero otherwise. Using weighted exogenous sampling maximum likelihood estimation and controlling for several individual characteristics, they demonstrate that firms tend to prefer geographically proximate targets, particularly when implementing technologically related acquisitions. The results also demonstrate the persistent effect of geographical proximity on organizational search processes due to firms' past experience.

A similar approach was followed by Ellwanger and Boschma (2012) for a set of 1,855 domestic M&As in the Netherlands over the 2002-2008 period. Following a logistic approach, they demonstrate that the likelihood of concluding an M&A deal is higher for firms that are very close on both the geographical and technological dimensions. Interestingly, the effect of industrial relatedness is found to be much stronger than the effect of geographical proximity.

Overall, the literature has highlighted that spatial distance is important in influencing M&A transactions, but it has also emphasized the key role played by cultural and national institutional settings, which may make countries relatively more distant or proximate. Therefore, our analysis is informed by many different dimensions of distance, which are likely to jointly shape opportunities in foreign markets. In the next section, we present how we operationalized the different notions of cultural, political, and spatial distance for the sample of 43 countries analyzed.

4. DISTANCE DIMENSIONS BETWEEN COUNTRIES

The literature has highlighted the roles of various types of distance in influencing foreign market exchanges as trade, FDI, M&As. The probability that a firm engages in a cross-border transactions may depend on the degree of proximity between the cultural, political, and spatial characteristics of its home country and that of the potential target. To assess the effects of different proximity measures on international deals, we collected country-level data on the following six indicators: geographical position, cultural features, governance effectiveness, financial and economic risk, democracy score, and corruption.[2]

We assume that firms willing to conduct a cross-border acquisition are not concerned about the absolute levels of the cultural and institutional indicators in the partner's country, but rather the extent to which the characteristics of the host country differ from those of its own country. Therefore, our aim is to compute various measures of the distance between each pair of countries.

[2] The sources and definitions of the distance measures and other variables are reported in Appendix.

Operationally, for each of our five dimensions (except for the geographical one), we first standardized the country values with respect to the distribution average set equal to one; then, we computed six distance matrices based on the absolute difference of the standardized values between any two countries.

Geography. The recent literature has emphasized that geographical distance helps to explain how perceptions of foreign countries may systematically influence decisions regarding firms' international activities (Egger, 2008; Lankhuizen et al., 2011). The geographical distance (GEO) between countries has been computed as the distance in kilometers between the countries' capital cities where the concentration of economic activity is typically highest.

Culture. Cultural differences have been often indicated as one of the main drivers of economic relationships between countries, as the closer two economies are in terms of social behavior, the lower the transaction costs and, in turn, the higher the probability of observing movements of people and the exchange of capital and goods. However, several contributions have proxied for cultural closeness by simply including a dummy for sharing a common language. Recently, Ragozzino, (2009) for M&A deals and Lankhuizen et al. (2011) for trade and FDI have employed the well-known cultural index originally proposed by Hofstede. In his seminal contributions, Hofstede (1980) grouped countries on the basis of four cultural dimensions.[3] Due to the lack of data for some developing countries it is not possible for us to use directly the Hofstede database. Therefore we employ the composite cultural index proposed by Kaasa (2013) on the basis of the four Hofstede dimensions; this index is computed by a principal component analysis on items taken from the World and European Value Surveys. The resulting index appears quite informative, as we have such countries as Egypt, Jordan, and Morocco in one tail of the distribution, while Denmark, the Netherlands, and Finland are at the opposite extreme. Finally, as explained above, we computed the full matrix of cultural distance (CULT) for each pair of countries.

Governance. The role of political and institutional factors in the host country in influencing firms' decisions to invest abroad was already highlighted by Dunning (1973) and has been examined in several subsequent studies (see, among others, the recent contributions by Coeurdacier et al., 2009; Bénassy-Quéré et al., 2007; Hyun and Kim, 2010; Hur et al. 2011). Firms are influenced by the degree of governance efficiency in the countries where the acquirer and target companies are located. These institutional elements have been investigated in depth by the World Bank, which has proposed a very general synthetic indicator of governance worldwide. Details on the underlying data sources, the aggregation method and interpretation of the indicators can be

[3] The four dimensions proposed by Hofstede are: power distance, uncertainty avoidance, individualism versus collectivism, and masculinity versus femininity. Two other dimensions were subsequently added to define the cultural profile of a nation: long-term orientation and indulgence versus restraint.

found in Kaufmann et al. (2010).[4] The standardized synthetic index ranks Belarus, Libya, Syria, Azerbaijan, and Russia as having the poorest governance quality, while Austria, Sweden, Denmark, and Finland occupy the top positions. As before, we computed a governance distance matrix (GOV).

Risk. The degree of risk associated with each country is computed by Euromoney, which considers worldwide expert assessments of the economic, political, and structural conditions in the countries, their debt indicators, credit ratings, and access to capital. Here, we consider the synthetic Euromoney country risk (ECR) index that combines the different elements. Among the EU neighboring countries, the most risky are Syria and Libya on the southern border and Belarus and Moldova on the eastern border. Unsurprisingly, the current situation in Greece also appears very uncertain, and the country occupies the fifth-worst position in the index ranking. Conversely, according to the index, the safest environment for doing business is in Luxembourg and Nordic countries, such as Sweden, Finland, and Denmark. Using the synthetic standardized index, we computed a matrix, the entries of which are the relative distance for each country pair in terms of riskiness (RISK).

Democracy. Another important feature of a country that may influence the decision to conduct M&A deals is the degree of democracy measured by the Unified Democracy Scores (UDS), recently developed by Pemstein et al. (2010). This synthetic index is computed using a Bayesian latent variable approach from ten existing democracy scales.[5] Libya, Syria, and Belarus exhibit the worst performance on the democracy score, while the best performance is found in Finland and Sweden. The full democracy (DEM) matrix presents bilateral distances between countries in terms of democracy scores.

Corruption. The final dimension considered is the degree of corruption in the public sector. More precisely, we employ the Corruption Perception Index (CPI) collected by Transparency International, which is an aggregate indicator that combines data on corruption from 13 independent and prominent institutions worldwide. To be included in the CPI, a country must be assessed in at least three different sources. Countries with highly corrupt public sectors include Libya, Syria, Ukraine, and Azerbaijan, while Sweden, Denmark, and Finland exhibit very low levels of

[4] The World Bank index is, as it summarizes six broad dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Elementary data are collected from a large number of survey institutes, think tanks, non-governmental organizations, international organizations, private sector firms, and expert survey respondents worldwide on governance quality and effectiveness.

[5] The synthetic index is based on a variety of elements, such as participation, inclusiveness, competitiveness, coerciveness, political and civil liberties, competitive elections, party competition, civilian supremacy, national sovereignty, freedom of organization, freedom of expression, and pluralism in the media.

corruption. We computed a corruption distance matrix containing the relative distance for each pair of countries (COR).

From the description of the various indexes and country rankings discussed above, we find that the institutional and political closeness dimensions are highly correlated. In Table 3, we report the correlation coefficients computed for the six distance matrices. As expected, measures related to governance (GOV) and corruption (COR) exhibit high correlation (0.80) and also appear to be strongly associated with the measures of risk (RISK) and democracy (DEM). The cultural dimension, although positively associated with other indexes, does not yield correlation coefficients above 0.51. Finally, geographical distance is barely associated with the other dimensions. Therefore, to avoid multicollinearity problems in the econometric estimation, we include the indexes broadly related to a country's institutional and political environments (governance, risk, democracy, and corruption) individually, while the geographical and cultural distances are included in all specifications.

5. EMPIRICAL MODEL

5.1 Modeling M&A counts

The empirical analysis is based on a general gravity model framework for count data, formalized as follows:

$$M\&A_{at} = f(pop_a,\ gdppc_a,\ pop_t,\ gdppc_t,\ gdppc\_gr_t,\ tech_t,\ geo_{at},\ cult_{at},\ pol_{at}) \qquad (1)$$

where the dependent variable is represented by the cross-border M&A counts for each possible pair (*a* is the acquirer country and *t* is the target) of 43 countries over the 2000-2011 period. The estimation sample comprises 1,806 country-pair observations.

Turning to the explanatory variables, following a well-established stream of literature, we include the population (*pop*) and GDP per capita (*gdppc*) for both the acquirer and target countries. As is standard in gravity specifications, population is intended to capture the relative notion of mass, while GDP per capita is expected to represent the country's economic wealth and development level; the higher the level of population or of GDP per capita, the higher the number of expected deals. Both population and GDP per capita are considered at their year-2000 values. We also consider two additional M&A determinants specific to the target country, represented by the growth rate of GDP per capita (*gdppc_gr*) and the technological level (*tech*). The GDP per capita growth rate, computed as the annual average over the 2000-2011 period, is expected to capture the

general economic conditions outlook of the country where the target firm is located. If the outlook is positive, the deal is expected to be more profitable, which increases the likelihood of observing additional deals.

The technological level in the host country is expected to enhance the probability of M&As motivated by technological reasons; accordingly, acquiring a firm is one of the most effective ways to ease the transmission of knowledge and technological competencies. The technological level is measured by the stock of patents computed as the sum of patent applications submitted to the European Patent office by resident inventors per million inhabitants over the 2000-2010 period.

Finally, a crucial aspect determining firms' M&As is the distance between the two countries involved in the deal. As previously noted, the broad empirical literature on international exchanges, and in particular on M&As, has emphasized not only the relevance of geographical distance but also the degree to which cultural, political, and institutional distances may act as intangible barriers that prevent firms located in certain countries from even considering engaging in deals with firms in certain other countries. Therefore, in our analysis we take into account the concurrent effects of geographical, cultural, and political distances by augmenting the traditional gravity model with the inclusion of the different distance measure presented in the previous section. It is worth noting that the gravity model, being the workhorse model used to analyze international exchanges, has featured a large number of different specifications over time. However, there is no consensus among scholars whether some variables should enter the model as a country's individual characteristics or in distance terms in order to capture the unique country pair's traits. In our analysis we follow the traditional specification, so that mass variables are included for the individual country, while features that are expected to characterize the pair of countries involved in a deal, such as those related to culture, institutions and location, are entered as distances.[6]

5.2 Estimation issues and model selection

As the M&A counts are used as the dependent variable, the natural starting point is to consider the Poisson regression model. This entails specifying the mean (μ_i) of the response variable (y_i from now, with i=1,2, … N=1,806 possible deals) as a function of a set of explanatory variables, $E(y_i|X_i)=\mu_i$. The standard parameterization of the mean is $\mu_i=exp(X_i\beta)$ to ensure that the nonnegativity constraints are not violated. Since the Poisson distribution is characterized by the equidispersion property, the variance is equal to the mean, so that the Poisson model is intrinsically heterosckedastic.

[6] We acknowledge that this choice may be debatable, but a deeper investigation on alternative ways of including the countries explanatory variables in terms of individual characteristics or bilateral distances is left for future research.

In empirical applications, the equidispersion property of the Poisson model has often been found to be excessively restrictive, as the data are usually overdispersed. Our sample data is no exception: our dependent variable has a mean value of 13 and a standard deviation 51, thus exhibiting significant overdispersion. One of the most common causes of overdispersion (Cameron and Trivedi, 2005) is neglected unobserved heterogeneity, which yields an excessive number of zero observations. Such heterogeneity can be modeled as a continuous mixture of the Poisson distribution by modifying the specification of the mean as $E(y_i|X_i)=\mu_i\eta_i$, with μ_i defined as before and η_i a random term with $E(\eta_i)=1$. In this case, the Poisson mixture has the same mean as the original Poisson. When η_i follows the gamma distribution with variance α, the negative binomial model results; the first two moments are $E(y_i|X_i)=\mu_i$ and $Var(y_i|X_i)=\mu_i+\alpha\mu_i^2$, and α is the overdispersion parameter to be estimated.[7]

Although the negative binomial model is generally adequate to capture overdispersion, in some instances, zero observations may not be compatible with such a model, leading to the problem of excess zeros. This situation occurs because the mechanism generating the zero observations may differ from that generating the positive observations. A zero observation can occur in two ways: it can be the realization of either a binary process or a count process when the binary variable takes a value of one. The resulting model is the zero-inflated model, in which the count density, $f_2(.)$ is supplemented with a binary process with density $f_1(.)$. If the binary process takes a value of zero with probability $f_1(0)$, then $y_i=0$, while if the binary process takes a value of one with probability $f_1(1)$, then y_i can take the count values 0, 1, 2, 3… from the count density $f_2(.)$, which can be specified as either a Poisson or a negative binomial density. Formally, the overall density of the y_i process is formalized as

$$f(y_i|X_{1i},X_{2i})=\begin{cases} f_1(0|X_{1i})+\{1-f_1(0|X_{1i})\}f_2(0|X_{2i}) & if\ y_i=0 \\ \{1-f_1(0|X_{1i})\}f_2(y_i|X_{2i}) & if\ y_i\geq 1 \end{cases} \quad (2)$$

Note that the set of conditioning variables, X_{1i} and X_{2i}, usually differ between the binary function $f_1(.)$ and count function $f_2(.)$ because the two sets are selected on the basis of substantive grounds and typically depend on the phenomenon being analyzed.[8]

[7] Note that this specification is referred to as negative binomial 2 (the negative binomial 1 entails a linear variance function). The NegBin2 specification is typically preferred because the quadratic form has been proven to provide a very good approximation to more general variance functions. This is a remarkable advantage because the maximum likelihood estimators for negative binomial models are not consistent when the variance specification is incorrect.

[8] Moreover, Jones et al. (2013) suggest that different sets of covariates should be included in the two parts of the model to avoid lack of convergence in the maximizing the likelihood function.

For the analysis of the determinants of M&As, the zero-inflated model is expected to be more appropriate than the Poisson or negative binomial models, as it is more reasonable to assume that the zero realizations are the result of distinct mechanisms. It may be the case that certain country pairs perceive each other as being so distant and dissimilar in terms of culture, institutions, rule of law, political stability, and democratic systems that firms from these pairs do not even contemplate engaging in M&A deals. The costs of becoming closer to begin the interaction process are substantially larger than the benefits of any possible deal.

In our sample, a striking example is presented by country pairs including Israel and one of the southern EU neighboring countries, i.e., Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Syria, or Tunisia. In these cases, the observed zero values are more likely to be the result of the well-known historical, political, and religious 'distances' that have prevented, or significantly limited, the occurrence of stable and trustful economic and political relationships between Israel and most of the other southern Mediterranean countries.

Thus, in analyzing M&A determinants, we maintain that cultural, political, and institutional distances play a crucial role in governing the splitting mechanism, and thus, they are included as explanatory variables for the $f_1(.)$ binary process, whereas the other variables, i.e., the economic indicators and geographical distance, are considered determinants of both the binary and count processes. As opposed to the other distance indicators, geographical distance is expected to also affect the number of completed deals, as it captures the unobserved tangible transaction costs, such as the transport ones.

Importantly, the specification of the splitting process for the zero observations would also be required if value rather than count data on M&As were used, but this process has largely been overlooked in the previous literature.[9] Therefore, we believe that our analysis may provide original and sound indications with respect to the main factors that shape the relationships among countries and that form the essential common base to activate business interactions between cross-border firms.

6. ECONOMETRIC RESULTS

6.1 Baseline specification

As stated in the previous section, economic and behavioral considerations lead us to believe that zero-inflated models are the most appropriate for modeling M&A deals. However, we test

[9] Some studies (see for instance Di Giovanni, 2005) account for censored or truncated data but do not model explicitly the zero values determinants.

whether such a hypothesis is also empirically supported by rigorous testing procedures. Thus, our estimation strategy entails first considering the Poisson and Negative binomial models and testing for evidence of overdispersion and then comparing these models to the more flexible zero-inflation model by applying the Vuong specification tests.

The estimation of the Poisson model is reported in the first column of Table 4; we include population and per capita GDP for both the acquirer and target countries, while the GDP growth rate and stock of patents are included for the target country only. We also include two dummies for acquirers and targets belonging to the EU15 group to account for the fact that as the EU15 countries are the wealthiest and most technologically advanced in our sample, M&A deals between them may be driven by factors significantly different from those affecting deals involving all other countries included in the sample. As the country pairs' variables, we include an array of distance indicators, which are expected to capture the concurrent effects of geographical, cultural, and institutional differences. Institutional distance is captured by including one of the four political indicators described in the fourth section and a dummy variable for the country pairs formed by Israel and one of the southern ENC. The political distance included in the baseline specification is based on the World Bank Governance indicator, which is considered the most general measure, as it comprises the broadest range of relevant governance dimensions. In the next section, we also consider other political and institutional indicators by conducting an extensive robustness analysis.

Although, as argued in the previous section, due to behavioral considerations, we believe that the relative cultural and political distance measures should almost exclusively affect the splitting process (engage or not engage in any bilateral cross-border M&A deal), we decide to include them in the Poisson mean specification as well to avoid any omitted variable problems, as misspecification of the mean could result in undue overdispersion (Cameron and Trivedi, 2005).

Because population, per capita GDP, the stock of patents, and geographical distance are log-transformed, the estimated parameters measure elasticities, while the coefficients associated with the other covariates have a semi-elasticity interpretation.

All estimated coefficients exhibit the expected signs and are significant at conventional levels,[10] with the only exception being the target country's GDP per capita. While the level of economic development is a very important determinant of M&A deals for the acquirer, population is relatively more influential in the target country. Both the GDP growth rate and technological level act as relevant and attractive features for potential acquirers. All three distance measures, along with the 'Israel dummy', exhibit significant and negative coefficients, indicating the

[10] Note that the standard errors of the coefficients if the Poisson model presented in Table 4 are computed using the Variance-Covariance matrix robust with respect to overdispersion.

detrimental effects that spatial remoteness and cultural and political dissimilarities have on M&A deals.

According to the Poisson model, all zeros are outcomes of the count process; thus, the fact that the cultural and political indicators were significant in explaining the Poisson model mean is not unexpected. Such indicators are supposed to have predictive power for the proportion of zeros that are generated by the binary process, but in this case can only be (mis-)assigned to the count process.

Given the overdispersion feature of the M&A data considered here, the adequacy of the Poisson model has to be assessed in terms of predicted probabilities. These are reported in Table 5, along with the actual probabilities up to count 25, which accounts for 90% of the total number of events. It is evident that the Poisson model substantially underpredicts the proportion of zeros (actual 55%, predicted 35%) and overpredicts positive values. This result is due to the restrictive property of equidispersion implied by the Poisson distribution.

Thus, we proceed by considering the alternative specification provided by the negative binomial model, which does not constrain the variance of the process to be equal to the mean. The results are reported in the second column of Table 4; as far as the mean of the process is concerned, the findings are qualitatively very similar to those discussed for the Poisson model. However, in terms of the maximized likelihood function, the negative binomial model is remarkably superior to the Poisson model. The gains are mainly produced by the more appropriate specification of the variance function; the variance parameter is highly significant (LR test=18,997 for the hypothesis $\alpha=0$, where α is the overdispersion parameter). This, in turn, allows for a sizeable improvement in the predicted probabilities (see Table 5) at the expense of having to estimate an additional parameter. The proportion of predicted zeros is now very close (53.6%) to the observed value. The positives are still overpredicted, although less severely than it was the case for the Poisson model.

Notwithstanding the gains provided by the negative binomial model, we further investigate whether the differences between the actual and predicted probabilities are due to an excessive number of zero observations with respect to the number consistent with a pure count process by estimating zero-inflated models.

In column 3 of Table 4, we report the estimation results for the zero-inflated negative binomial (ZINB) model.[11] As discussed in the previous section, in both cases, we have to simultaneously model the splitting mechanism and count processes. Given the substantial flexibility

[11] Given the existence of overdispersion we prefer to model the count process by means of the negative binomial specification (as before negative binomial 2) rather than the Poisson one. In a preliminary analysis we tested the Zero inflated Poisson (ZIP) specification against the ZINB one: the former was overwhelmingly outperformed by the latter, which exhibited a highly significant overdispersion parameter and a much higher log-likelihood value (-12602.2 vs. -3496.4).

provided by the zero-inflated models in the specification stage, we can now distinguish on substantive grounds, mainly related to firms' behavior, the set of covariates that enter the binary process (X_1 in equation 2) from the set of covariates that pertain to the count process (X_2 in equation 3).[12] Based on the discussion reported in the fifth section, we believe that cultural, institutional, and political differences are crucial in determining whether firms are willing to initiate economic interactions. If countries share common and recognized characteristics along those 'intangible' dimensions, the necessary conditions to consider engaging in a business deal are satisfied; otherwise, the 'dissimilarity' costs are excessively high and exceed any potential benefit arising from the deals. Therefore, in our models, the binary process is a function of the complete set of distances (geographical, cultural, institutional, and the 'Israel dummy'), as well as of pure socioeconomic indicators (population and GDP per capita) and the two EU dummies for both acquirer and target countries. The binary process is specified as a logit model for the probability of observing a zero value, and the results are reported in the column labeled 'Inflate'.[13] The count process is modeled as above with respect to the acquirer and target variables; only geographical distance is included for the country pairs; this is expected to account for transport costs.

Focusing on the results reported in column 3 of Table 4, it is evident that the higher the relative masses (population) and economic development levels (GDP per capita) of the acquirer and target countries, the lower the probability of observing a zero value of M&A deals for given distance values. On the other hand, when holding population and GDP per capita constant, all of the distance indicators have the opposite effects, and thus, they significantly contribute to increasing the probability of observing a zero value. In essence, if two countries are very distant in terms of spatial, cultural, and institutional dimensions, the probability that they will not conclude a bilateral deal is high. In the count part of the model, most of the variables take the expected signs and are significant. The target's GDP per capita still remains irrelevant in explaining the number of events, but it is worth noting that it now exhibits predictive power in governing the splitting mechanism. This effect was clearly concealed in the Poisson and negative binomial models. The growth rate of GDP per capita has the expected positive sign but it is significant only at the 12% level.

The Voung test results reported at the bottom of Table 4 allow us to compare the ZINB specification with its non-zero inflated counterpart, the negative binomial model. The test follows a standard normal distribution with large positive values favoring the ZINB model and large negative values favoring the negative binomial model. The high positive value of the test (4.96) thus

[12] We also tested whether the same set of regressors could enter both parts of the model, but the results were not satisfactory as the cultural distance loses significance or exhibits the wrong sign in the count part of the model. This may due to the fact that a two-nonlinear-part model, as the ZINB one, put too much a requirement on the data (see Jones et al., 2013).

[13] Similar results are obtained when the Probit specification is chosen instead of the logit one.

indicates that a significant proportion of the zero values are 'pure' zeros due to the complete lack of relationships and not simply the result of unsuccessful interactions between cross-border firms that resulted in failed deals.

The overall comparison of the three estimated models enables us to argue that the ZINB model is the most appropriate specification, as it is able to simultaneously account for two important features, overdispersion and excess of zeros, of the M&A data analyzed in this study. Therefore, model 3 in Table 4 is our preferred specification.

6.2 Robustness analysis

To test the strength of the results discussed thus far, we conducted an extensive robustness analysis based on the ZINB model. The main results are reported in Table 6. In the first three estimated models, we consider an alternative measure of the countries' relative institutional-political distances. Governance distance is thus replaced by risk, democracy, and corruption distances in the binary part of the model. All other variables are unchanged with respect to the third specification reported in Table 4, with the exception of cultural distance, which is not included in model 3 because of its high degree of collinearity with the corruption distance variable. The main finding is that most of the coefficients for both the binary and count part of the model are remarkably stable with respect to the consideration of different political distance measures. Only in the case of the GDP growth rate does the significance of the coefficient appear to depend on the model specification; it is not significant when the risk political distance is included, but it reaches the 10% significance level in the other two alternative specifications. All three political distance measures are highly significant and exhibit substantially larger coefficients than in the baseline model.

In the model reported in column 4, we replaced the acquirer country's GDP per capita with the stock of patents; its positive and significant coefficient indicates that the acquirers' technological level increases the expected number of M&A deals. However, the baseline model outperforms this latter specification, because the level of GDP per capita is a more comprehensive economic indicator of a country's acquiring potential abroad.

Finally, to determine whether the main findings were substantially driven by M&As between the EU15 countries, we re-estimate our baseline specification using a subsample that excludes such cases. The results, reported in the last column of Table 6, are in line with those discussed for the entire sample. The only notable exception is that the target country's stock of patents is no longer significant. This result, however, can be explained by M&As deals that are motivated by technological reasons being more likely to involve countries of the EU15 group.

Overall, the analysis presented in this paper provides robust findings on the newly investigated issue of M&A activities conducted within the sample that includes the EU countries and the 16 states involved in the ENP.

7. CONCLUSIONS

In this article, we assess the impact of cultural, political, and spatial distances, in addition to conventional measures of economic convenience, on cross-border M&A. We focus our analysis on the cross-border M&As completed among 43 countries (EU and its NC) over the 2000-2011 period, thus considering 1,806 pairs of potential transactions. The choice of this highly differentiated set of countries (advanced economies, new member states, Eastern Europe, and Mediterranean Africa) allows us to provide an original contribution to the current debate on the drivers of cross-border M&As. We maintain that the heterogeneity of the data is largely attributable to the multi-dimensional distances among the countries, which are supposed to significantly affect the probability that firms in these countries consider engaging in business activities abroad and, in particular, international M&A transactions. Focusing on count data, we rigorously tested this hypothesis by estimating zero-inflated types of models. We demonstrate that the absence of completed deals for a considerable number of country pairs (excess of zeros) is the result of two distinct mechanisms: a binary process and a count process for the rate of recurrence of M&A deals.

In contrast to the existing empirical literature, the econometric setting based on zero-inflated specifications enables us to properly account for the fact that M&As are simultaneously determined by the two processes described above and that the determinants of the initial decision to enter a foreign market are substantially different from those affecting the decision to engage in an additional transaction in a market where transactions are operating.

Evidence based on the estimation of the binary process suggests that the probability that a firm in a given country elects to enter into M&A negotiations with a firm in another country is inversely related to a comprehensive set of relative cultural, political (governance, democracy, risk, corruption), and spatial distances once one controls for the level of per capita GDP and population. To the best of our knowledge, this is the first study to assess the concurrent effects of different types of distance within a unified econometric framework.

The count process is estimated by employing a gravity specification, where the population and level of per capita GDP are included for both the acquirer and target countries, while the technological capital and per capita GDP growth rates are target-specific covariates included to capture the potential profitability of the deal. We find that all of the explanatory variables positively

affect the rate of recurrence of M&As, while spatial distance has an adverse effect that is directly related to the transaction costs associated with the collection and interpretation of information regarding the potential target, including the costs of negotiation and other forms of personal interaction.

Finally, focusing on the EU and ENC, we explore a largely neglected sample of countries. The relationships between the EU and adjacent countries has received substantial attention since 2007 when the EU has attempted to develop an integrated policy towards the non-candidate countries on the EU's eastern and southern borders as an alternative to further enlargements. Among the different ways in which valuable interactions between the EU and ENC are generated, capital transactions represent a key channel. Thus, understanding the drivers of M&A activities in this area might aid in increasing the effectiveness of the ENP, which is aimed at establishing close, peaceful, and cooperative relationships with bordering countries.

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Appendix. Data sources and definitions for variables and distance matrices

Variable		Definition	Primary Source
Country vectors			
M&A	Merger & Acquisition	Completed deals, 2000-2011	SDC Platinum database
POP	Population	Million of resident individuals, 2000	World bank
GDP	Gross domestic product	Billion international $, constant at 2005 prices, in PPP, 2000	World bank
GDPgr	GDP growth	GDP annual average growth rate 2000-2011, %	World bank
PAT	Patent	Patent applications at EPO by inventor residence and priority year, per million population, 2000-2010	OECD-REGPAT
Distance matrices between pairs of countries			
GEO	Geography	Euclidian distance between country capital cities, km	Own calculation
CULT	Culture	Composite index of cultural features	Kaasa (2013) based on World Value Survey and European VS
GOV	Governance	Worldwide Governance Indicators (WGI)	World bank
RISK	Risk	Financial and Economic Risk (ECR)	euromoneycountryrisk.com
DEM	Democracy	Unified Democracy Scores Index (UDS)	unified-democracy-scores.org
COR	Corruption	Corruption Perception Index (CPI)	transparency.org

Table 1. M&A completed deals per group of countries

	Total		Cross-Border				Domestic
Country	Acquirer	Target	Acquirer	Target	Share on tot acquirer %	Share on tot target %	
EU15	92199	88790	20596	17187	22.3	19.4	71603
EU12	6231	7961	1854	3584	29.8	45.0	4377
ENC-East	11297	12916	674	2293	6.0	17.8	10623
ENC-South	1305	1365	267	327	20.5	24.0	1038
Total	111032	111032	23391	23391	21.1	21.1	87641

Table 2. Related econometric studies on spatial and institutional determinants of M&A deals

Paper	Period	Coverage	Unit of analysis	Method	Data source	Dependent variable	Geography	Culture	Governance	Risk	Other territorial variables	Firm variables
Chakrabarti, Mitchell (2013)	1980-2003	USA	2070 firms	Logit, weighted exogenous	SDC	domestic MA, chemical sector	√					prior MA, subsidiaries, age, size, product, public
Coeurdacier, De Santis, Aviat (2009)	1985-2004	mostly Europe	32 countries	Poisson	SDC	cross-border MA	√		√		GDP, common language, trade, capitalisation	
Di Giovanni (2005)	1990-1999	World	193 countries	Tobit	SDC	cross-border MA deal values	√				GDP, financial vbl, trade, language, telephon traffic, exchange rate	
Ellwanger, Boschma (2012)	2002-2008	Netherlands	1855 firms	Logistic	BVD	domestic MA	√					public, subsidiary, diversification
Green, Meyer (1997)	1993	World	countries	Poisson	Securities Data Publishing	cross-border MA			√	√	GDP, trade, tourism, patents	
Hur, Parinduri, Riyanto (2011)	1997-2006	World	165 countries	OLS	UNCTAD	cross-border M&A inflows			√		GDP, trade, technology, financial market	
Hyun, Kim (2010)	1989-2005	World	101 countries	Tobit/ probit	Thomson One Banker	cross-border MA deal values	√		√		GDP, financial vbl, trade, language, exchange rate	
Ragozzino (2009)	1993-2004	USA	608 firms	Tobit	SDC	cross-border MA % ownership	√	√		√		high tech, public, knowledge distance
Rodriguez-Pose, Zademach (2003)	1990-1999	Germany	40 regions	OLS	M&A Review	domestic MA regional flows	√		√		population, GDP, human capital, R&D, industry structure	

Table 3. Correlations among country distance indicators

(Cross border sample: 1806 obs.)

		GEO	CULT	GOV	RISK	DEM	COR
GEO	Geography	1					
CULT	Culture	0.22	1				
GOV	Governance	0.31	0.47	1			
RISK	Risk	0.13	0.48	0.71	1		
DEM	Democracy	0.25	0.48	0.76	0.53	1	
COR	Corruption	0.21	0.51	0.80	0.73	0.54	1

All coefficients are significant at the 1% level

Table 4. Model specification for cross-border M&A count data

	1	2	3	
	Poisson	Neg Bin	Zero Inflated Neg Bin	
			Inflate	Count
Acquirer country				
Population	0.565 ***	0.622 ***	-0.530 ***	0.436 ***
	(0.045)	*(0.050)*	*(0.094)*	*(0.058)*
GDP per capita	2.040 ***	2.206 ***	-0.975 ***	1.558 ***
	(0.322)	*(0.175)*	*(0.288)*	*(0.127)*
Target country				
Population	0.651 ***	0.714 ***	-0.548 ***	0.591 ***
	(0.065)	*(0.065)*	*(0.107)*	*(0.072)*
GDP per capita	0.145	0.128	-0.493 **	0.203
	(0.306)	*(0.215)*	*(0.222)*	*(0.367)*
GDP per capita growth rate	0.057 ***	0.036		0.122
	(0.020)	*(0.025)*		*(0.078)*
Patents per capita	0.166 ***	0.315 ***		0.221 ***
	(0.063)	*(0.045)*		*(0.078)*
A-T countries distances				
Geography	-0.672 ***	-1.145 ***	0.841 ***	-1.073 ***
	(0.058)	*(0.079)*	*(0.248)*	*(0.101)*
Culture	-0.018 **	-0.040 ***	0.044 ***	
	(0.008)	*(0.008)*	*(0.016)*	
Governance	-0.161 **	-0.017	0.476 ***	
	(0.073)	*(0.063)*	*(0.110)*	
Israel dummy	-2.803 ***	-3.858 ***	2.738 ***	
	(0.516)	*(0.552)*	*(0.820)*	
Shape parameter ln(α)		0.679 ***		0.513 ***
		(0.095)		*(0.120)*
Log-likelihood	-12976.4	-3477.9		-3496.415
LR test for α=0		18997		18000
Vuong test of zero infl neg bin vs. standard neg bin				4.96

Observation number: 1806

M&A deals are counted over the period 2000-2011

All regressions include a constant

Two dummies for acquirer and target countries belonging to EU15 are included in models 1-2 and in the inflate part of model 3

The 'Israel' dummy takes value 1 for all country pairs involving Israel and one of the South neighbouring countries

Population, GDP per capita, patents per capita and distance are log transformed

Robust standard errors in parenthesis. Level of significance: *** 1%, ** 5%, * 10%

Table 5. Actual and predicted probabilities of M&A count data

Count	Actual	Poisson	Neg Bin	Zero inflated neg bin
0	0.553	0.352	0.536	0.559
1	0.097	0.140	0.117	0.081
2	0.055	0.081	0.059	0.050
3	0.034	0.055	0.037	0.035
4	0.022	0.041	0.027	0.027
5	0.024	0.032	0.020	0.021
6	0.017	0.026	0.016	0.018
7	0.011	0.022	0.013	0.015
8	0.012	0.018	0.011	0.013
9	0.007	0.016	0.010	0.011
10	0.008	0.013	0.008	0.010
11	0.005	0.012	0.007	0.009
12	0.006	0.010	0.006	0.008
13	0.007	0.009	0.006	0.007
14	0.004	0.008	0.005	0.006
15	0.007	0.007	0.005	0.006
16	0.004	0.007	0.004	0.005
17	0.005	0.006	0.004	0.005
18	0.008	0.006	0.004	0.004
19	0.003	0.005	0.003	0.004
20	0.003	0.005	0.003	0.004
21	0.002	0.005	0.003	0.004
22	0.004	0.004	0.003	0.003
23	0.002	0.004	0.003	0.003
24	0.003	0.004	0.002	0.003
25	0.002	0.004	0.002	0.003
Sum	0.905	0.893	0.916	0.913

Table 6. Robustness analysis on determinants of cross-border M&A deals
(Zero inflated negative binomial models)

	1		2		3		4		5	
	Inflate	Count	Inflate	Count	Inflate	Count	Inflate	Count	Inflate	Count
									excluding intra EU15 cases	
Acquirer country										
Population	-0.435 ***	0.440 ***	-0.560 ***	0.445 ***	-0.506 ***	0.437 ***	-0.649 ***	0.313 ***	-0.560 ***	0.382 ***
	(0.109)	*(0.061)*	*(0.098)*	*(0.057)*	*(0.088)*	*(0.059)*	*(0.083)*	*(0.064)*	*(0.107)*	*(0.063)*
GDP per capita	-0.838 **	1.555 ***	-0.946 ***	1.585 ***	-1.093 ***	1.544 ***	-1.449 ***		-1.175 ***	1.389 ***
	(0.341)	*(0.136)*	*(0.302)*	*(0.136)*	*(0.294)*	*(0.139)*	*(0.218)*		*(0.333)*	*(0.128)*
Patents per capita								0.390 ***		
								(0.039)		
Target country										
Population	-0.490 ***	0.599 ***	-0.548 ***	0.598 ***	-0.545 ***	0.595 ***	-0.552 ***	0.608 ***	-0.604 ***	0.512 ***
	(0.116)	*(0.072)*	*(0.117)*	*(0.074)*	*(0.105)*	*(0.074)*	*(0.102)*	*(0.080)*	*(0.127)*	*(0.081)*
GDP per capita	-0.376	0.167	-0.545 **	0.227	-0.556 **	0.217	-0.459 **	0.236	-0.645 ***	0.362
	(0.290)	*(0.356)*	*(0.240)*	*(0.350)*	*(0.226)*	*(0.370)*	*(0.199)*	*(0.409)*	*(0.218)*	*(0.408)*
GDP pc growth rate		0.101		0.112 *		0.147 *		0.111		0.185 *
		(0.078)		*(0.068)*		*(0.079)*		*(0.084)*		*(0.101)*
Patents per capita		0.220 ***		0.187 **		0.258 ***		0.211 ***		0.121
		(0.079)		*(0.082)*		*(0.074)*		*(0.078)*		*(0.096)*
A-T countries distances										
Geography	0.950 ***	-1.101 ***	0.837 ***	-1.070 ***	1.164 ***	-1.062 ***	0.995 ***	-0.913 ***	1.203 ***	-0.855 ***
	(0.322)	*(0.119)*	*(0.237)*	*(0.097)*	*(0.270)*	*(0.108)*	*(0.208)*	*(0.093)*	*(0.297)*	*(0.132)*
Culture	0.042 **		0.020				0.039 ***		0.048 **	
	(0.018)		*(0.013)*				*(0.014)*		*(0.021)*	
Governance							0.393 ***		0.549 ***	
							(0.091)		*(0.121)*	
Risk	2.902 ***									
	(1.145)									
Democracy			1.318 ***							
			(0.239)							
Corruption					1.704 ***					
					(0.592)					
Israel dummy	2.368 **		2.421 ***		4.024 ***		3.119 ***		3.367 ***	
	(0.987)		*(0.884)*		*(0.908)*		*(0.791)*		*(0.941)*	
Shape parameter ln(α)		0.532 ***		0.479 ***		0.531 ***		0.562 ***		0.786 ***
		(0.119)		*(0.126)*		*(0.119)*		*(0.124)*		*(0.125)*
Log-likelihood		-3499.5		-3475.9		-3516.2		-3533.8		-2467.4

Observations: 1806 for models 1-4; 1596 for model 5. M&A deals are counted over the period 2000-2011. All regressions include a constant
Two dummy variables for acquirer and target countries belonging to EU15 are included in the inflate part of all models
The 'Israel' dummy takes value 1 for all country pairs involving Israel and one of the South neighbouring countries
Population, GDP per capita, patents per capita and distance are log transformed
Robust standard errors in parenthesis. Level of significance: *** 1%, ** 5%, * 10%