Location Choices of Multinational Firms: The Case of Mergers and Acquisitions

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November 26, 2003

Abstract

This article examines the location choices of cross-border Mergers and Acquisitions (M&A) between OECD members' firms in the 1990's. In addition to traditional determinants of FDI, we estimate the impact of specific factors affecting the M&A location pattern. Two distinct econometric methods are implemented : the conditional logit and the count model (Poisson or negative binomial model). In spite of the use of alternative econometric methods, we find that the supply of target firms (captured by the market capitalization and the privatization activity) constrains the location of M&A. However, it is not the only determinant of location : the market size, the labor cost, the market access and the financial openness play a positive and significant role on the M&A location. A bandwagon effect is also observed. In the opposite, the corporate tax rate and the productivity decrease the probability to attract M&A. Cultural and geographic distances and differences in legal rules also exert a negative significant impact on M&A strategies. Only the ownership structure has contrasted results.

Keywords : Foreign Direct Investment, Merger and Acquisition, Location, conditional logit, count model.

JEL Classification : F23, L1, R3

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1 Introduction

The 20th century witnessed a strong activity of Mergers and Acquisitions (M&A) on several times (see e.g. Scherer and Ross (1990)). However, the 1990's experienced a new wave of industrial restructuring which differed in many respects from prior consolidation periods. First, the new M&A operations involved larger multinational firms : the transaction value rose dramatically (Kang and Johansson (2000)). Also, M&A took place not only in manufacturing, but also in service sectors (especially in telecommunications, financial services and business services ; OECD (2001), Evenett (2002)). Another important feature is that M&A[1] implied much more cross-border operations (Black (2000)) : their number grew very quickly from 4 149 in 1991 to 5 373 transactions in 1998 (UNCTAD (2000), Kang et Johansson (2000)). Almost 90% of these operations concerned developed countries' firms. Furthermore, these cross-border M&A represented on average about one quarter of total M&A transactions during the last decade (both in value and number). This figure could be even higher in some countries. For instance, in France, the share of cross-border M&A increased from 41% in 1990 to 50.7% in 1999, with a slight decline in 2000 and 2001 (Coutinet and Sagot-Duvauroux (2003)).

Through cross-border M&A, multinational firms strengthened their international position : cross-border M&A progressively replaced Greenfield Investments[2] in Foreign Direct Investment (FDI) since the beginning of the nineties. At the end of the period, about 85 % of FDI transaction values took the form of M&A[3]. Therefore, facing this major change in FDI composition, Lipsey (2000) notes that cross-border M&A could not be ignored when examining the decision of inter-national investments. In this context, this paper tends to investigate the different factors which

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[1]The first four M&A wave were mainly confined to the United States and Great Britain. The fifth and last M&A wave encompassed all major industrial countries.

[2]A Greenfield Investment is defined as the establishment of a new production facility in contrast to a cross-border M&A where a firm purchases shares of an existing foreign firm. Note that we will use indistinctly the terms merger and acquisition.

[3]Very recently, M&A declined relative to Greenfield Investments. The share of cross-border M&A deals fell from at most 80% of total FDI flows in 2001 to at most 55% in 2002 (UNCTAD (2003)).

determine the pattern of cross-border M&A locations. Put differently, we ask here why a French firm has more incentives to take over or to merge with a German firm rather than a British one, or conversely ?

This important question remains almost unexplored : the geography of M&A has been overlooked (Chapman (2003)). Previous research investigating determinants of FDI location do not usually consider M&A (see e.g. Woodward (1992), Head, Ries and Swenson (1995) and (1999), Mayer and Mucchielli (2002) or Mucchielli and Puech (2004)). To our knowledge, almost all these empirical studies traditionally treat only Greenfield Investments, except O' Huallachain and Reid (1997) and Basile (2003). O'Huallachain and Reid notice that M&A are less concentrated geographically than Greenfield Investments : the location of M&A is restricted in a given region by the scarcity of available acquisition candidates. However, this result is mitigated by Basile in Italy at a regional level. The level of market size or labor costs play a role as important as the supply of target firms, challenging the scholarly disinterest in the distribution of acquisitions.

Another literature examined cross-border M&A but without tackling the issue of their location (see for a discussion Bertrand and Madariaga (2003)). Some authors analyzed cross-border M&A as an entry mode. Caves and Mehra (1986) or for instance Hennart and Park (1993) observed the trade-off between M&A and Greenfield Investment. of foreign firms entering the U.S. market. Zejan (1990), then Andersson and Swensson (1996) examined Swedish overseas strategies. Baldwin and Gorecki (1987) compared these two entry modes for foreign and domestic firms in Canadian sectors. Girma (2002) assessed the influence of the European integration on the determinants of non-European companies penetrating into the United Kingdom through cross-border M&A and Greenfield Investments.

Other studies focused exclusively on cross-border M&A and their determinants. For instance,

at a microeconomic level, Gonzalez, Vasconcellos and Kish (1998) put forward the arguments of target firms' under-valuation or mismanagement. From an event study, Seth, Song and Pettit (2000) found that synergy gains constituted the main motivation of cross-border M&A. As for Louri (2001), she analyzed the main microeconomic factors of foreign companies penetrating into the Greek market over the period 1987-1996. At a macroeconomic level, Kish and Vasconcellos (1993) estimated to what extent financial factors (mainly exchange rate, stock price and interest rate) influenced M&A between Japanese and American firms over the period 1982-1989. Very recently, using a gravity equation, Di Giovanni (2002) explored macroeconomic and financial determinants of cross-border M&A.

In this context, the purpose of this paper is to explore the pattern of cross-border M&A location. We examine location choices of M&A between 18 OECD members' firms over the period 1990-1999. The determinants of location are depicted at two distinct levels. At a sector level, we include three different determinants: market size, labor costs and productivity. This study encompasses 18 manufacturing and services sectors. At a country level, we first use some common determinants of FDI : corporate tax, geographic and cultural distances and market access.

In addition to these traditional variables affecting FDI location, we take into account some specific determinants of M&A related to market structure and regulation. The availability of acquisition candidates is captured by the variables market capitalization and privatization activity. We also estimate the influence of ownership structure, legal rules and financial openness as well as the existence of bandwagon effects (imitation behaviors).

We follow two methods of estimation : the conditional logit (McFadden (1984)) and the count model (Poisson or negative binomial model). These complementary methods enable us to shed light on robust findings. In spite of the use of distinct econometric methods, we find that

the supply of target firms (captured by the market capitalization and the privatization activity) constrains the location of M&A. However, it is not the only determinant of location : the market size, the labor cost, the market access and the financial openness play a positive and significant role on the M&A location. A bandwagon effect is also observed. In the opposite, the corporate tax rate and the productivity decrease the probability to attract M&A. Only the ownership structure has contrasted results. In addition, cultural and geographic distances and difference in legal rules in the conditional logit case exert a negative significant impact on M&A strategies.

The paper proceeds as follows: first, we present briefly the econometric model (section 2) as well as the variables used (section 3). Second, we discuss the empirical findings (section 4) before concluding in section 5.

2 The econometric model: location choices

We focus on the location choices of M&A. By assumption, we omit any trade-off between cross-border M&A and Greenfield Investments. This assumption relies on the nature of our database (see section 3). It records M&A between large multinational firms. Given the size of M&A investments, Greenfield Investments, that say the establishment of new productive facilities, may not constitute a realistic alternative to the firms' external growth [4]. In the opposite, it does not prevent export activities as an alternative entry mode in foreign markets to cross-border M&A (see the expected effect of geographic distance and market access in section 3.2).

Thus, consider a firm located in a country i. This firm wishes to acquire a company in

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[4]The decade of the 1990s has seen a dramatic rise in the number and value of large-scale M&A involving multinational firms (OECD (2001)). On average, a cross-border M&A has doubled in size over the period 1990-1999. As a result, Greenfield investments could be not a realistic alternative mode since it requires much more time than acquiring existing firms. It is particularly true for an important size of investment. Speed is a major advantage of M&A over Greenfield Investments, especially in sectors such as telecommunication, insurance, or banking services. These sectors need huge investments in production and distribution networks.

one out of n countries indexed by j with $j = 1, ..., n$ $(i \neq j)$. Thus, it has n alternative choices [5]. We denote G_j the gain that the firm i obtained from merging with an other country j's firm. It corresponds to its share in merging firms' joint-profits. This gain depends on country or sector level characteristics X_s in both countries[6]. Therefore, merging profits are rewritten as follows : $G_j = g(X_s^i, X_s^j)$. The firm i chooses the location k yielding the highest gain G_j : $G_k = max(G_j)$ with $j = 1, ..., n$.

Different econometric estimations may model M&A location choices. We will first present the conditional logit, then the count model.

2.1 The conditional logit

The conditional logit is the most frequently used method when examining location choices. It is based on the MacFadden's model of multinomial logit. With this method, regressions are implemented and clustered by M&A operations. Thus, for each M&A operation, the characteristics sector/year/country of the purchaser firm do not vary. Only bilateral and country j's characteristics X_s^j matter : $G_j = g(X_s^j)$. G_j is equal to $\beta X_s^j + e_j$, where X_s^j, β and e_j are respectively the observable characteristics of location j, a vector of coefficient of estimated parameters and a random term.

If errors terms are identically and independently distributed, then the probability of locating in a country j corresponds to :

$$P_j = \frac{e^{\beta' X^j}}{\sum_{j=1}^{n} e^{\beta' X^j}} \qquad (1)$$

By setting $d_j = 1$ when the firm i decides to locate in j and $d_j = 0$ in the opposite case, the log-likelihood is written $logLL = \sum_{k=1}^{N} \sum_{j=1}^{n} d_{kj} log P_{kj}$ (with N the whole sample).

Besides, all the variables have been transformed into logs. Thus, each coefficient may roughly

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[5]In the following, for the sake of simplicity, we do not take into account the temporal dimension in all the notations and mathematical expressions.
[6]We assume homogeneity among firms of a given sector and year in an observed country.

be expressed as an elasticity function for an "average buyer" (See Crozet, Mayer and Mucchielli (2003)). It indicates how the probability of taking over a domestic firm changes with a variation in an explanatory variable. From equation 1, this elasticity can be written :

$$\frac{\partial P_j}{\partial X_s^j} \frac{X_s^j}{P_j} = \beta_s(1 - P_j)$$

where β_s is the estimated coefficient of the variable X_s^j. This coefficient overestimates slightly the elasticity of probability of location choices. However, this overestimation can be evaluated. The average probability to choose the location j is equal to $P_j = \frac{1}{n}$, where n is the number of alternative choices. Thus, if we have 18 alternative choices, coefficients must be multiplied by 0.944.

Nevertheless, the model of conditional logit is perfectly valid only if the assumption of independence of irrelevant alternatives is respected : e_j are supposed to be independent between all choices (independence of the external choices). It implies that the ratio of probabilities of any two alternatives is unaffected by the choice set. After having controlled observable variables, location choices should be considered to be symmetrically substitutable. In this respect, Guimaraes et al. (2000) and (2003) point out that using a count model (an estimation of a Poisson distribution) is equivalent to implement a conditional logit model. However, this method does not rely on the assumption of independence of random terms.

In the count model, the number of M&A for a year/ sector / target firm's country are aggregated. Therefore, we lose information on the initial location of the buyer (bilateral variables are not included).

2.2 The count model

The count model was proposed by Hausman et al. (1984). In the count model, the probability that y_i firms of country j are taken over is written : $Prob(y_i) = f(X_j^s)$. This discrete probability function is similar to a Poisson distribution (Greene (1994)) : $Prob(Y = y_i) = \frac{e^{-\lambda_i}\lambda_i^{y_i}}{y_i!}$, with $ln\lambda_i = \beta'X_j^s$.

However, our database may include a too large number of cells without any M&A. Some sectors in a given country may experience no M&A over the entire period 1990-1999. To remedy this difficulty[7], some authors (see Lambert (1992), List (2001), Girma, Blonigen or e.g. Blonigen and Feenstra) have used the model ZIP (zero inflated Poisson model) to correct such a presence of excess zeros.

This framework identifies a two-step decision process. First, firms choose the countries where they do not want to invest. Second, among the set of remaining countries, a Poisson process determines their respective probability of attracting foreign investments. Therefore, this method distinguishes between determinants deterring firms from investing and those explaining the number of foreign firms attracted in a given country. Underlying mechanisms generating zeros and nonzero counts are thus distinct.

In the model ZIP, y_i takes the value zero with a probability φ_i and a Poisson distribution $[\mu_i]$ with a probability $1 - \varphi_i$:

$$Prob[y_j = 0] = \varphi_j + (1 - \varphi_j)e^{(-\lambda_j)}$$

and

$$Prob[Y = y_j | Y > 0] = (1 - \varphi_j)\frac{e^{(-\lambda_j)}\lambda_j^{y_j}}{y_j!}$$

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[7]See Cameron and Trivedi (1986) for a discussion of the different approaches to deal with excess zeros.

φ_i follows a logistic transformation of parameter X'^j, with X^j the vector of variables influencing non-investment decisions[8].

The Vuong's test (1989) enables us to statistically discriminate between the model ZIP and the standard model. We calculate this statistic in each regression of a Poisson model. A standard count data model is the most appropriate specification if there is no separate process for the zero counts.

However, a restrictive property of the Poisson model is the mean-variance equivalence[9], which is also called equidispersion. The violation of this restriction leads to a similar consequence than that provoked by the presence of heteroscedasticity in a OLS model: the value of parameters are consistent but inefficient. Variances are biased, which invalidates hypothesis tests. In this case, we adopt a negative binomial model which relaxes the constraint of equidispersion by adding a gamma-distributed error term into the Poisson model. The probability distribution of the negative binomial model is then written :

$$Prob(Y = y_j | u) = \frac{e^{-\lambda_j e^{(u_j)}} \lambda_j^{y_j}}{y_j!}$$

where $e^{(u_j)}$ has a gamma distribution with a mean and a variance equal respectively to 1 and α. The negative binomial model permits an over-dispersion corresponding to :

$$Var[y_{ij}]/E[y_{ij}] = 1 + \alpha_j E[y_{ij}]$$

For each regression with a count model, we apply a likelihood ratio test to check whether α differs significantly from 0. If it is the case, then the test asserts that an over-dispersion ex-

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[8]Following Girma (2002) and Basile (2003), we use the same set of variables in the first and second step. There is no reason a priori to think that these two processes have distinct determinants.

[9]The mean is equal to the variance λ_j in a Poisson distribution.

ists, which recommends the use of a negative binomial model. The Vuong test remains valid to discriminate between a negative binomial model with (model ZINB - Zero inflated negative binomial) or without excess zeros.

To sum up, in all regressions concerning the count model, we will first test the hypothesis $\alpha = 0$. If α is significantly different from 0 , a negative binomial model is more appropriate than a Poisson model. Second, we calculate the Vuong statistic to test the hypothesis of a zero excess. A statistic higher than 1.96 supports the choice of a model ZIP when a Poisson model is appropriate, or a model ZINB (zero inflated negative binomial) when a negative binomial model is recommended.

3   Description of variables and their expected effects

3.1   The endogenous variable

In the conditional logit model, the endogenous variable is qualitative. It is equal to 1 (respectively 0) when a firm of country i (does not) takes over a firm of country j. In the count model (Poisson or negative binomial), the dependant variable is the number of firms purchased, observed for each year and an industry at the country level.

Our study covers the period 1990 - 1999. It includes 400 cross-border M&A over a set of 18 sectors (ISIC rev3 classification) and countries. Our database (Source : DOME [10]) encompasses all main industrial countries. Graphic 1 displays a clear increasing tendency to M&A. The number of M&A transactions surged from 6 in 1990 to 102 in 1999. Then, the annual growth rate was about 33% in this decade. Also, as it can be observed in table 1, American, German, French and English multinational firms strongly participated to the process of M&A both as

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[10]The DOME ("Database On Mergers in Europe") database has been recorded by the Institute for World Economics (University of Kiel).

buyer or target firms. In addition, table 2 shows that financial institutions largely took part in M&A activities. Deregulated sectors such as telecommunications or transports also witnessed M&A. Nevertheless, traditional industrial sectors (mechanical, electronics, or e.g. transport equipment industry) remained strongly affected by restructuring.

Only M&A notified[11] by the European Commission are concerned[12]. Therefore, our sample consists of M&A between multinational companies selling goods at a very large scale on the European market. Only horizontal and vertical M&A are kept. Joint-ventures (i.e. alliances) are excluded.

Figure 1: **Evolution of cross-border M&A**
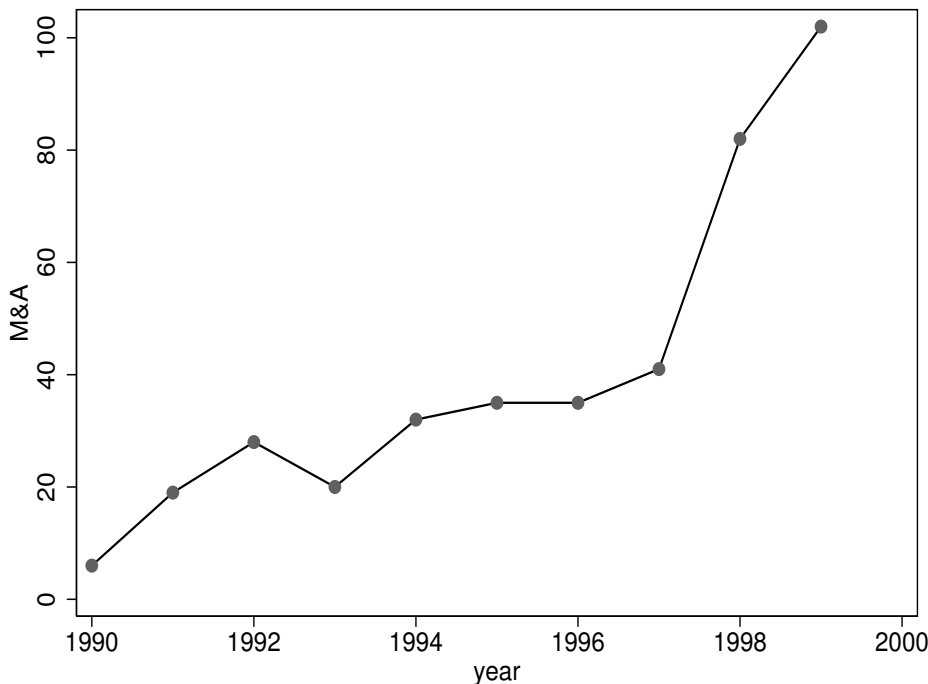
Source: Authors' calculations from DOME database.

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[11]11 M&A notified over the period 1990-1999 have been prohibited. Companies are usually able to address competition issues by divesting a part of their businesses. We have kept such data, since they reflect real location choices.

[12]A M&A has a community dimension if the combined aggregate worldwide turnover of all the companies concerned is more than 5 000 million Euros and the community-wide turnover of each of at least two of the companies is more than 250 million Euros (unless these companies achieve more than two-thirds of their community-wide turnover within one and the same member state).

Table 1: **Number of cross-border M&A per country (1990-1999)**

country	buyer	target firm
Austria	5	5
Belgium	19	11
Canada	3	8
Denmark	8	2
Finland	5	4
France	47	85
Germany	67	63
Italy	29	9
Japan	5	10
Korea	1	1
Netherlands	34	35
Norway	3	3
Portugal	5	0
Spain	29	6
Sweden	21	16
Great-Britain	81	59
United-States	37	78
Luxembourg	1	5
Total	400	400

Source: DOME database

Table 2: **Number of cross-border M&A per sector (1990-1999)**

Sectors	Buyers	Target firms
Agriculture, hunting, forestry and fishing	4	3
Mining and quarrying	4	6
Food products, beverages and tobacco	13	12
Textiles, textile products, leather and footwear	1	4
Wood, products of wood and cork	3	2
Pulp, paper, paper products, printing and publishing	10	9
Chemical, rubber, plastics and fuel products	54	52
Other non-metallic mineral products	6	7
Basic metal and fabricated metal products	20	20
Machinery and equipment	47	51
Transport equipment	44	36
Manufacturing industries n.e.c and recycling	1	2
Electricity, gas and water supply	12	8
Construction	2	6
Wholesale and retail trade, hostels and restaurants	37	43
Transports, storage and telecommunication	37	37
Finance, insurance,real estate and business activities	95	86
Community, social and personal services	10	16

Source: DOME database

3.2 Independent variables

Our econometric estimation includes traditional variables affecting FDI location and more specific variables to M&A location. We have independent variables at sector and country level (see table 3 for a description of data and their sources).

3.2.1 Sector level variables

Market size : the production at the sector level is used as a proxy of the market size. A huge market size means a great local demand and easier outlets. Hence, it is expected to stimulate M&A activities.

Labor costs : this variable represents labor costs in the host country. It provides an indication of companies' production costs in the considered sector. All things being equal, a rise in the production cost should deter a company from taking over a local firm. Also, this variable could approximate the structure of employment : a higher share of qualified employees results in higher per capita wages, reversing the former effect.

Productivity : the variable productivity gives information on the level of productivity in a given sector of a country. It indicates the technological level of host country firms. On the one hand, a higher productivity could foster the take-over of domestic firms if buyers are willing to absorb tangible and intangible assets hold by high-technology firms[13]. On the other hand, productivity could approximate the profitability of target firms, which affects the acquisition price. A firm with a low productivity should be taken over at a lower acquisition price. In addition, a M&A transfers the ownership of existing productive assets from a less efficient firm to more an efficient one. The buyer brings its superior technology to the target firm engendering

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[13]R&D indicators have not be retained since there is no R&D expenditures in services sectors.

efficiency gains[14]. As a result, the sign associated with this variable is not obvious.

Follower   : the variable Follower represents the total number of M&A per sector-country over the three year period preceding each M&A. This variable captures imitative and strategic behaviors among firms (see Knickerbocker (1973) for FDI). Rival firms' incentives to merge may increase when two competing firms merge (see Caves (1991) or e.g. Fauli-Oller (2000) in a theoretical framework of Cournot competition). They may be willing to prevent any competitive advantage to the leader in the investing country. Managers may also imitate each other to minimize their business risk[15]. According to Schenk (1996), it is better to make the same mistake as the colleagues, than to be the only one to take the right decision with the risk of being the only one to make a mistake. As a result, the sign of the variable Follower is expected to be positive. However, an investment opportunity effect (reducing number of available target firms) could soften this bandwagon effects.

3.2.2   Country level variables

Geographic distance   : this variable estimates the geographic distance between two countries (distance between their capitals). On the one hand, a high distance encourages companies to invest abroad rather than export towards the host country. On the other hand, it increases the costs of coordination and information on foreign markets, which dissuades them from investing overseas. The net effect of geographic distance is then ambiguous.

Cultural distance   : this variable accounts for the cultural distance between two countries (Morosini, Shave and Singh (1998)). Four dimensions are identified[16] (Hofstede (1983)): power

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[14]With factor markets failure, transfers of valuable intangible assets (e.g. know-how) incur too expensive transaction costs (Caves(1996)).

[15]In addition to imitation phenomena, managerial behaviors (power building etc.) or non-anticipated post-merger difficulties (wrong evaluation of synergy gains, underestimation of culture clashes etc.) may also explain the high rate of M&A failure.

[16]Surveys were collected in 66 countries in the 1970's. However, they are still valid since culture remains relatively stable during several generations.

distance, uncertainty avoidance, individualism-collectivism and masculinity-femininity. Power distance reflects the degree to which a culture believes how institutional power should be distributed (equally or unequally) and how the decisions should be viewed (accepted or not). Uncertainty avoidance refers to the extent to which a culture feels threatened by uncertain and risky situations. Individualism-Collectivism describes the degree to which a culture has allegiance to the group. Masculinity-Femininity indicates the degree to which a culture values behaviors such as acquisition of wealth or e.g. caring for others. A high cultural distance tends to increase the operational costs of foreign subsidiaries and to raise the risk associated with FDI. In addition, it makes managerial and organizational or e.g. technological skills less transferable. A high cultural distance may also increase the organizational cost of firms' integration (less cooperation between teams etc.). These costs harm the profitability of cross-border M&A.

Corporate tax : this variable indicates the average tax imposed on the income of corporation. All else being equal, a rise in corporate taxes reduces expected merging gains. Therefore, it should have a deterrent effect on M&A.

Market access : the variable market access assesses trade integration between two countries. We approximate bilateral access to markets i and j by the value ϕ_{ij} (called the "phi-ness" of the trade)[17]:

$$\phi_{ij} = \sqrt{\frac{m_{ij}m_{ji}}{m_{ii}m_{jj}}}$$

where m_{ij} (m_{ji}) represents the imports of i (j) coming from j (i) and m_{ii} (m_{jj}) are local sales (production minus exports) in country i (j). This variable ϕ_{ij} lies between 0 and 1. The closer it is to 1, the more markets are integrated. Two opposite effects are then expected. If FDI are motivated by the "tariff jumping" argument, a better market access should have a negative

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[17]Its calculation could be based on the model of Dixit-Stiglitz-Krugman monopolistic competition (see Head and Mayer (2004)).

effect on the incentives to merge : firms have fewer gains to locate abroad in order to remove exporting trade costs. However, an increasing market access means also tougher competition. It could push companies to consolidate to restore their mark-up.

Market capitalization : the market capitalization of listed companies gives information on M&A opportunities in a given country. The supply of procurable target firms may constraint the choice of M&A location. With a fall in market capitalization, the available pool of domestic companies shrinks, which constitutes a friction factor refraining M&A (mismatching between offer and demand, upward pressure on acquisition prices in the market for corporate control, etc.). This variable also provides a measure of financial deepening (size of financial market). Deepening financial markets helps firms to relax their internal financing constraints. They access larger and cheaper funds to finance projects, which is expected to reinforce industrial restructuring.

Privatization : the variable privatization indicates the intensity of privatization activity. As a rise in market capitalization, the sale of owned-state assets should make the entry of foreign firms easier by relaxing the scarcity constraint on available domestic firms.

Ownership structure : this indicator evaluates the shareholders' dispersion within firms. It corresponds to the share of companies where there are no controlling shareholders[18]. In some countries, ownership is concentrated within few hands (such as founding families or banks). Large investors represented on the company board of directors are then able to monitor the incumbent management and to replace it when it performs poorly. With disperse ownership structure, M&A play a more important role as a disciplining mechanism for controlling managers' behaviors (see Healy and Palepu (1994) or Hart (1995)). In addition, a concentrated ownership pattern is more

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[18]A shareholder is defined to control a company if its voting rights (hold directly or indirectly) are at least higher than 20% (we have also used the threshold of 10% and the results were almost similar).

likely to constitute an entry barrier to new investors, when owners have decided to protect the incumbent management. Small and numerous owners are a priori less reluctant to trade their shares[19]. Therefore, a growing share of domestic firms widely held should make M&A easier to implement.

Legal rules   : the variable Legal rules identifies the legal origin of the commercial law : common law (English origin) versus civil law (Romano-Germanic legal tradition). It is equal to 1 when the target and the buyer countries belong to the same system of legal rules. The empirical study led by Lopez-de-Silanes et al. (1998) points out that common law countries offer stronger legal protection for investors (shareholders and creditors) than civil law countries. Thus, in our case, the variable Legal rules reflects some differences in corporate governance[20]regime within a country : the legal framework of a country strongly shapes the corporate governance at a firm level (Bris and Cabolis (2002)). But, the expected relation between Legal rules and our dependent variable is not so clear. On the one hand, acquiring firms look cautiously at corporate governance practices of the target. They assess whether the target could be integrated easily (or not) into the buyer's business. In this respect, differences in corporate governance regimes could incur matching costs. Similar corporate governance practices may also enable acquiring firms to better evaluate gains from merging. On the other hand, M&A reallocate the control of firms. It may transfer corporate governance. It may then improve the protection of investors within the newly integrated firm or for instance provide a better access to international capital markets to the target firm (Rossi and Volpin (2001)).

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[19]Financial literature on corporate governance has examined links between ownership structures and takeovers. To this respect, Grossman and Hart (1980) have stressed free-riding behaviors for widely-held corporations with too small shareholders : target shareholders can anticipate that the post-takeover value of the firm will be higher than the tender price (otherwise the buyer has no gain). Then, they may prefer to hold their shares and wait that other shareholders sell theirs. As a result, if all shareholders behave similarly, no takeover occurs.

[20]Corporate governance refers to the way in which shareholders exert control over the corporation

Table 3: Variables and data sources

market size	production (current prices*) (STAN database - OECD ISIC Rev 3, $1990 - 1999$)
labor costs	average wage per worker (current prices) (STAN database - OECD ISIC Rev 3, $1990 - 1999$)
productivity	average productivity per worker (current prices) $= \frac{value\ added}{employment}$ (STAN database - OECD ISIC Rev 3, $1990 - 1999$)
geographic distance	geographic distance between capitals of two countries (CEPII database on geodesic distances)
cultural distance	cultural distance between countries A and B $= \sqrt{\sum_{i=1}^{i=4}(I_{iA} - I_{iB})^2}$ with I the score for the i Hofstede's cultural dimension (Authors' calculations from Hofstede (1983))
corporate tax	average corporate tax per country (Word Tax Database, OTPR)
market access	measure of bilateral market access (Authors' calculations from STAN database - OECD ISIC Rev 3, $1990 - 1999$)
capitalization	market capitalization of listed companies at current prices (World Development Indicators, Word Bank)
privatization	Amount raised by privatization value per country (Mahboobi (2002), OECD)
ownership structure	share of firms without controlling shareholder (La Porta et al. (1999))
legal rules	similarity (or not) of legal rules in home and host countries (La Porta et al. (1998))
financial openness	share of stocks hold by foreign residents on the stock market (Eurostat)
follower	total number of M&A per sector-country over the three year period preceding each M&A (DOME)
* All variables expressed in value are converted in U.S. dollars.	

Financial openness : this variable is a proxy of the openness in financial markets. It repre-

sents the share of stocks hold by foreign residents on the host country stock market[21]. A positive

effect is expected: a rise in financial openness indicates least effective impediments on foreign

investors. Furthermore, it is a priori associated with a better and more transparent information

on investment opportunities and a greater confidence of foreign investors on the economy of the

host country.

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[21]Unfortunately, this variable is available only for 10 countries (Austria, Belgium, Finland, France, Germany, Italy, Netherland, Norway, Spain and Sweden). It will be included only into few regressions.

4 Empirical results and interpretations

Empirically, mergers are observed to come in waves. Each wave exhibits distinct features. In addition, M&A strongly cluster by industry over time (see for instance Andrade, Mitchell and Stafford (2001)). Our window of analysis coincides with the fifth M&A wave (see graphic 1). As a consequence, the estimations of location choices are likely to be biased by a temporal effect[22]. We control this temporal dimension by introducing years fixed effects[23]. They capture effects common to all countries and industries.

In our estimations, we proceed as follows. First, we make out our regressions using the conditional logit method. Then, we employ the count model.

4.1 Location of cross-border Mergers and Acquisitions : the conditional logit estimation

Tables 4, 5 and 6 display respectively econometric outcomes for the conditional logit and count models. In the last column of each table (7th for the logit model and 5th for the count model), we report the results for manufacturing sectors only.

The conditional logit specification gives the following results : the traditional FDI variable market size has the expected sign. As in numerous studies on FDI location, it is found to be positive and significant in all our different estimations. In columns 4 and 5, the elasticity associated with market size is slightly more important : this might be due to the size of our sample that is dramatically reduced with the inclusion of the variable financial openness.

The labor cost has a significant (except in columns 4 and 5), but positif impact. It records a non-intuitive sign as in some analysis on FDI location[24] : all things being equal, a rise in labor

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[22]However, this bias should not be too important since our dependant variable is the number, and not the value of M&A operations. The value of M&A transactions is probably more affected by the boom on stock prices over the period 1990-1999.

[23]We have not included year dummies in the conditional logit estimation. There is no variability among alternative choices since regressions are implemented by year.

[24]Head and Ries (1996), Ferrer (1998) or e.g. Devreux and Griffith (1998) find a non-significant effect. Smith

Table 4: cross-border M&A : Conditional logit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
market size	0.334^a	0.275^a	0.228^b	0.686^a	0.875^a	0.177^b	0.304^c
	(0.070)	(0.082)	(0.091)	(0.177)	(0.219)	(0.077)	(0.106)
labor cost	0.779^b	0.782^b	0.855^b	0.567	0.739	0.647^c	1.640^c
	(0.349)	(0.349)	(0.373)	(0.444)	(0.500)	(0.348)	(0.540)
productivity	-0.632^b	-0.499	-0.449	-1.014^b	-1.232^b	-0.487	-0.832^a
	(0.315)	(0.323)	(0.350)	(0.431)	(0.496)	(0.324)	(0.453)
capitalization	0.305^a	0.303^a	0.245^a	-0.120	-0.337^a	0.232^a	0.314^c
	(0.045)	(0.046)	(0.051)	(0.103)	(0.130)	(0.047)	(0.060)
corporate tax	-0.942^c	-0.772	-0.539	0.288	1.553^b	-0.987^c	-0.648
	(0.485)	(0.527)	(0.629)	(0.597)	(0.774)	(0.532)	(0.726)
privatization	0.044^a	0.040^a	0.033^a	0.042^c	0.138^b	0.050^a	0.039^c
	(0.010)	(0.010)	(0.011)	(0.024)	(0.059)	(0.010)	(0.014)
distance	-0.438^a	-0.454^a	-0.402^a				-0.340^c
	(0.053)	(0.055)	(0.064)				(0.079)
ownership structure		0.070	0.080	0.489^a	0.725^a	0.157	0.083
		(0.095)	(0.106)	(0.134)	(0.161)	(0.098)	(0.133)
follower			0.149^a		-0.030		
			(0.048)		(0.067)		
cultural distance				-0.232^a	-0.278^a	-0.147^b	
				(0.086)	(0.094)	(0.071)	
market access				0.679^a	0.794^a	0.551^a	
				(0.121)	(0.139)	(0.061)	
financial openness				0.532^b	0.817^b		
				(0.263)	(0.329)		
legal rules						0.338^b	
						(0.157)	
Observations	6800	6389	5540	2993	2616	6101	3267
Log likelihood	-928.549	-918.752	-796.535	-514.081	-438.492	-883.627	-455.909
Pseudo R^2	0.18	0.17	0.17	0.20	0.23	0.18	0.19
LR chi2	409.47	375.63	326.05	263.36	254.84	384.38	219.76
Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.0000

Standard errors in parentheses
^{c} significant at 10%; ^{b} significant at 5%; ^{a} significant at 1%
All variables are in logarithm

costs (i.e. production costs) should have a deterrent effect on foreign investors. Such a positive effect[25] may come from a correlation with qualifications structure at a sector level. Moreover, interestingly, the distinction between manufacturing and non-manufacturing sectors seems to matter [26]. The manufacturing sectors respond more to labor costs (higher value of its coefficient in column 7 of table 4).

Productivity very often exerts a negative (and sometimes not) significant impact on firms' location choices. As discussed in the description of variables, this negative effect approximates either the link between profitability of target firms and the acquisition price or technological transfers from the buyer to the target firm (efficiency gains).

The geographic distance and market access have opposite but consistent effects[27]. The sign is positive for market access and negative for the geographic distance. The proximity among firms strengthens competition and then incites firms to merge. In the opposite, the cultural distance increases organizational costs, which discourages them from merging.

Thus, it is first confirmed that the geographic distribution of M&A depends on traditional FDI variables. The supply of acquisition candidates is not the sole location determinant of M&A. However, a rise in the supply of available target firms fitting its general specification and having desirable attribute effectively increases M&A activity : the variable market capitalization displays a positive and significant sign. It may also suggest that the development of the financial market has a positive effect on M&A. The negative sign observable in specification 4 and 5 is certainly due to the introduction of the variable financial openness. Market capitalization becomes correlated with market size[28], which obliges us to interpret with some caution coefficients for these two

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and Florida (1994) point out that the increase in labor costs in automobile sector has a positive influence on Japanese FDI in American counties.

[25]The removal of the variable productivity changes neither the sign of the variable labor costs nor other econometric parameters.

[26]In the opposite, in the conditional logit, the coefficient of other parameters remain very stable after this data split-up.

[27]We have not included simultaneously these two variables because of a high degree of correlation (about 0.8). Such a correlation was foreseeable since the geographic distance has usually negative consequences on trade flows.

[28]However, there is almost no correlation between the variables financial openness and market capitalization

columns.

In addition, the variable privatization (which is positive and significant) emphasizes as well the idea that the supply of target firms restricts the location choices of M&A. Nevertheless, the elasticity of this variable is very weak. This is not surprising since in most developed countries, privatization took mainly place in the 1980's.

The ownership structure which is a more specific determinant of M&A location does not seem to matter, except in column 4 and 5. It may result from opposite forces offsetting each other at an aggregated level (see section 3.2.2). With a more disaggregated assessment of this variable (a sector rather than a country level), this variable would certainly play a more important role. The variable follower exhibits a positive and significant impact on cross-border M&A operations[29]. Lastly, the similarity of legal rules between buyer and target firms promotes cross-border operations.

To test the robustness of our finding, we now apply an other econometric estimation : the count model (CM).

4.2   Location of cross-border Mergers and Acquisitions : the count model estimation

With a count model (CM), each regression is associated with two different tables. Table 5 models the process of zero M&A in a given sector/country. Coefficients express changes in the probability to attract *no* M&A. In table 6, coefficients indicate the effects of variables on the number of inward M&A in FDI recipient countries.

(about 0.1).

[29]The variable follower represents the total number of M&A per sector-country over the three year period preceding each M&A. We tested the sensibility of this variable to the number of years. The sign is different (respectively similar) for one (two) years.

Table 5: Cross-border M&A : Count model (first stage)

	ZINB(1)	ZINB(2)	ZINB(3)	ZIP(4)	ZINB(5)
market size	-0.832^c	-0.876^c	-0.446	-2.184^c	-1.789^b
	(0.317)	(0.294)	(0.312)	(0.520)	(0.698)
labor cost	-3.934^c	-3.885^c	-5.438^c	-3.841^b	-6.753^b
	(1.281)	(1.170)	(1.830)	(1.519)	(3.056)
productivity	2.838^c	3.031^c	3.638^c	5.866^c	0.582
	(0.873)	(0.843)	(1.202)	(1.814)	(1.753)
capitalization	-1.225^c	-0.802^c	-0.856^b	0.745	-2.372^c
	(0.248)	(0.275)	(0.341)	(0.468)	(0.629)
corporate tax	11.139^c	9.791^c	14.796^c	2.117	22.803^c
	(3.598)	(3.147)	(5.344)	(2.622)	(7.598)
privatization	-0.058	-0.055	-0.318^b	0.113	-0.122
	(0.056)	(0.055)	(0.136)	(0.105)	(0.123)
market access		-0.831	-1.068^b		
		(0.521)	(0.513)		
ownership structure	5.557^c	3.903^c	2.703^c	0.501	13.494^c
	(1.660)	(1.146)	(1.002)	(0.805)	(4.119)
follower			-1.267^b		
			(0.610)		
financial openness				-3.479^b	
				(1.392)	
Constant	76.330^c	58.620^c	61.091^c	19.974	199.290^c
	(20.990)	(17.766)	(20.951)	(15.681)	(55.658)
Observations	3060	2970	2106	2160	2040
Likelihood ratio test ($\alpha =0$)	39.69	20.61	9.12	0.00	5.76
Prob$\geq$chibar2	0.0000	0.0000	0.0000	1.0000	0.0082
Vuong's statistics	3.65	3.72	4.20	4.29	3.91

Standard errors in parentheses
^{c} significant at 10%; ^{b} significant at 5%; ^{a} significant at 1%
All variables are in logarithm

Table 6: Cross-border M&A : Count model (second stage)

	ZINB(1)	ZINB(2)	ZINB(3)	ZIP(4)	ZINB(5)
market size	0.574^c	0.527^c	0.415^c	0.450^c	0.565^c
	(0.069)	(0.078)	(0.070)	(0.119)	(0.095)
labor costs	0.301	-0.016	-0.073	0.119	1.985^c
	(0.268)	(0.282)	(0.272)	(0.330)	(0.402)
productivity	0.397^c	0.594^b	0.528^b	1.119^c	-0.904^c
	(0.235)	(0.233)	(0.206)	(0.244)	(0.308)
capitalization	-0.079	-0.110	-0.116^c	0.120	-0.082
	(0.066)	(0.069)	(0.070)	(0.086)	(0.077)
corporate tax	0.430	0.308	0.770	0.763	0.388
	(0.688)	(0.700)	(0.733)	(0.654)	(0.827)
privatization	0.060^c	0.050^c	0.015	0.048^b	0.055^c
	(0.013)	(0.013)	(0.014)	(0.025)	(0.015)
market access		0.538^c	0.384^c		
		(0.107)	(0.109)		
ownership structure	0.384^c	0.487^c	0.387^c	0.262^c	0.407^b
	(0.139)	(0.141)	(0.138)	(0.138)	(0.168)
follower			0.262^c		
			(0.046)		
financial openness				0.231	
				(0.230)	
Constant	-19.905^c	-14.767^c	-10.284^c	-28.527^c	-22.892^c
	(3.219)	(3.504)	(3.359)	(4.091)	(3.889)
Observations	3060	2970	2106	2160	2040
Log likelihood	-989.889	-964.002	-765.238	-651.649	-511.269
LR chi2	143.92	157.00	138.96	133.31	118.38
Prob>chi2	0.000	0.000	0.013	0.000	0.0000

Standard errors in parentheses
^{c} significant at 10%; ^{b} significant at 5%; ^{a} significant at 1%
All variables are in logarithm

The Vuong statistic detects the presence of excess zeros (both for the Poisson and the negative binomial model). Furthermore, the likelihood ratio test leads us to apply a ZINB model in all specifications except for the fourth one. With count models, bilateral variables (geographical and cultural distance) are to be excluded since data are now aggregated by sector/year/country[30].

Analyze econometric outcomes. The effect of the market size seems to be quite robust and similar at the two different stages of the estimation : at the first stage, the coefficient is negative, which means that a larger market size decreases the probability not to attract M&A. At the second step, the positive sign points out that an increasing demand has a positive influence on the number of firms purchased among host countries.

Certainly for similar reasons, labor costs have again a counter-intuitive impact in concordance with the conditional logit estimation. However, these effect occurs only at the first stage [31]. At the second step, variables are not significant. Once countries have not been rejected as potential hosting countries, differences in labor costs among high labour cost sectors / countries do not play anymore.

Reversely, the impact of productivity is not obvious. A rise in productivity increases the probability not to attract FDI : a company tries to buy out a firm established in a low-productivity sector/country. Then, among the group of selected low-productivity sectors/countries, productivity exerts a positive force on M&A.

We again find such a complex relation between M&A and ownership structure (positive sign both at the first and second stage[32]). A decrease in market capitalization (resp. privatization activity) restricts M&A location but only in the first (second) step. The corporate tax has the

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[30]The variable market access is not anymore bilateral. For each country, we calculate a non-pondered arithmetic mean of access markets with respect to each country partner.

[31]An increase in labor costs decreases the probability to attract no M&A.

[32]The first effect could compensate for the second one, explaining the non-significant sign of this variable in the conditional logit.

opposite (dissuading) effect, but with a larger amplitude : lower tax countries are more attractive as a group. However, conditional on being in the low tax group, variations in the corporate tax is not meaningful [33]. The market access have the same (positive) effect as in the conditional logit. The variable Follower has a negative (respectively positive) sign at the first (second) step confirming a bandwagon effect. The openness of financial markets has a significant effect only at the first stage.

Lastly, restricting the analysis to manufacturing sectors magnifies the coefficients of almost all explaining variables in the first stage. However, in the second stage, apart from labor costs and productivity variables, qualitative and quantitative effects are quite similar. For these variables, as in the logit model, the positive impact of labor costs on M&A location is accentuated (negative and positive sign respectively in the first and second step). As for the productivity, outcomes for both steps now suggest a negative effect, meaning that firms are attracted by low-efficiency local companies.

To conclude, the conditional logit and the count model give almost similar and expected estimations.

5 Conclusion

This paper seeks to analyze the determinants of cross-border M&A location choices. Our study includes M&A between OECD members' firms over the period 1990-1999. We implement two distinct econometric methods : the conditional logit and the count model (Poisson or negative binomial model). In addition to traditional variables affecting FDI location, we take into account some specific determinants of cross-border M&A.

Although the supply of target firms (captured by the market capitalization and the priva-

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[33]It may stem from our imperfect measure of tax. Actual tax may depend on other features of the tax code such as investment allowances or for instance depreciation schedules.

tization activity) effectively constrains the location of M&A, it is found that the geographic distribution of M&A is not determined only by the availability of domestic assets. The market size, the labor cost, the market access and the financial openness matters as well (positive and significant effect on the M&A location). There also seems to be a bandwagon effect. In the opposite, the corporate tax rate and productivity decrease the probability to attract M&A. The significant negative effect of productivity suggests that cross-border M&A are in part driven by efficiency motivations (technological transfers from foreign buyers to acquired domestic firms). This welfare enhancing aspect of international M&A could attenuate the usual fears raised by their anti-competitive effects and the loss of national sovereignty they may imply. Furthermore, with the conditional logit method, cultural and geographic distances and differences in legal rules exert a negative significant impact on M&A strategies.

Finally, this paper contributes to highlight the interest in exploring the geographic features of M&A. Indeed, the importance of M&A geography has been underestimated until now. To conclude, as Chapman (2003) noted, this complex subject certainly deserves further empirical and theoretical research.

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