EUROPEAN CENTRAL BANK

EUROSYSTEM

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FINANCIAL AND INSTITUTIONAL FORCES

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CONTENTS

Abstract

Cross-border mergers and acquisitions (M&As) sharply increased over the last two decades. It is often pointed out that cross-border capital reallocation is partly the result of financial liberalization policies, government policies and regional agreements. In this paper, we identify some of the main forces driving cross-border M&As using a unique database on bilateral cross-border M&As at the sectoral level (in manufacturing and services) over the period 1985-2004. We focus on the role of institutional and financial developments with a special attention to the role played by the European Integration process. We identify the impact of (i) joining the European Union and (ii) joining the Euro on cross-border M&As. We show that EU and EMU have almost doubled M&As in manufacturing towards their members from all over the globe, with an additional 50% increase within EMU countries. Conversely, the service sector did not exploit the opportunity offered by the single currency. We also show how cross-border M&As are linked to the acquirer expected profitability and provide insights on the effectiveness of policies to attract foreign capital (such as corporate tax incentives, and interventions to improve the country's financial system and product market regulations).

Keywords: Cross Mergers and Acquisitions, Gravity Equation, Euro.

JEL Classification: F30, F36, F41, G11.

Non-technical summary

Cross-border mergers and acquisitions activities (M&As) sharply increased over the last two decades, partly as result of financial liberalization policies, government policies and regional agreements.

Capital reallocation across firms occurs either through the sale of property, plant and equipment or through M&As, in which the transfer of financial claims from the acquiring firm brings along that of the underlying assets of the targeted firm. In the case of cross-border M&As, the main activity of the acquirer and target firms are registered in two different countries. Various motives for M&As can be distinguished in general. In the industrial organization literature two basic motives stand out: an efficiency motive and a strategic motive. Efficiency gains arise because takeovers increase economies of scale or scope. Strategic gains arise if M&As change the market structure and thus a company's competitive position and profit level. The main problems with these explanations is that they cannot explain why cross-border M&As move for example in waves together with developments in stock markets. Moreover, cross-border mergers are related to economy-wide shocks, such as the European economic integration.

In this paper, we identify some of the main forces driving M&As, using a unique database on bilateral cross-border M&As at the sectoral level (in manufacturing and services) over the period 1985-2004. The key empirical findings are: (1) EMU helped the restructuring of capital within the same sector of manufacturing activity among euro area firms; (2) joining the EU favoured both horizontal and vertical mergers; (3) policymakers can help attract capital by reducing the corporate tax rates and the degree of product market regulations and by improving the country's financial systems. Specifically, over the average period 1999-2004, EMU increased intra-euro area cross-border horizontal M&As activity in manufacturing by 200%. The estimated effect on euro area M&As from non-euro to euro area countries amounts to a 70% increase. The impact of the euro on vertical mergers in manufacturing sectors from non-euro to euro area countries is also important (about 140%). We also found that the service industry has not yet fully benefited from European integration. Existing barriers to trade in services could have undermined M&As decisions of entrepreneurs in the services industry. Indeed, we show that the level of protection and barriers to entry in the services sector act as a strong deterrent to cross-border M&As in services across countries.

We also find that profitability is a key driver of M&As, as the acquiring sector's stock market capitalization is an important explanatory variable of cross-border M&As within the same sector as well as across sectors for both firm type in manufacturing and services. Q theory suggests that if the market value of a firm over its book value is greater than one - implying the existence of "intangibles" such as brands, reputation and knowledge or growth potential that business analysts and shareholders value - then the firm should increase its capital stock as investing is profitable. The empirical results of this paper provide support to the Tobin's q prediction, and this result can explain also why cross-border M&As come in waves.

Finally, we obtain interesting results on the role of corporate taxation, which are informative for government policies. A 10 percentage point decrease in the differential in effective average corporate taxes between target and acquiring countries would increase the outflows of manufacturing equity investment in the same sector by 68%. This large effect suggests that changes in corporate taxes are an efficient tool to attract foreign capital and raise the question of the coordination of fiscal policies in Europe.

1 Introduction

Cross-border mergers and acquisitions (M&As) have long been an important strategy to expand abroad. Due to technological developments and globalization, M&As activity sharply increased over the last two decades. They skyrocketed in the 1990s reaching a pick in 2000 with the booming stock markets and the larger degree of financial liberalization worldwide, declined sharply in 2001 and 2002 and rebounded again with new developments in the world economy after 2003 (see Figures 1 to 3 in the appendix, section 7.1).[1] Traditionally, developed countries, and in particular the developed countries of the European Union (EU15) and the United States, have been the largest acquirer and target countries of M&As. Over the 2003-2005 period, developed countries accounted for 85% of the USD 465 billion cross-border M&As, 47% and 23% of which respectively pertain EU15 and US firms either as acquirer or as target countries (UNCTAD (2006)).

Despite this increased importance of cross-border M&As, which constitute by far the largest share of foreign direct investment, the determinants underlying such activities remain unclear.[2] The only empirical papers - we are aware of - are Di Giovanni (2005) and Head and Ries (2007), who using respectively Tobit and the Poisson maximum likelihood method, find cultural and geographical proximity to be important determinants of aggregate MAs; Berger at al. (2004) who using Tobit look at determinants of cross-border transaction values in the financial sector; while Goerg et al (2006) and Focarelli and Pozzolo (2008) focus on the number of cross-border deals using the negative binomial regression model, respectively for M&As in manufacturing sectors and those in banking and insurance.

In this paper, we focus on the role of institutional and financial developments on cross-border M&As related to manufacturing and service sectors with a special attention to the role played by European integration using Poisson maximum likelihood method. The institutional environment is of a particular interest for cross-border M&As since they are affected by various regulations at the country level (or regional level) such as competition policy, corporate and capital taxes, various restrictions to capital movements across borders, protection of certain industries.

From that perspective, the Single European Market in 1992 and the Third Stage of Economic and Monetary Union (EMU) in 1999 constitute important experiments to evaluate the impact of regional agreements on capital reallocation. In the paper, we jointly investigate the impact on cross-border M&As of joining the European Union (EU effect), whose single market formally removes

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[1]Capital reallocation across firms occurs either through the sale of property, plant and equipment or through M&As, in which the transfer of financial claims from the acquiring firm brings along that of the underlying assets of the targeted firm. In the case of cross-border M&As, the main activity of the acquirer and target firms are registered in two different countries.

[2]A review of the literature in management science can be found in Shimizu et al (2004).

the remaining barriers to free movements of capital, labour, goods and services within the European Economic Community;[3] and the impact of adopting the euro (EMU effect), whose introduction should have facilitated the movement of capital by boosting financial integration in the euro area, through the reduction of the cost of capital, the elimination of exchange rate risk, the sharing of common trading platforms (e.g. the creation of Euronext through the cross-border merger of the Amsterdam, Brussels, Lisbon and Paris exchanges) and integration in post-trading market infrastructure.

While the impact of the EMU on trade in goods and portfolio flows has attracted a great deal of attention from policy makers and scholars,[4] such analysis has not been performed for capital reallocation through cross-border M&As.[5] Has EU/EMU fostered capital reallocation through M&As across their member states? Has EU/EMU increased their capacity to attract capital from the rest of the world? These are crucial questions for potential entrants who would like to assess the benefits of joining EU/EMU.

Besides the role played by EU or EMU membership, understanding more broadly the determinants of capital reallocation across countries is key for policymakers, as most countries try to provide incentives to attract FDI without a clear evaluation of their policies.

Literature classifies the various motives to merge in the following main groups (see e.g. Perry and Porter (1985), Andrade *et al.* (2001), Nocke and Yeaple (2007), Long *et al.* (2007)):[6] 1) high-Tobin's q firms are those with the best technology and seek to expand their capital stock[7]; 2) efficiency gains arise because takeovers increase economies of scale or scope or other synergies, such as tax considerations or acquisition of funds; 3) strategic gains arise if M&As change the market structure and thus a company's competitive position and profit level by forming monopolies or oligopolies; 4)

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[3]Neary (2007) shows that trade liberalization can trigger cross-border merger waves.

[4]Examples of the former are Rose (2000), Micco, Stein and Ordonez (2003), Flam and Nordstrom (2003), Baldwin and Taglioni (2006), Baldwin (2006); examples of the latter are Lane (2006), Coeurdacier and Martin (2006), De Santis and Gerard (2006).

[5]The closest paper to our work is Petroulas (2007), who estimated the impact of the introduction of the euro on inward FDI flows and finds that the EMU increased FDI flows by approximately 15% within the euro area. See also De Sousa and Lochard (2006a, 2006b) and Schiavo (2007) for related work on the impact of EMU on FDI flows. However, these studies do not control for developments in the stock market and for the general tendency of investing in the euro area from the rest of the world. As a result, their estimates may be somewhat upward biased.

[6]See Nocke and Yeaple (2007) and Head and Ries (2007) for additional references on theoretical industrial organization issues.

[7]Q theory suggests that if the market value of a firm over its book value is greater than one - implying the existence of "intangibles" such as brands, reputation and knowledge or growth potential that business analysts and shareholders value - then the firm should increase its capital stock as investing is profitable. Jovanovic and Rousseau (2002), for example, show that the q-theory of investment can be used to explain domestic investment via M&As and find that M&As respond to stock market developments by more than direct investment. Eisfeldt and Rampini (2005) used the Tobin's q to show that capital reallocation between firms is procyclical. De Santis *et al.* (2004) argue that the q-theory of investment can also translate in higher FDI outflows and find that a rise in the euro area stock market (a proxy for euro area Tobin's q led to an increase in euro area outward FDI to the United States over the period 1980 to 2001. Similarly, De Santis and Ehling (2007) - looking at the interlinkages between FDI and foreign portfolio investment among Germany, the other G7 economies and Switzerland over the quarterly period 1980-2006 - find that German FDI outflows and inflows are both function of Tobin's q.

building empires allow to diversify and hedge against sectoral shocks; 5) managers might be motivated by managerial compensation or pure ego. It is very difficult to empirically disentangle these different strategic elements. We focus on the value-enhancing motives, which broadly encompass the first three main groups. M&As can help satisfy future goods demand, can reduce costs, might change the market structure and the market power, thereby affecting future profits captured by the market valuation of the acquiring firm. We also attempt to look at the building empire motives by looking at mergers within a given sector (horizontal) or across different sectors (vertical).

We also control for the impact of the quality of institutions in driving cross-border M&As. Sound institutions and a high degree of governance play an important role in the competitiveness of an economy as well as a country's credibility vis-à-vis international investors. Reliable institutions enhance transparency, and sound legal and political systems offer a less uncertain environment to investors. Therefore, countries' institutions might also affect the reallocation of capital cross-border by reducing the cost of the capital.[8]

We also raise the questions of the effectiveness of fiscal policies and of product market regulations in attracting foreign capital. One implication of the processes of financial globalization and European integration is that capital is more mobile internationally, which raises concerns regarding the use of tax and market regulation policies in order to compete across countries. The issue of capital attractiveness leads to several discussions within the EU on possible tax and market regulation harmonization among member states. While one could argue that countries with higher corporate taxes and higher degree of market regulations are less attractive for cross-border M&As, the quantitative impact of these policies on firms' location decisions is essentially an empirical question.

To assess the impact of the main forces driving cross-border M&As, we construct a unique database for 10 acquiring manufacturing sectors and 10 acquiring service sectors located in 21 different countries targeting foreign assets in 31 different host countries (over the 1985-2004 period). Specifically, an acquiring manufacturing firm (sector) can merge with or acquire foreign firms whose main activity can be classified (i) in the same sector of the acquiring firm ("within mergers"), or (ii) in a different manufacturing sector or service sector ("across mergers"). Similarly, an acquiring service firm (sector) can merge with or acquire foreign firms within the same sector, or whose main activity is either in manufacturing or in a different service sector. We believe that mergers occurred within sectors includes mostly horizontal mergers while mergers across sectors can be seen as vertical mergers.[9]

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[8]Alfaro et al. (2007, 2008) find institutional quality to be a causal determinant of equity and FDI inflows (see also Wei (2000a, 2000b) for earlier work on these issues). Using FDI stocks in a cross-section analysis, Daude and Fratzcher (2007) found that institutions do not affect FDI positions.

[9]We must be cautious with this interpretation since cross-border M&As are aggregated at the 2-digit level and some mergers within the same sector might be vertical ones.

From 1948 to 1994, the General Agreement on Tariffs and Trade (GATT) provided the rules for much of the world goods trade. Moreover, the OECD has been promoting the liberalization of capital account operations among its members since the early 1960s. However, the code of liberalization covering cross-border services has not been yet agreed (OECD, 2002). The General Agreement on Trade in Services (GATS) is the only agreement at the international level which regulates and liberalizes trade in financial services as well as investment of financial services providers.[10] The GATS agreement was negotiated in the Uruguay Round (1986-1994). Members (self-)committed to launch successive rounds of services negotiations with a view to achieving a progressively higher level of liberalization. The first such round was to begin no later than five years from the date of entry into force of the Agreement and, accordingly, started in 2000. Within the time frame of the overall negotiating deadline of 1 January 2005, the Doha Development Agenda establishes that "participants shall submit initial requests for specific commitments by 30 June 2002 and initial offers by 31 March 2003". Needless to say that large restrictions in trade in services are still in place and their elimination is under policy discussion.

Therefore, we assess the determinants of cross-border M&As in such activities separately, as pooling them in regression analysis would be inappropriate, given different developments on the process of liberalization of trade and investment in manufacturing and services. This is especially important when we test the impact of market regulations on cross-border M&As.

The key findings can be summarized as follows: (1) EMU helped the restructuring of capital within the same sector of manufacturing activity, thereby enhancing efficiency, particularly among euro area firms; (2) joining the EU implies adopting the Single European Market Act, which favored both horizontal and vertical mergers; (3) the acquiring sector's expected profitability is a key driver of cross-border M&As; (4) policymakers can help attract capital by reducing the corporate tax rates and the degree of market regulations and by improving the country's financial systems. As expected, the degree of market regulations plays a key-role for M&As in the service sector (but not for manufacturing); (5) physical and cultural proximities facilitate cross-border M&As, while geographical distance is much more relevant for developing countries.

Overall, we shed light on the major role played by European integration to foster cross-border M&As between EMU countries in the manufacturing sector (preferential financial liberalization). On top of this reallocation inside EMU, we also find that manufacturing sectors of both EU and EMU have attracted equity capital from the rest of developed countries (unilateral financial liberalization).

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[10]According to the GATS agreement, trade in services can take different forms: cross-border trade, consumption abroad, commercial presence, and presence of natural persons. Commercial presence implies that a service supplier of one member establishes a territorial presence, including through ownership or lease of premises, in another member's territory to provide a service (e.g. domestic subsidiaries of foreign insurance companies or hotel chains).

The European integration effects are not found in the service industry. We provide some evidence suggesting that capital reallocation in services did not occur owing to the high degree of product market regulations in these sectors, which hindered entry of foreign firms in national markets.

The remaining sections of the paper are structured as follows: Section 2 describes the estimation strategy following the literature on gravity and FDI and presents the data. Sections 3 and 4 discuss the main empirical results for manufacturing and services, respectively. Section 5 presents some additional results on the role of EMU, financial depth and distance. Section 6 concludes.

2 Estimation strategy to model cross-border M&As

2.1 Theoretical motivation

We follow Head and Ries (2005, 2007) to model the location decision of multinational firms through M&As.[11] For simplicity, we abstract from time and sectoral subscripts.

Denote with p_{ij} the probability that a randomly drawn company from country i acquires a randomly drawn target in country j. Using the total stock of targets in country j (k_j) and the total number of potential acquiring company in country i (m_i), the expected value of mergers and acquisitions ($M\&A_{ij}$) between country i and j is:

$$E(M\&A_{ij}) = m_i p_{ij} k_j \tag{1}$$

Assume also that net profits from an acquiring company s_i in country (i) for an investment in country j are $[\pi_i - \sigma t_{ij} + \varepsilon_{s_{ij}}]$, where π_i is the discounted value of the gross profits due to the profitability of the merger, t_{ij} denote transaction costs between markets i and j (note that t_{ij} can be a multi-dimensional vector) and $\varepsilon_{s_{ij}}$ is random term of unobserved firm level characteristics, independently distributed with Type I Extreme value cumulative distribution ($CDF(\varepsilon) = \exp(-\exp(-\varepsilon))$).

Using discrete choice theory (see Mac Fadden (1974)), one can show that under such assumptions:

$$p_{ij} = \frac{\exp(\pi_i - \sigma t_{ij})}{\sum_l m_l \exp(\pi_l - \sigma t_{lj})} \tag{2}$$

where the probability to win the bid for a firm in country i is positively related to the discounted value of its expected profits and negatively related to transaction costs; but it also depends on the position of all the potential competitors, $B_j = \sum_l m_l \exp(\pi_l - \sigma t_{lj})$, with respect to market j. Using the latter expression, we get:

$$E(M\&A_{ij}) = m_i \frac{\exp(\pi_i - \sigma t_{ij})}{B_j} k_j \tag{3}$$

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[11]See also Guimaraes, Figueirdo and Woodward (2003).

where B_j is a measure of the "financial remoteness" of market j. The interpretation of this term is clearcut: (i) the higher the discounted value of the expected profits of all other potential buyers or (ii) the easier it is for all potential acquiring firms to buy a target firm in country j, the more difficult it is for a firm in country i to compete on such an asset. Given the analogy with the "multilateral resistance factor" developed in the trade literature (Anderson and Van Wincoop (2003)), B_j is alike the "market potential" (or "supplier access"). We can rewrite (3) as follows:

$$E(M\&A_{ij}) = \exp\left(\log(m_i) + \log(k_j) - \log(B_j) + \pi_i - \sigma t_{ij}\right) \tag{4}$$

where m_i and k_j are related to market sizes, π_i is related to the profitability of investments in country i and t_{ij} is related to transaction costs between markets.

We can therefore use the gravity equations framework to estimate the impact of various determinants of cross-border M&A in a given sector s, which takes the following form[12]

$$M\&A_{ij,s,t} = e^{\alpha_i} e^{\alpha_j} e^{\alpha_t} e^{\alpha_s} (\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t})^{\beta} Z_{ij,s,t}^{\theta} \eta_{ij,s,t} \tag{5}$$

where $M\&A_{ij,s,t}$ denotes M&A between source country i (acquirer) and host country j (target) at time t in sector s, $\text{GDP}_{i,s,t}$ (resp. $\text{GDP}_{j,s,t}$) stands for the market size of sector s in country i (resp. j), $Z_{ij,s,t}$ is a set of control variables (linked to expected profitability of firms, transactions costs and other barriers) that might affect cross-border M&A and α_i, α_j, α_t and α_s are the source and host country fixed effects, a time-fixed effect and a sectoral fixed-effect respectively. $\eta_{ij,s,t}$ is an error term assumed to be statistically independent of the regressors.

The use of acquirer/target fixed-effects is necessary to control for unobservable countries characteristics in order to limit potential biases due to omitted variables in the estimation. In particular, it allows to control for the "financial remoteness" B_j of some host markets (assumed to be constant over time). We also control for time fixed-effects since cross-border M&As have been strongly increasing over time due to increasing financial integration across countries. As for $Z_{ij,s,t}$, we assume that they are function of geography, institutions and financial variables capturing expected profitability of firms. Variables are described in detail in the following subsections.

2.2   Description of the data on mergers and acquisitions

We construct an annual panel of cross-border M&As of completed transactions in the manufacturing sector and services at the second digit for a sample of 21 "source" (acquiring) countries and 31 "host" (target) countries using Thomson Financial (SDC Platinum) over the 1985-2004 period. Countries and sectors (10 manufacturing and 10 service sectors) are described in the Appendix (section 7.2).

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[12]For other theoretical foundations of gravity models for FDI, see among others Bergstrand and Egger (2007) and Ramondo (2007).

The panel covers the largest industrialized markets, which accounts for a very large share of cross-border M&As. For example, over the 1999-2004 period, the panel covers 74% of the world cross-border M&As (72% in manufacturing and 75% in services). Over this period, the total annual transactions covered by the panel amount to EUR 458 billions. Over the period considered, services accounted for about one half of total cross-border M&As. At the end of the 1980s, cross-border M&As accounted for about one tenth the amount of transactions recorded at the turn of the new century (see Tables 18 and 19 in the Appendix).

Over the period considered, the most important acquiring manufacturing sectors in terms of size accounting for almost three quarters of global M&As in manufacturing are (i) chemicals, petroleum, coal, rubber and plastic products, (ii) machinery and equipment, and (iii) food, beverages and tobacco. For services, one third of world M&A in services involved electric, gas and water supply as the acquiring sector with Japan being very active. The second most important sector is financial intermediation excluding banking and insurance with the United States playing an important role.

We divide the twenty years sectoral observations in two main groups:

1) M&As occuring within the same sector ("within sectors"): acquirer and target firms belong to the same sector.

2) M&As occuring across sectors ("across sectors"): the acquirer firm is targeting a firm whose main activity does not belong to the sector of the acquirer (according to our level of disaggregation).

Broadly speaking, this decomposition allows us to indirectly disentangle the determinants of M&As driven to allocate efficiently production across the globe from M&As that are intended to build conglomerates (and essentially driven by risk diversification motives or "empire building" motives). In the sample, around two thirds of M&A transactions have occurred within the same sector.

2.3   Description of the regressors

Following expression (5), we study M&As by assessing the roles of market size, transaction costs and firms' expected profitability.

The first key variable is sectoral GDP in the source and the host country at time t. We restrict the elasticity to be the same for country i and country j by using the log of the product of the two GDPs at date t ($\log(\text{GDP}_{i,s,t} \, \text{GDP}_{j,s,t})$), but none of the results depend on this restriction.

As for transaction costs, the empirical literature on trade and FDI flows points out the roles of geography and institutional settings. Accordingly, we use the bilateral geographical distance[13] between the main cities of country i and country j denoted by Dist_{ij} and a dummy Border_{ij}, which equals one when the two countries share a common border. We also use the dummy ComLang_{ij}, which equals

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[13]Geographical distance is taken from the data set on manufacturing trade of the World Bank (Nicita and Olarreaga (2007)).

one if the two countries share a common language.

As for the institutional setting, we control for the quality of institutions in the source (resp. host) country by means of an indicator of civil liberties $\text{CivLib}_{i,t}$ (resp. $\text{CivLib}_{j,t}$) at time t, which measures over time and across countries the freedom of expression and belief, the association and organization rights, the rule of law and human rights, personal autonomy and economic rights. Civil liberties is taken from Freedom House and ranges between one (the best country) and seven (the worst country). It quantifies the expansion of political democracy, personal liberties, and good government practices, which has been remarkable over the years, also because the abuse of power by governments and their interference with the lives of their citizens have generally been on the declining trend. We expect that an improvement in countries' civil liberties reduces the cost of capital and encourages investment in these economies. We choose this indicator rather than an indicator of institutional quality more related to economic concepts mostly because of its wide cross-country coverage over the sample. This indicator is nevertheless highly correlated to other institutional variables, such as corruption indices from Transparency International or variables from La Porta *et al.* (2006).

In discussing the institutional setting, given the important role of EU and particularly euro area firms in cross-border deals, it is useful to assess the role of European integration. To study the impact of EMU we use two dummies constructed as follows: $\text{EMU}_{i,t}\,\text{EMU}_{j,t}$ is equal to one if both countries belong to EMU at time t and zero otherwise; $\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$ is equal to one when the host country j belongs to the euro zone but not the source country. Using two different dummies allow us to quantify the impact of EMU on cross-border M&A both within the euro area (preferential financial liberalization) and between countries outside the EMU and EMU countries (unilateral financial liberalization). One could also add a dummy equal to 1 when the source country belongs to EMU but not the target. Indeed, one could potentially expect some diversion effects similar to the trade literature. However, this dummy was never significant and we decided not to consider it in our analysis.

A similar set of dummies is used to study the effect of EU: $\text{EU}_{i,t}\,\text{EU}_{j,t}$ is equal to one if both countries belong to the EU at time t and zero otherwise; $\text{NONEU}_{i,t}\,\text{EU}_{j,t}$ is equal to one when the target belongs to the EU but not the acquirer.

As for expected profitability of firms, a neoclassical model of investment predicts that countries with higher Tobin's q increase their capital stock also through cross-border M&As. Therefore, we control for the market capitalization over GDP of the acquirer country i in a given sector s: $\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$. One could argue that the Tobin's q should be measured by the market-to-book ratio but unfortunately such a variable is not available for a wide cross-section of countries over the period considered. For the countries on which data is available, the market-to-book ratio is highly correlated with market-to-GDP

ratio: the correlation coefficient is as high as 0.9.[14]

We also control for the market value-GDP ratio of the target country j, as M&As might be more likely when foreign capital is more economical (Baker, Foley and Wurgler (2008)), $\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$. The use of the market capitalization to GDP ratio of acquirer and target countries can also help controlling for equity bubbles, which ex post was particularly evident at the turn of the century. Data market capitalization is the yearly average market value of the sector from Thomson Datastream and data on sectoral GDPs are obtained from OECD (Stan database).

Finally, we study the role played by some other potential barriers to cross-border M&As such as corporate taxation and product market regulation. We do not include these variables in our benchmark regressions but add them in some robustness checks as they are not available for the whole set of countries considered.

We assess the role of corporate taxation using annual corporate tax rates constructed by Devereux and Griffith (2003) for a wide range of OECD countries.[15]

As for product market regulations, the OECD has constructed comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. Specifically, the indicators cover formal regulations in the following areas: state control of business enterprizes, legal and administrative barriers to entrepreneurship, barriers to international trade and investment[16]. Two different types of product market indicators exist that are consistent across time and countries: (1) economy-wide indicators and (2) sectoral indicators for a given country.

(1) The economy-wide indicator is an index that summarizes a large set of rules and regulations that have the potential to reduce the strength of competition (regulations to entry, public ownership and degree of competition). This indicator has been constructed for the economy as a whole only at two points in time - 1998 and 2003 - and for the service industry for annual period between 1975 and 2003. Given that the correlation between the aggregate indicators for services and the whole economy for the two years 1998 and 2003 is very high (around 0.8), the indicator on the regulation for services is used as a proxy for the degree of product market regulation also in manufacturing to cover the time dimension of the sample. Moreover, the OECD disaggregates the product market regulation indicator in three different dimensions: an index of regulation excluding public ownership (based on entry barriers and degree of competition), an index of entry barriers and an index of public ownership. We make use of these disaggregated components, as they can provide valuable information about which

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[14]Note that this correlation should be unity if the capital-output ratio were constant.

[15]Data on corporate taxation among OECD countries over the period 1984-2004 are taken from M.P Devereux's website. See Devereux and Griffith (2003) and Devereux, Griffith and Klemm (2002).

[16]Data on product regulations are available only for OECD countries (see Indicator of Product Market Regulations on the OECD website for data source).

dimension of regulations matters most for cross-border M&As.

(2) The sectoral indicators in OECD countries between 1975 and 2003 are computed assessing the degree of regulations in some key service industries, such as airline, rail and road transport, electricity and gas, post and telecommunications and retail distribution (see Conway et al. (2005) and Conway and Nicoletti (2006)). They measure the potential costs of anti-competitive regulation in a given sector of the economy. Conversely, the indicators for manufacturing are incomplete, as they are simply imputed from those in services using input-output tables: the indicators for manufacturing are increasing with the use of the output of the service industries as intermediate inputs in the production process of the sector.

The descriptive statistics concerning the sectoral indicators (across countries and across sectors) are provided in the appendix (see Tables 16 and 17). They indicate that services are strongly regulated particularly in Greece and France and less so in New Zealand, the UK and the US.

Finally, as robustness checks, we also control for bilateral trade in goods at the sectoral level as well as the financial depth of a country using the ratio of domestic credit to GDP in the target and acquiring country at a given date. Sectoral goods trade data (exports) are provided by the World Bank (Nicita and Olarreaga (2007)), while domestic credit over GDP is provided by the World Development Indicators of the World Bank.

2.4   Specification and methodology

Cross-border M&As (M&A$_{ij,s,t}$) are the total value of assets purchased through M&As in the target country j firms in sector s resident in country i at year t. The determinants of such variable are obtained estimating the following regression

$$
\begin{aligned}
\text{M\&A}_{ij,s,t} = \ & \exp[\alpha_i + \alpha_j + \alpha_t + \alpha_s + \beta_1 \log(\text{GDP}_{i,s,t}\text{GDP}_{j,s,t}) + \beta_2 \log(\text{Dist}_{ij}) + \beta_3 \text{Border}_{ij} + \beta_4 \text{ComLang}_{ij} \\
& + \beta_5 \text{CivLib}_{i,t} + \beta_6 \text{CivLib}_{j,t} + \beta_7 \log(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}) + \beta_8 \log(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}) + \gamma_1 \text{EMU}_{i,t}\, \text{EMU}_{j,t} \\
& + \gamma_2 \text{NONEMU}_{i,t}\, \text{EMU}_{j,t} + \delta_1 \text{EU}_{i,t}\, \text{EU}_{j,t} + \delta_2 \text{NONEU}_{i,t}\, \text{EU}_{j,t} + \theta z_{ij,s,t}]
\end{aligned}
\tag{6}
$$

where the α's are our set of fixed-effects, which control for unobservable country/sector characteristics, and $z_{ij,s,t}$ is a set of additional controls variables (not used in our benchmark regressions), such as corporate taxation, product market regulation, exports and credit.

Once taken into account data attrition caused by our control variables, we have about 8000 observations in each manufacturing or service sector; since we have 10 sectors in manufacturing (resp. 10 in services), this makes approximately 80,000 observations in manufacturing (resp. 80,000 observations in services) of which about 5% are non-zero. Indeed, at a given date, in a given sector and for a given pair of countries, it is very likely that no M&A deal occurs. The lack of M&As deals

in the sample leads to biased estimators in standard OLS regression and therefore we use Poisson Maximum-Likelihood estimators throughout the analysis (see Santos Silva and Tenreyro (2006), and Head and Ries (2007)).[17] As explained by Razin and Sadka (2007a, 2007b), Tobit estimators are consistent if the presence of zeroes is due to measurement errors (some transactions are not observed). While our data are certainly subject to some measurement errors (some M&As might not be recorded by Thomson Financial), most of the zeroes are "true zeroes" in the sense that no M&As occur that year for a given sector s and a given country-pair $\{i;j\}$. In that case, Tobit estimator are likely to be biased. Therefore, the discussion of the empirical results is based on Poisson estimations.

Being concerned by the large amount of zeroes, we also ran regressions on bilateral cross-border M&As at the aggregate level (where non-zero observations account for more than 20%): the estimates are fully consistent with the results obtained using sectoral data. Therefore, we mostly focus the analysis showing regression at the sectoral level (except for some robustness checks on the role of EMU in Section 5 of the paper).

3 Cross-border M&As in manufacturing sectors

3.1 Total cross-border M&As

The results of the benchmark specifications for total manufacturing obtained using Poisson quasi-MLE are shown in Table 1. The sectoral regressions cover the period 1985-2003 due to the lack of the sectoral value added in 2004, while the aggregate regressions (non reported because results are broadly similar) are based over the period 1985-2004.

Common language and border dummies are significant. The estimates of the common language dummy is fully in line with previous estimates of Head and Ries (2007). Surprisingly, the impact of geographical distance is close to zero and non significant while in previous papers it has been shown to be a major determinant for M&A transactions (Di Giovanni (2005), Goerg, Hijzen and Manchin, (2006), Head and Ries (2007)).[18] We attribute this finding to the combination of three factors. First, as shown by Head and Ries (2007) and Santos Silva and Tenreyro (2006), estimates tend to be strongly biased upwards in standard OLS or Tobit estimations, which have been widely used in past literature.[19] Second, most countries in our sample are developed markets. If distance proxies for information costs (Portes and Rey (2005)) or monitoring costs (Head and Ries (2007)), it is very likely that such costs are much less distance related among developed markets. Finally, the specification includes a border

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[17]Razin and Sadka (2007a, 2007b) also show the bias in OLS or Tobit estimations and correct it using an alternative method based on an Heckman-selection model.

[18]We also tested a dummy variable for a common legal system, following La Porta *et al.* (1998) but this variable was not significant.

[19]In an non-reported regression, we find that Tobit estimations give a large impact of distance on M&A transactions. Other variables of interest were essentially unaffected.

dummy and regional agreement dummies which are partly collinear with the distance variable.[20] We will investigate further the role of distance in section (5.4).

	Cross-border M&A$_{ij,s,t}$ in manufacturing		
	(1)	(2)	(3)
$\log(\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t})$	.924***	.907***	.812***
	(.186)	(.183)	(.177)
$\log(\text{Dist}_{i,j})$	-.064	-.059	-.056
	(.124)	(.124)	(.125)
Border_{ij}	.404*	.407*	.392*
	(.227)	(.226)	(.226)
ComLang_{ij}	.566***	.564***	.580***
	(.166)	(.167)	(.164)
$\text{EMU}_{i,t}\,\text{EMU}_{j,t}$	1.013***	.995***	.940***
	(.355)	(.344)	(.336)
$\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$	.586**	.570**	.599**
	(.246)	(.247)	(.249)
$\text{EU}_{i,t}\,\text{EU}_{j,t}$	1.100*	1.039*	1.132**
	(.568)	(.558)	(.564)
$\text{NONEU}_{i,t}\,\text{EU}_{j,t}$	.849*	.791*	.868*
	(.454)	(.445)	(.451)
$\text{CivLib}_{i,t}$		-.158	-.096
		(.207)	(.208)
$\text{CivLib}_{j,t}$		-.730***	-.714***
		(.236)	(.238)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$			.557***
			(.097)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$			-.120
			(.085)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
# Obs.	78490	78490	76642

Table 1: Gravity Models on bilateral M&As at the sectoral level (manufacturing sector). Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

The quality of institutions in the host country is found to be an important determinant: countries with poor civil liberties might have a higher cost of capital and therefore are relatively less attractive. The effect is quantitatively important since an improvement of the indicator of civil liberties in the host country from 5 (the level of Turkey) to 1 (the US) doubles inward cross-border M&As *ceteris*

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[20]Without any other controls but market sizes, the elasticity of distance is significant, yet much lower than previous estimates (estimates is -0.2).

paribus.

The interpretation of the EMU effects is relatively straightforward: the adoption of the single currency has increased both cross-border M&As between euro area countries (preferential financial liberalization, $\gamma_1 \simeq 0.95$) and M&As from non-euro area countries towards euro area countries (unilateral financial liberalization, $\gamma_2 \simeq 0.6$). The magnitude of these effects is large since the single currency has raised respectively intra-euro area cross-border M&As by 160% and M&As from non-euro area countries towards euro area countries by 80%. In other words, EMU has increased cross-border M&As towards the euro area from all over the globe (including the individual euro area countries) by 80% with an additional increase between euro area countries of about 40%.[21] The EMU effects on cross-border M&As are of the same order of magnitude than those found for the reallocation of bond portfolios and larger than those found for equity portfolios (see Lane (2005), Coeurdacier and Martin (2006), De Santis and Gerard (2006)).

Similarly to the criticisms against the common currency effect on trade, it could be argued that the EMU effects are too large because the gravity equations are not well performed. First, we control for the common preferential trade agreement (the EU), geography as well as institution quality. Second, the EMU effects are neither driven by unobservable characteristics of euro area countries (controlled by source/host countries fixed effects), nor by an increasing number of M&As through time due to financial liberalization (controlled by the time fixed-effects), nor by some cyclical properties of stock prices in euro countries around the beginning of the EMU (controlled by both the acquirer and the target countries market capitalization). Still, it can be argued that EMU dummies are capturing the impact of some omitted variables. In the next section, we will try a number of potential candidates (trade, taxation and market regulations)[22]. Moreover, we run some additional robustness checks in section 5, focusing on the impact of EMU over time by controlling for unobservable factors with EMU that have been constant over time. Results hardly change.

The results concerning the EU effects are similar to those described for EMU, but note that $\delta_1 = 1.13$ and $\delta_2 = 0.87$ are not very different; everything else equal, the EU Single market has mostly increased M&As towards the EU from all countries in the world. We have weak evidence that the EU fostered M&As between EU countries in addition to the unilateral financial liberalization effect. Overall, the additional "M&A creating" effect of the EU is slightly less robust than for EMU.

Finally, sectoral M&As strongly react to movements in the market capitalization to GDP ratio of the acquiring sector. Sectors experiencing a stock market boom tend to expand by investing abroad

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[21]Given the functional form (5) and the definition of the two EMU dummies, the additional EMU effect between euro area countries is computed as follows $e^{\gamma_1 - \gamma_2} - 1$.

[22]We also control for bilateral nominal exchange rate volatility. Results remain invariant and this additional control was not significant (non-reported).

through M&As. This is consistent with standard Q-theory of investment. The estimates are both significant and large in magnitude. One could have expected that firms tend to buy assets in countries experiencing a drop in asset prices. This would be consistent with an efficient reallocation of capital from high Q countries towards low Q countries (see Jovanovic and Rousseau (2008)). This does not seem to be the case, since the estimate is not significant (even though the sign is negative).

Bris *et al.* (2007) show that the euro has increased Tobin's *q*-ratios among 11 euro area member states relative to the other 5 European countries. Part of the increase in corporate valuations is explained by the decrease in interest rates and by the decrease in the cost of equity. This result is very interesting in the light of our paper because the impact of EMU via the stock market capitalization to GDP ratio would capture the effect of the reduction of the cost of capital, while the binary variables would capture other elements linked to the removal of barriers to financial trade, which have all facilitated the reallocation of capital among euro area countries.

3.2 Cross-border M&As within and across sectors

How do results change when considering horizontal and vertical cross-border M&As separately? Results with such decomposition are shown in Table 2.

EMU increased intra euro area horizontal cross-border M&As in manufacturing by about 200%. The estimated effect on euro area M&As from non-euro to euro area countries amounts to about 70%, but it is statistically significant at 15% level. The impact of the euro on vertical M&As between euro area countries is not statistically significant, while non-euro area countries seem to have diversified their investment risk purchasing euro area assets. Therefore, the euro has facilitated cross-border M&As within the euro area, which aimed at restructuring capital within the same sector of activity, rather then boosting the formation of conglomerate activities between euro area sectors.

Both EU binary variables are very similar in magnitude in both horizontal and vertical mergers of the manufacturing sector. However, reducing the number of observed deals by cutting the sample in two increases the standard errors of the variables capturing the EU effect in (i) intra-EU horizontal activity and (ii) extra-EU vertical mergers targeting EU firms, thereby making the coefficients statistically significant only at 10-15% confidence interval.

A 1% increase in the stock market capitalization to GDP ratio in a given country is associated with a 0.4% increase in mergers within the same sector (horizontal) from firms of that country, while the response of mergers across sectors (vertical) is twice as large (0.8%). We see that as a confirmation that stock market developments and profitability are important drivers of M&As whatever their nature.

As for the institutional setting, we find the variable to be statistically significant only for mergers across sectors (vertical). The variable aims at capturing the degree of economic freedom in a country.

	Cross-border M&A$_{ij,s,t}$ in manufacturing			
	Within sectors		Across sectors	
	(1)	(2)	(3)	(4)
$\log(\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t})$	.970***	.883***	.771***	.690***
	(.226)	(.228)	(.261)	(.248)
$\log(\text{Dist}_{i,j})$	-.060	-.059	-.114	-.101
	(.155)	(.156)	(.243)	(.244)
Border_{ij}	.658**	.646**	-.138	-.152
	(.300)	(.299)	(.391)	(.383)
ComLang_{ij}	.217	.226	1.156***	1.192***
	(.234)	(.233)	(.245)	(.233)
$\text{EMU}_{i,t}\,\text{EMU}_{j,t}$	1.121***	1.090**	.477	.377
	(.434)	(.430)	(.379)	(.368)
$\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$	.494	.519	.839**	.882**
	(.327)	(.331)	(.363)	(.364)
$\text{EU}_{i,t}\,\text{EU}_{j,t}$	1.016	1.091	1.279**	1.410***
	(.698)	(.691)	(.503)	(.525)
$\text{NONEU}_{i,t}\,\text{EU}_{j,t}$	.898*	.967*	.786	.876
	(.516)	(.517)	(.563)	(.544)
$\text{CivLib}_{i,t}$	-.334	-.284	.130	.200
	(.267)	(.273)	(.266)	(.285)
$\text{CivLib}_{j,t}$	-.363	-.355	-1.484***	-1.445***
	(.265)	(.271)	(.370)	(.361)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$		.413***		.811***
		(.105)		(.202)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$		-.100		-.180
		(.100)		(.119)
Source country dummies	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
# Obs.	78490	76642	78490	76642

Table 2: Gravity Models on bilateral M&As at the sectoral level (manufacturing sector): M&As within and across sectors (other).
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

The higher the degree of liberties in the target countries, the easier it is for firms with their main activities based in other countries to build conglomerates by acquiring, or merging with, those firms located in freer markets.

The border effect is positive and statistically significant for horizontal mergers in manufacturing. Sharing a common border might imply a rise in competition and these stimulated mergers. Common language is also considered a potential factor reducing the cost of doing business. The latter is

significant for vertical mergers. Overall, the results suggest that physical and cultural proximity are determinants of cross-border mergers in manufacturing.

3.3 The role of trade, corporate taxation and product market regulation

3.3.1 The role of trade in goods

A key variable, which might have been affected by EMU and potentially correlates with cross-border M&As, is bilateral goods trade, even though the impact of EMU on trade has been shown to be empirically very small (Flam and Nordstrom (2003); see also Baldwin (2006) for a survey). We are aware that bilateral goods trade and cross-border M&A flows should be simultaneously determined, but we cannot provide useful instruments to goods trade that are independent from cross-border M&As. Having said that, the endogeneity is more an issue for firms' sales and less for investment, as the latter requires an adjustment period before it is translated into production. Thus, we simply run the previous regression and control for the log of bilateral manufacturing exports[23] between country i and country j in sector s divided by the product of GDPs at date t ($\log(\frac{\text{Export}_{ij,s,t}}{\text{GDP}_{i,s,t}\text{GDP}_{j,s,t}})$). In theory, cross-border M&As can be trade creating (due to intra-firm trade for instance) or a substitute for trade. In our regression, we find the impact of trade to be not statistically significant. This suggests that the two potential theoretical channels of trade on M&As cancel out in the data, even though such a conclusion must be taken with extreme caution since it is hard to infer any causality from this regression. Most importantly, the EU/EMU effects are robust when we control for trade in goods.

3.3.2 The role of corporate taxation

Next we assess the role of corporate taxation for two reasons. First, the results might have clear policy recommendation, as it is generally argued that multinational firms tend to expand in countries where tax rates are on average lower. Second, the convergence in corporate taxes among EU and EMU countries over time might bias the estimates on the EU/EMU binary variables. Therefore, we control for the difference in effective average corporate tax rates (in percentage points) between host country j and source country i at date t ($\text{EATR}_{j,t} - \text{EATR}_{i,t}$).

The impact of the difference in corporate tax rates has the expected sign and is strongly significant (see Table 4); the semi-elasticity with respect to differences in corporate taxation is found to be equal to -4.6. This estimate is broadly in line with estimates by Razin and Sadka (2007a), who found elasticities ranging from -3 to -5 for FDI flows among OECD countries (see also Devereux and Griffith (1998), Benassy *et al.* (2005) and Razin, Rubinstein and Sadka (2005)). Columns 2 and 3 indicate that M&As within the same sector are those mostly affected by corporate taxation with an elasticity equal to -6.8, suggesting that increasing by 10 percentage points the corporate tax in the host country

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[23]We also used bilateral imports and an average of bilateral import and exports. Results are very similar.

	Cross-border M&A$_{ij,s,t}$ in manufacturing		
	all	within sectors	across sectors
	(1)	(2)	(3)
$\log(\text{GDP}_{i,t}\,\text{GDP}_{j,t})$	.926***	1.046***	.693***
	(.178)	(.220)	(.248)
$\log(\text{Dist}_{i,j})$	-.015	.011	-.138
	(.140)	(.179)	(.257)
Border_{ij}	.526**	.699**	.141
	(.225)	(.292)	(.404)
ComLang_{ij}	.600***	.160	1.379***
	(.186)	(.264)	(.247)
$\text{EMU}_{i,t}\,\text{EMU}_{j,t}$	.993***	1.171**	.272
	(.369)	(.467)	(.361)
$\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$	.630**	.553*	.882**
	(.254)	(.336)	(.350)
$\text{EU}_{i,t}\,\text{EU}_{j,t}$	1.142**	1.015	1.600***
	(.582)	(.696)	(.565)
$\text{NONEU}_{i,t}\,\text{EU}_{j,t}$	.872*	1.009**	.846
	(.450)	(.510)	(.531)
$\text{CivLib}_{i,t}$	-.002	-.180	.264
	(.224)	(.294)	(.305)
$\text{CivLib}_{j,t}$	-.714***	-.356	-1.451***
	(.259)	(.290)	(.388)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$	.611***	.470***	.831***
	(.103)	(.124)	(.208)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$	-.087	-.049	-.195
	(.091)	(.110)	(.127)
$\log\left(\frac{\text{Exp}_{i,j,s,t}}{\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t}}\right)$	.007	.092	-.165
	(.084)	(.097)	(.108)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
# Obs.	62571	62571	62571

Table 3: Gravity Models on Bilateral M&As at the sectoral level in manufacturing: The role of trade. Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

	Cross-border M&A$_{ij,s,t}$ in manufacturing		
	all	within sectors	across sectors
	(1)	(2)	(3)
$\log(\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t})$	.934***	1.065***	.731***
	(.182)	(.225)	(.262)
$\log(\text{Dist}_{i,j})$	-.025	-.019	-.082
	(.132)	(.167)	(.264)
Border_{ij}	.452*	.708**	-.083
	(.242)	(.326)	(.392)
ComLang_{ij}	.506***	.110	1.202***
	(.173)	(.250)	(.239)
$\text{EMU}_{i,t}\,\text{EMU}_{j,t}$	.899***	1.051**	.362
	(.327)	(.419)	(.395)
$\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$	.480**	.339	.890**
	(.237)	(.319)	(.380)
$\text{EU}_{i,t}\,\text{EU}_{j,t}$	.862	.604	1.654***
	(.645)	(.773)	(.638)
$\text{NONEU}_{i,t}\,\text{EU}_{j,t}$	.545	.403	1.103
	(.508)	(.545)	(.685)
$\text{CivLib}_{i,t}$	-.049	-.204	.195
	(.220)	(.277)	(.300)
$\text{CivLib}_{j,t}$	-.812***	-.394	-1.558***
	(.265)	(.317)	(.374)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$	.545***	.374***	.826***
	(.102)	(.112)	(.207)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$	-.103	-.080	-.174
	(.090)	(.108)	(.127)
$\text{EATR}_{i,t} - \text{EATR}_{j,t}$	-4.593**	-6.804***	-1.593
	(1.835)	(2.212)	(2.589)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
# Obs.	47234	47234	47234

Table 4: Gravity Models on Bilateral M&As at the sectoral level in manufacturing: The role of corporate taxation.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

	Cross-border M&A$_{ij,s,t}$ in manufacturing					
	all	within	other	all	within	other
	(1)	(2)	(3)	(4)	(5)	(6)
log(Sect. Regulation$_{j,s,t}$)	.237	.366	.289			
	(.692)	(.932)	(.893)			
log(Agg. Regulation$_{j,t}$)				-.569	-.904	-.116
				(.693)	(.878)	(.954)
Source country dummies	yes	yes	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other controls	yes	yes	yes	yes	yes	yes
# Obs.	60506	60506	60506	60506	60506	60506

Table 5: Gravity Models on bilateral M&As at the sectoral level (manufacturing sector): the impact of product market regulations (1).
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, time-dummies and sectoral dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

(while keeping the taxes in the source country constant) reduces horizontal cross-border M&A by 68%. This result points towards a substitution effect of corporate taxation on firms' investment decisions. The estimates on all other variables are essentially unaffected, despite the sample is now halved.

3.3.3 The role of product market regulations

Then, we investigate the impact of product market regulations. The results reported in Tables 5 and 6 indicate that the impact of product market regulations on cross-border M&As in the manufacturing sector is very weak (other variables are not reported but estimates were not affected by this additional control). The sectoral variable log(Sect. Regulation$_{j,s,t}$) that measures the potential costs of service regulations on a given manufacturing sector is not significant (not even correctly signed). The economy-wide indicator of regulation log(Agg. Regulation$_{j,t}$) is correctly signed but not significant (only regulations excluding public ownership, a variable mainly capturing the degree of oligopoly in a country, is somewhat statistically significant).

All these results are potentially biased as the indicators are constructed using regulations of the service sectors. However, we believe that regulations plays a lower role in cross-border MAs in manufacturing, as such activities have been strongly liberalized, particularly since the beginning of the 1990s.

	Cross-border M&A$_{ij,s,t}$ in manufacturing					
	all	within	all	within	all	within
	(1)	(2)	(3)	(4)	(5)	(6)
log(Agg. Reg$_{j,t}$ excl. Pub.Own)	-.975*	-1.093				
	(.521)	(.675)				
log(EntryBarriers$_{j,t}$)			-.474	-.600		
			(.349)	(.454)		
log(Pub.Ownership$_{j,t}$)					.389	.183
					(.310)	(.355)
Source country dummies	yes	yes	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other controls	yes	yes	yes	yes	yes	yes
# Obs.	60506	60506	60506	60506	60506	60506

Table 6: Gravity Models on bilateral M&As at the sectoral level (manufacturing sector): the impact of product market regulation (2).
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, time-dummies and sectoral dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs. Control variables of the benchmark regression included but not reported.

4   Cross-border M&As in services

4.1   Benchmark regressions

In this section, we perform a similar empirical analysis but for cross-border M&As in services, using the same country sample, the same period 1985-2004 and the same methodology as in manufacturing. The first set of results are reported in Table 7. The sectoral regressions cover the period 1985-2003 due to the lack of the sectoral value added in 2004, while the aggregate regressions (non reported because results are broadly similar) are based over the period 1985-2004.

	Cross-border M&A$_{ij,s,t}$ in services		
	all	within sectors	across sectors
	(1)	(2)	(3)
$\log(\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t})$	.155	.142	.052
	(.217)	(.298)	(.223)
$\log(\text{Dist}_{i,j})$	-.075	-.218	-.096
	(.177)	(.201)	(.187)
Border_{ij}	1.303***	1.413***	1.101***
	(.348)	(.391)	(.375)
ComLang_{ij}	.648***	1.100***	.256
	(.239)	(.300)	(.343)
$\text{EMU}_{i,t}\,\text{EMU}_{j,t}$	-.399	-.569	-.167
	(.280)	(.410)	(.355)
$\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$	.448	.827	-.305
	(.540)	(.697)	(.369)
$\text{EU}_{i,t}\,\text{EU}_{j,t}$	.598	.470	.585
	(.382)	(.375)	(.531)
$\text{NONEU}_{i,t}\,\text{EU}_{j,t}$	-.295	-1.006	.678
	(.575)	(.624)	(.593)
$\text{CivLib}_{i,t}$	.238	.167	.295
	(.314)	(.408)	(.306)
$\text{CivLib}_{j,t}$	.150	.349	-.136
	(.260)	(.391)	(.214)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$	.535***	.648**	.407**
	(.174)	(.286)	(.198)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$	.110	.181**	-.016
	(.073)	(.084)	(.093)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
# Obs.	83034	83034	83034

Table 7: Gravity Models on Bilateral M&As at the sectoral level in services.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

Unlike in manufacturing, European integration (captured by EMU and EU dummies) has not fostered cross-border reallocation of capital in the service industry. Services regulations fall within the competence of individual EU Member States and the EU internal market for services remains to date very fragmented. Only in December 2006, the European Parliament and Council have adopted the Directive on services in the internal market (commonly referred to as the Bolkestein Directive), an initiative of the European Commission aimed at creating a single market for services within the EU,

similar to the single market for goods.[24] If this directive helps liberalizing trade in services, it might trigger a new wave of cross-border mergers.

Although distance is not significant, physical and cultural proximity affect cross-border M&As in services given the large and highly significant estimates of the impacts of border and common language. This confirms the results obtained for manufacturing. Again, in our sample, geography is not a key-driver of capital reallocation across borders. Given that existing literature founds distance to be an important barrier to cross-border M&As (Di Giovanni (2005), Head and Ries (2007), Goerg et al (2006)), we will investigate this issue more in depth in section (5.4).

We also find that cross-border M&As of services are fostered by stock market expansions of the acquiring sector. This result is robust across all specifications aiming at capturing horizontal and vertical M—As. Quantitatively, the response to an increase in the acquiring sector's stock market over GDP ratio is very similar to that obtained in the case of manufacturing. This evidence confirms the major role played by stock markets developments in triggering cross-border reallocation of capital across the globe.[25]

We do not report the regressions including differences in corporate taxation because it is not statistically significant, while we cannot control for trade in services due to lack of data. The fact that institutions and corporate taxation are not significant may be due to the large trade barriers existing in the service industry. This issue is looked carefully in the next session.

4.2 The role of product market regulations

We expect the role of market regulations to be a key determinant in services, as most sectors are strongly protected. This is confirmed by the data (see Tables 8 and 9): the impact of product market regulations on cross-border M&As in services is strong, statistically significant and robust across the various alternative measures. Quantitative estimates are also very similar, regardless whether using the aggregate ($\log(\text{AGG. REGULATION}_{j,t})$) or the sectoral indicators ($\log(\text{SECT. REGULATION}_{j,s,t})$). Interestingly, the percentage of shares owned by the government is not an impediment for cross-border M&As in services, while tougher entry regulations or lower competition in the domestic economy

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[24]This Directive is seen as an important kick-start to the Lisbon Agenda which, launched in 2000, is an agreed strategy to make the EU "the world's most dynamic and competitive economy" by 2010. With the proposed legislation, the Commission wants to reduce the barriers to cross-border trade in services, objectively justified on the grounds of public interest.

[25]One could be concerned that we do not control well for market sizes in our regressions, which might cast doubt on our results. Indeed, the impact of GDPs is small and not statistically significant. But, most of the impact of market sizes is already taken care of by the source and host country fixed-effects. In fact, GDP changes in the service sector are very smooth, which makes it harder to identify their impact over time. Note that we obtain coefficients on GDP close to one when excluding fixed effects.

	Cross-border M&A$_{ij,s,t}$ in services					
	all	within	other	all	within	other
	(1)	(2)	(3)	(4)	(5)	(6)
log(SECT. REGULATION$_{j,s,t}$)	-1.268***	-1.471***	-1.249***			
	(.295)	(.456)	(.314)			
log(AGG. REGULATION$_{j,t}$)				-1.135**	-1.736***	-.570
				(.564)	(.621)	(.592)
Source country dummies	yes	yes	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other controls	yes	yes	yes	yes	yes	yes
# Obs.	65802	65802	65802	68502	68502	68502

Table 8: Gravity Models on bilateral M&As at the sectoral level (service sector): the impact of product market regulations (1).
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, time-dummies and sectoral dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

	Cross-border M&A$_{ij,s,t}$ in services					
	all	within	all	within	all	within
	(1)	(2)	(3)	(4)	(5)	(6)
log(AGG. REG$_{j,t}$ excl. Pub.Own)	-1.579**	-2.010***				
	(.656)	(.766)				
log(ENTRYBARRIERS$_{j,t}$)			-1.191***	-1.232**		
			(.434)	(.550)		
log(PUBLICOWNERSHIP$_{j,t}$)					-.116	-0.281
					(.346)	(.342)
Source country dummies	yes	yes	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other controls	yes	yes	yes	yes	yes	yes
# Obs.	68502	68502	68502	68502	68502	68502

Table 9: Gravity Models on bilateral M&As at the sectoral level (service sector): the impact of product market regulations (2).
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, time-dummies and sectoral dummies are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

reduces the degree of foreign investment (see Table 9). Services account for around 70% of value-added in most OECD countries and, depending on the country, account for between one-third and one-half of total intermediate inputs of manufacturing activities (e.g. business services, transport, telecommunications and electricity). Therefore, policymakers can attract large amounts of equity capital by reducing the degree of market regulations in the service sectors. Quantitatively, such policies can have large impact. According to the estimate on total cross-border M&As (and using the aggregate index; see Table 8, column (1)), *ceteris paribus*, reducing the degree of regulations from the level of the most regulated countries over the period 1998-2003 (France and Greece) to the level of the least regulated (US and UK) could increase inward investment towards these countries by about 70%, an economically large impact.[26]

All in all, as for the manufacturing sector, proximity and expected profitability are key determinants of cross-border M&As in services. Furthermore, domestic regulations are relevant for foreign investors, because the implied fixed costs to enter the domestic market are potentially larger than the economies of scale and scope resulting from the M&As. Conversely, institutional variables (EMU, EU, civil liberties) perform poorly in explaining cross-border M&As in services. Most likely, the existing international barriers in the service industry have dramatically reduced the potential role of European integration and, more specifically, have dampened the potential impact of the adoption of the single currency.

5 Robustness checks

5.1 Robustness checks concerning the EMU effect in manufacturing

One common criticism in the literature on the role of common currencies on trade is that the usual regression does not control for some unobservable characteristics (constant over time) in the bilateral dimension; if such a variable increases both the probability of joining the same currency union and the intensity of transactions between the two countries, the coefficient related to the impact of the common currency would be biased upward (see Glick and Rose (2002), Baldwin and Taglioni (2006)). The various robustness checks require the use of additional dummy variables. In all our robustness checks, we keep all the controls of our benchmark regression (column (3) of Table 1).

First, we identify the impact of EMU in the time-dimension, by adding a dummy variable which is equal to one over the 1985-2004 period for country pairs inside EMU in 2004 and run the same regression as before. Such a strategy allows us to identify the impact of EMU across-time by comparing cross-border M&As within EMU countries after the date of the introduction of the euro with cross-

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[26]We use the elasticity -1.3 of Table 8 (column (1)) and the degree of regulation 65% higher in France and Greece compared to the UK/US over the period 1998-2003. See Table 17 in the appendix.

	Cross-border M&A$_{ij,s,t}$ in manufacturing		
	All	Within sectors	Across sectors
	(1)	(2)	(3)
EMU$_{i,t}$ EMU$_{j,t}$	.839**	.914**	.603
	(.377)	(.464)	(.393)
NONEMU$_{i,t}$ EMU$_{j,t}$	.650**	.615*	.789**
	(.256)	(.332)	(.359)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
Other controls	yes	yes	yes
#Obs.	76642	76642	76642

Table 10: Bilateral M&As in manufacturing: The EMU effects identified in the time-dimension. Estimation using Poisson-QMLE estimators. An additional dummy constant over the whole period which equals one for country pairs inside the EMU is included but not reported (never significant). Country dummies of acquiring countries and target countries and time-dummies are included but not reported. Controls of Table 1 - column (3) are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

border M&As within EMU countries before the introduction of EMU. We report the results in Table 10. They are almost identical to the results of the previous regressions. This additional dummy (not reported) is not significant while the impact of EMU, now fully estimated in the time dimension, remains almost the same as in the previous tables.[27]

Finally, in order to assess how the EMU effects have evolved over the 1999-2004 period, we interact EMU$_{i,t}$ EMU$_{j,t}$ with three time dummies starting in 1999: one for the years 1999-2000, one for 2001-2002 and one for 2003. [28] As shown in Table 11 the increase in cross-border M&As within the euro area is not restricted to a specific period though it has not been constant through time. This regression shows that the impact of EMU has been less pronounced in 2003. Moreover, as expected, the same interaction dummy was no different from to zero in 1997-1998.

We conduct the same exercise using aggregate data (data aggregated across sectors), as we have information up to 2004 and the number of non-zeros in the MAs database is increased to about 20% of the sample. The results re ported in Table 12 confirms those reported in the previous Table with strong EMU effects also in 2004.

Overall, we can safely argue that EMU helped restructuring manufacturing capital among euro area countries.

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[27]Another standard solution to deal with this problem is to estimate the regression with fixed-effects per country pairs, α_{ij}. We run this regression (non-reported) using aggregate data and find very similar estimates.

[28]We checked that

	Cross-border M&A$_{ij,s,t}$ in manufacturing		
	All	Within sectors	Across sectors
	(1)	(2)	(3)
EMU$_{i,t}$ EMU$_{j,t}$ × $I_{t=1999,2000}$	1.002*	1.039*	.450
	(.519)	(.607)	(.393)
EMU$_{i,t}$ EMU$_{j,t}$ × $I_{t=2001,2002}$	1.117***	1.788***	.407
	(.369)	(.476)	(.510)
EMU$_{i,t}$ EMU$_{j,t}$ × $I_{t=2003,2004}$	.190	.225	-.026
	(.479)	(.585)	(.771)
Source country dummies	yes	yes	yes
Target country dummies	yes	yes	yes
Sectoral dummies	yes	yes	yes
Time dummies	yes	yes	yes
Other controls	yes	yes	yes
#Obs.	76642	76642	76642

Table 11: Bilateral M&As: The EMU effects interacted with time dummies after 1999.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries, time and sectoral dummies are included but not reported. Controls of Table 1 - column (3) are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

	Aggregate cross-border M&A$_{ij,t}$ in manufacturing		
	all	within sectors	across sectors
	(1)	(2)	(3)
EMU$_{i,t}$ EMU$_{j,t}$ − 1999	1.621**	1.686**	.661
	(.735)	(.830)	(.529)
EMU$_{i,t}$ EMU$_{j,t}$ − 2000	0.395	0.660	-0.130
	(.438)	(.601)	(.450)
EMU$_{i,t}$ EMU$_{j,t}$ − 2001	0.763	1.848*	.489
	(.578)	(.997)	(.534)
EMU$_{i,t}$ EMU$_{j,t}$ − 2002	1.785***	2.239***	.366
	(.484)	(.538)	(.365)
EMU$_{i,t}$ EMU$_{j,t}$ − 2003	0.230	0.318	-0.609
	(.496)	(.588)	(.583)
EMU$_{i,t}$ EMU$_{j,t}$ − 2004	0.966**	1.290**	-0.114
	(.46)	(.520)	(.914)
Source/Target country dummies	yes	yes	yes
Time dummies	yes	yes	yes
Other controls	yes	yes	yes
# Obs.	10046	10046	10046

Table 12: Bilateral Aggregate M&As: The EMU effects interacted with time dummies after 1999.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target countries and time dummies are included but not reported. Controls of Table 1 - column (3) are included but not reported. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

5.2 Estimating the extensive versus the intensive margins of the EMU effects

We also investigate whether EMU has affected the probability of engaging in M&As with an EMU country ("extensive margin") or affected the volume of M&As among member states ("intensive margin"). Implicitly, the former would capture the effect of EMU on the fixed costs in undertaking M&As, while the latter would capture the effect of EMU on transaction costs. We do it using aggregate data (data aggregated across sectors) of bilateral cross-border M&As as the number of zeroes with sectoral data is too large given the empirical strategy we use to identify the two margins.

To assess whether EMU has influenced the decision to engage in M&As with a given country ("extensive margin"), we compute a dummy which is set equal to one if there is at least one transaction between country i and country j at date t ($\mathbf{1}_{aggM\&A_{ij,t}>0}$) and we run the same exercise as before with the addition of such dummy using a logit estimation. The results on the EMU dummies are shown in column (2) of Table 13.

We also run a standard OLS gravity regression, which excludes the zero transactions (see Table 13, column (1)). This regression is informative as it gives the impact of EMU on the size of M&As conditionally on observing transactions ("intensive margin").

The comparison of the two columns provides a decomposition of the overall effect already measured with the Poisson estimations. We can argue that EMU acted as "preferential liberalization" mostly by increasing the probability of M&As between two euro area countries (Table 13, column (2)). The "extensive margin" effect is large since the probability of M&As between two euro area countries has increased by 50% after EMU while the probability of a M&A between non-euro area countries and euro area countries has not been affected by the introduction of the euro.

The single currency has also increased the size of M&As towards the euro area from all countries in the world including euro area countries[29]. The "intensive margin" effect is around 50% (Table 13 - column (1)). This decomposition is a confirmation of the previous results. Indeed, if we add the two margins, cross-border M&As (in value) have doubled between euro area countries ($e^{0.305+0.389} = 2$), while non-euro area M&As targeting the euro area have risen by about one quarter ($e^{0.480-0.240} = 1.27$). Using such computations, the EMU effect between euro area countries in addition to the general tendency to invest in the euro area would amount to about 50% ($\simeq 2/1.27 - 1$). These results suggest that EMU acted through a decrease in fixed-costs within EMU countries ("extensive margin") and a decrease in proportional transaction costs for every single country in the world ("intensive margin"). With lower transactions costs, the euro area becomes more like one bigger economy, and this encourages MAs also from non euro area countries.

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[29]The estimate of the dummy $\text{EMU}_{i,t}\,\text{EMU}_{j,t}$ is even smaller than the one of the dummy $\text{NONEMU}_{i,t}\,\text{EMU}_{j,t}$, but not statistically different.

	Aggregate cross-border M&A$_{ij,t}$ in manufacturing	
	OLS-non zero	Logit
	log(M&A$_{ij,t}$)	$\mathbf{1}_{M\&A_{ij,t}>0}$
	(1)	(2)
EMU$_{i,t}$ EMU$_{j,t}$	0.305*	0.389***
	(.167)	(.16)
NONEMU$_{i,t}$ EMU$_{j,t}$	0.480***	-0.240
	(.185)	(.163)
Source country dummies	yes	yes
Target country dummies	yes	yes
Time dummies	yes	yes
Other controls	yes	yes
# Obs.	2374	10046
R^2	0.36	0.40

Table 13: Bilateral Aggregate M&As: Intensive and extensive margins.
The OLS non zero estimation is a standard OLS regression dropping all zero observation. The logit estimation is a logistic regression on a dummy variable which equals one when at least one M&A is observed for a given year and a given country-pair. Controls of Table 1 are included but not reported (Stock market over GDP is at the aggregate level). Country dummies of acquiring countries and target countries and time-dummies are included but not reported. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors.

5.3 Investigating the role of financial depth

The various experiments carried out in the previous sections (manufacturing versus services, horizontal versus vertical mergers, controlling for various variables) indicate the importance of the acquiring sector's stock market capitalization to GDP ratio as a key variable explaining cross-border M&As.

Di Giovanni (2005) also finds aggregate cross-border M&As to be a function of aggregate stock market capitalization. He also controlled for credit to GDP ratio of the acquirer, but the latter variable was less significant in his regressions. He interprets his results as the consequence of financial depth and puts forward financial deepening as a key driver for M&As. While Di Giovanni (2005) does not consider the impact of the depth of financial markets of the target country, one could argue that more developed financial markets should also attract M&As. In the regressions, we do not find that market capitalization over GDP of the target countries matters, but it would be premature to conclude that the development of financial markets of target countries do not impact cross-border M&As. In the regressions we control for source and target countries fixed effects (contrary to Di Giovanni (2005)) and given that the countries' financial depth changes smoothly across time, it is very likely that its impact is captured by the fixed-effects. Indeed, we can show that the fixed-effects control for the degree of financial development across countries and changes over time of the market capitalization to GDP ratio is more related to changes in the profitability of investments of the acquiring country (as

	Cross-border M&A$_{ij,s,t}$ in manufacturing					
	(1)	(2)	(3)	(4)	(5)	(6)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$	.506***		.470***	.557***		.563***
	(.051)		(.049)	(.097)		(.099)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$	.229***		.244***	-.120		-.130
	(.048)		(.048)	(.085)		(.083)
$\log\left(\frac{\text{DomCredit}_{i,t}}{\text{GDP}_{i,t}}\right)$		.469***	.185*		.157	.090
		(.100)	(.108)		(.183)	(.169)
$\log\left(\frac{\text{DomCredit}_{j,t}}{\text{GDP}_{j,t}}\right)$		.729***	.682***		.269	.237
		(.094)	(.090)		(.271)	(.280)
Source country dummies	no	no	no	yes	yes	yes
Target country dummies	no	no	no	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other Controls	yes	yes	yes	yes	yes	yes
# Obs.	76642	76071	74283	76642	76071	74283

Table 14: Gravity Models on Bilateral M&As at the sectoral level in manufacturing: The role of financial deepening and Tobin's Q.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target counties have been excluded from columns (1) to (3). Time-dummies and sectoral dummies are always included. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

	Cross-border M&A$_{ij,s,t}$ in services					
	(1)	(2)	(3)	(4)	(5)	(6)
$\log\left(\frac{\text{MktCap}_{i,s,t}}{\text{GDP}_{i,s,t}}\right)$	.562***		.533***	.535***		.530***
	(.068)		(.066)	(.174)		(.176)
$\log\left(\frac{\text{MktCap}_{j,s,t}}{\text{GDP}_{j,s,t}}\right)$	.515***		.487***	.110		.098
	(.052)		(.053)	(.073)		(.071)
$\log\left(\frac{\text{DomCredit}_{i,t}}{\text{GDP}_{i,t}}\right)$		.330***	.154		.181	.248
		(.092)	(.104)		(.292)	(.260)
$\log\left(\frac{\text{DomCredit}_{j,t}}{\text{GDP}_{j,t}}\right)$		.532***	.279**		-.057	-.053
		(.090)	(.113)		(.201)	(.200)
Source country dummies	no	no	no	yes	yes	yes
Target country dummies	no	no	no	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes	yes
Other Controls	yes	yes	yes	yes	yes	yes
# Obs.	83034	82872	80654	83034	82872	80654

Table 15: Gravity Models on Bilateral M&As at the sectoral level in services: The role of financial deepening and Tobin's Q.
Estimation using Poisson-QMLE estimators. Country dummies of acquiring countries and target counties have been excluded from columns (1) to (3). Time-dummies and sectoral dummies are always included. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. Observations are clustered within country pairs.

in a standard Q-theory of investment).

We investigate this hypothesis by running the same regressions wit and without fixed-effects and add two additional controls for financial depth: domestic credit over GDP of source and target countries. Regressions in Tables 14 and 15 (see columns (1) to (3)) indicate that countries with deeper financial markets have a more intense M&A activity, both as buyers and sellers of financial assets. This holds for both measures of financial depth as market capitalization and domestic credit of the host and source countries are all statistically significant for manufacturing as well as services. However, when controlling for fixed effects, the only variable which remains statistically significant is the acquiring sector's market capitalization to GDP ratio (Tables 14 and 15; columns (4) to (6)). We see these regressions as very suggestive evidence that financial deepening is an important driver of cross-border M&As across countries (both for source and host countries) but this effect cannot be identified across time. Across time, only changes in expected profitability of the acquiring sector (of a given country) affect significantly cross-border M&As, supporting the Tobin's q theory of investment.

5.4 Investigating the role of geography

We found very little impact of distance on cross-border M&As, which contradicts some previous work where geography has usually been found to play a major role in shaping international financial transactions (Portes and Rey (2005), Georg, et al (2006), Head and Ries (2007)). We test two competitive explanations for this result: first, as already argued, the sample is mostly restricted to developed markets and if distance proxies some information asymmetries, it is likely that information costs are less related to distance for those countries. Second, a large share of M&A activities occurs from 1995 onwards and it is possible that the improvement of information technologies worldwide reduced information costs dramatically, making distance statistically insignificant.

We investigate the first explanation by estimating whether geographical distance is a larger barrier for M&As towards developing countries compared to M&As towards developed markets (see appendix, section 7.2, for the classification) by simply interacting the variable $\log(Dist_{ij})$ with a dummy which is equal to one when the target country is a developed country. As shown in Table 16 (column (1) in the case of manufacturing and column (3) in the case of services), distance matters more when the target country is a developing country (the elasticity is around -0.5 for both manufacturing and services and highly significant), while the effect of distance is negligible when the target country is a developed market. This evidence supports the hypothesis that distance is essentially related to monitoring and information costs for cross-border M&As.

We also investigate the second explanation by estimating the effect of distance over time for both developed and developing markets, by dividing the sample in two periods (before and after 1995).

	M&As in manufacturing		M&As in services	
Distance elasticity when j is:	(1)	(2)	(3)	(4)
Developing Countries	-.452***		-.517***	
	(.126)		(.155)	
before 1995		-.521***		-.527***
		(.148)		(.182)
after 1995		-.459***		-.517***
		(.126)		(.156)
Developed Countries	-.026		-008	
	(.131)		(.197)	
before 1995		-.015		-.023
		(.137)		(.211)
after 1995		-.030		0.006
		(.138)		(.198)
Source country dummies	yes	yes	yes	yes
Target country dummies	yes	yes	yes	yes
Sectoral dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Other controls	yes	yes	yes	yes
#Obs.	76642	76642	83034	83034

Table 16: Mergers and Acquisitions in manufacturing and services: The role of geography. Estimation using Poisson-QMLE estimators. All controls of Table 1 - column (3), country dummies of acquiring countries and target countries, time/sectoral dummies and sectoral are included but not reported. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors.

While for developed markets, geography played no role over the whole period, the impact of distance has decreased over time when the target is a developing country and the acquiring sector belongs to manufacturing (see Table 16, column (2) and (4)), which is only somewhat consistent with the second hypothesis of a decrease in informational costs over the period, as the change over time in the value of the two elasticities is very small.

Distance is a major obstacle to cross-border M&As towards emerging markets while we found its impact to be very weak on M&As among developed markets. This result suggests that distance essentially proxies some information costs that are more predominant in developing countries.

6 Conclusion

In this paper, we study the determinants of cross-border mergers and acquisition (M&As) over the 1985-2004 period in 10 manufacturing and 10 service sectors among the major economies of the world. This exercise has been carried out by compiling a unique database using Thomson Financial. It includes about three quarters of observations around the world and covers a broad spectrum of M&As. Following the theoretical and empirical literature on the volume of M&As and FDI transactions and

using the gravity modelling approach, we study the role of: the EU single market, EMU, expected profitability, institutions, corporate taxation, product market regulations, financial depth and physical and cultural proximity.

The empirical results suggest that European integration and the improvement of the institutional setting in the target country have positively influenced the world developments of cross-border M&As of the manufacturing sector. We can safely argue that institutional changes acted as trigger factors of capital reallocation of manufacturing across the globe.

The impact of the euro is very strong for M&As within the same sector (horizontal) in manufacturing. EMU almost tripled intra euro area cross-border horizontal M&As activity in manufacturing. The estimated effect on euro area M&As from non-euro to euro area countries amounts to a 70% increase. The impact of the euro on vertical mergers in manufacturing sectors from non-euro to euro area countries is also important (about 140%). Therefore, EMU had the effect typical of unilateral financial liberalization and fostered the re-allocation of capital across firms by reducing marginal and fixed costs to undertake such transactions. The euro facilitated cross-border M&As within the euro area, which aimed at restructuring capital within the same sector of activity, rather then boosting the formation of conglomerate activities between sectors. These results are very indicative particularly for countries which have recently joint the EU and EMU or might join in the near future. They might attract sizeable foreign investment and gain from a more efficient reallocation of manufacturing capital.

Conversely, the impact on cross-border M&As in services of EU, EMU and institutions is not statistically significant pointing out that such activities may be affected by the significant barriers to cross-border trade in services, which could have undermined M&As decisions of entrepreneurs. This also implies that large structural changes will most likely occur as cross-border barriers are dismantled in the service industry. We find support for this hypothesis when testing the impact of product market regulation on cross-border M&As. The level of protection and barriers to entry in the service sector act as a strong deterrent to cross-border M&As in services across countries. The new directive on services in the EU adopted in 2006 can help breaking such barriers allowing firms to find the most efficient location for their investment in Europe, thereby triggering a new wave of cross border M&As within the EU.

The empirical results of this paper provide support to the value enhancing motive of M&As, as the acquiring sector's stock market capitalization is an important explanatory variable of cross-border M&As within the same sector as well as across sectors for both firm type in manufacturing and services. As a rule of thumb, a 10% increase in the sectoral market value relative to its GDP rises M&As of such sector by about 5%. The result that M&As respond to the acquiring sector's stock

market capitalization explains why cross-border M&As come in waves and implies that they ought to enhance economic efficiency in the home and target country, unless they are driven by an equity bubble, managerial motives or strategic policy considerations which however do not boost profits. It could be pointed out that market capitalization over GDP is rather a proxy of financial depth, as deep liquid markets provide firms access to capital necessary to undertake investment projects which they might otherwise have to forego. We argue that financial depth is an important variable influencing cross-border M&As, but it is a smooth process which cannot be easily identified across time; while - even controlling for sectoral/country/time fixed effects - sectoral market capitalization over GDP of the acquirer remains always statistically significant. This implies that Tobin's q theory of investment is at work.

We also obtain interesting results on the role of corporate taxation and product market regulations, which are informative for government policies. A 10 percentage point decrease in the differential in corporate taxes between target and acquiring countries would increase the outflows of manufacturing equity investment by 68%. The results also undisputable suggest that firms in manufacturing and particularly in services prefer to expand in those countries characterized by a lower degree of product market regulation, regardless of the public sector size in the target country. This implies that government can act and be successful to attract foreign equity capital. This also raises the question of the coordination of such policies within regional agreements.

Finally, as a by-side product, we reinvestigate the role of geography on cross-border M&As. Geography is measured using standard variables employed in gravity equations, such as geographical distance and binary variables for common border and common language. We find that proximity is of importance to understand M&As activities. Indeed, there is considerable anecdotal evidence to suggest that top management decisions are affected by national culture. Strategic decisions and actions, for example, may be influenced by differences of opportunism and trust in other societies (Angwin (2001)). Cultural differences do play an important role in affecting acquirers' perceptions of target companies and that this may have important consequences for the negotiation of cross-border M&As deals. However, the impact of geography seems to be much more relevant for developing countries than for developed markets.

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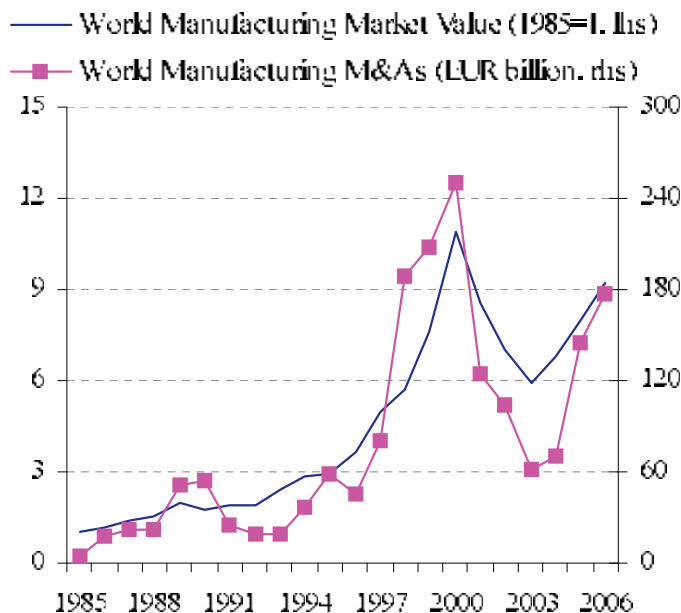
7 Appendix

7.1 Trend in Cross-Border M&As and World Stock Market Value
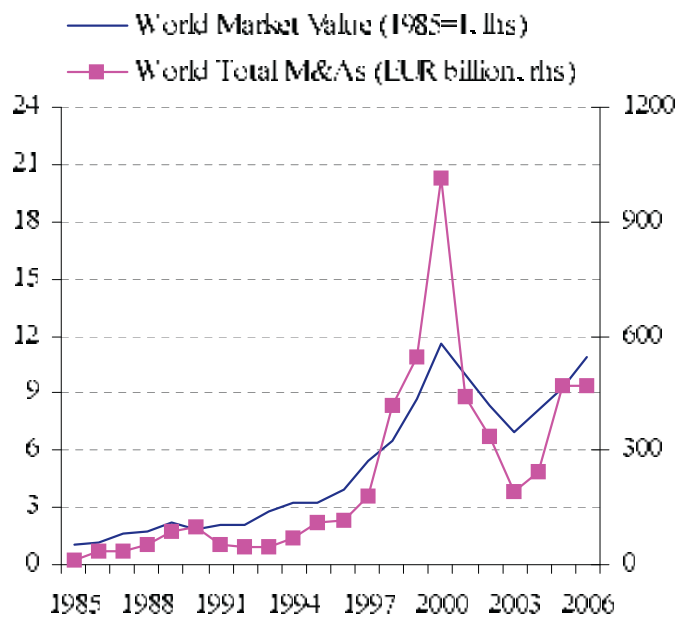
Source: Thomson DataStream.

Figure 1: Cross-border M&As in all sectors (manufacturing and services) and stock market developments

Source: Thomson DataStream.

Figure 2: Cross-border M&As in manufacturing and stock market developments
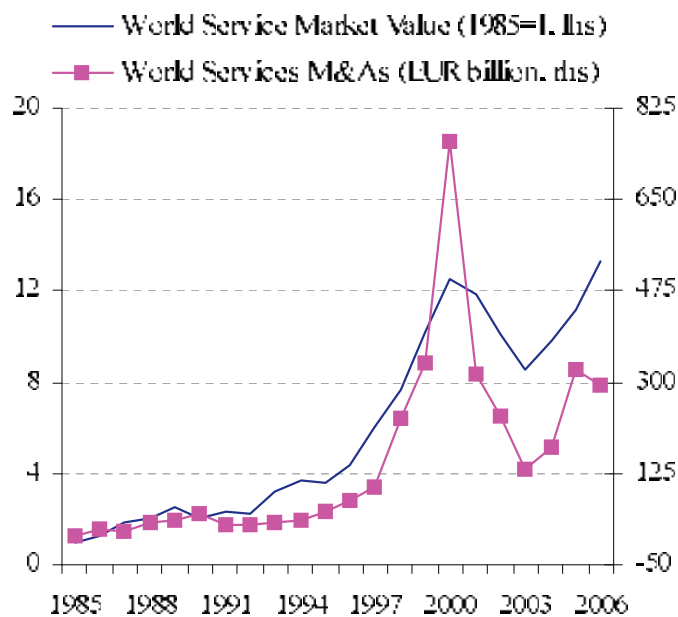
Source: Thomson DataStream.

Figure 3: Cross-border M&As in services and stock market developments

7.2   Country List and Sectors

Source Countries (21)
Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, South Korea, Luxemburg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, United States

Target Countries (31)
Developed Countries (20): Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Japan Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States
Developing countries (11): Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia, South Korea, Turkey

Manufacturing Sectors (10)
1 - Manufacture of Food, Beverages and Tobacco
2 - Textile, Wearing Apparel and Leather Industries
3 - Manufacture of Wood and Wood Products, Including Furniture
4 - Manufacture of Paper and Paper Products, Printing and Publishing
5 - Manufacture of Chemicals and Chemical, Petroleum, Coal, Rubber and Plastic Products
6 - Manufacture of Non-Metallic Mineral Products, except Products of Petroleum and Coal
7 - Basic Metal Industries & Fabricated Metal Products
8 -Machinery and Equipment
9 - Transport Equipment
10 - Other Manufacturing Industries

Service Sectors (10)
1 - Transport and Storage
2 - Communication
3 - Electric, Gas and Water Supply
4 - Education, Health, Social and Personal Service Activities
5 - Hotels and Restaurant
6 - Wholesale Trade
7 - Retail Trade
8 - Banking
9 - Insurance
10 - Other Financial Intermediation

7.3 Descriptive statistics

Data Source for cross-border M&As: Thomson Financial (SDC Platinum)

Sample:

- Annual data over the period 1985-2004

- 21 source countries and 31 target countries

- 10 manufacturing sectors and 10 service sectors

Aggregate M&As **in manufacturing**

Variable	Mean	Std Dev.	Min	Max	N	Non Zeroes
aggM&A$_{ij,t}$ (millions of USD)	117.71	1134.54	0	59838.63	13671	2605
aggM&A$_{ij,t}$ "within sectors" (millions of USD)	70.02	759.07	0	34440.55	13671	1809
aggM&A$_{ij,t}$ "across sectors" (millions of USD)	47.69	649.96	0	56426	13671	1664

Aggregate M&As **in services**

Variable	Mean	Std Dev.	Min	Max	N	Non Zeroes
aggM&A$_{ij,t}$ (millions of USD)	183.4	2366.9	0	210155.7	13671	2671
aggM&A$_{ij,t}$ "within sectors" (millions of USD)	107.63	2150.6	0	207185.2	13671	1716
aggM&A$_{ij,t}$ "across sectors" (millions of USD)	75.8	748.9	0	37268.2	13671	1892

Sectoral M&As in **manufacturing**

Variable	Mean	Std Dev.	Min	Max	N	Non Zeroes
$\text{M\&A}_{ij,s,t}$ (millions of USD)	11.221	289.17	0	54223	121200	4404
$\text{M\&A}_{ij,s,t}$ "within sectors" (millions of USD)	7.224	215.98	0	32875.11	121200	2795
$\text{M\&A}_{ij,s,t}$ "across sectors" (millions of USD)	3.997	182.905	0	53450.11	121200	2377

Sectoral M&As in **services**

Variable	Mean	Std Dev.	Min	Max	N	Non Zeroes
$\text{M\&A}_{ij,s,t}$ (millions of USD)	21.83	759.00	0	206354.5	121200	5043
$\text{M\&A}_{ij,s,t}$ "within sectors" (millions of USD)	12.95	722.26	0	206354.5	121200	2840
$\text{M\&A}_{ij,s,t}$ "across sectors" (millions of USD)	8.88	220.61	0	34013.7	121200	3018

Explaining variables (country specific data)

Variable	Mean	Std Dev.	Min	Max	N
$\log(\text{Dist}_{ij})$	7.610	1.001	4.19	9.324	13671
Border_{ij}	.0614	.2401	0	1	13671
ComLang_{ij}	.0368	.1884	0	1	13671
$\text{CivLib}_{i,t}$	1.464	.7146	1	5	13020
$\text{CivLib}_{i,t}$	1.840	1.168	1	7	12180
$\text{EATR}_{j,t} - \text{EATR}_{i,t}$	-.0015	.1044	-.4314	.4314	60069

Explaining variables (sector/country specific data)

Variable	Mean	Std Dev.	Min	Max	N
$\log(\text{GDP}_{i,s,t}\text{GDP}_{j,s,t})$ in manufacturing	11.849	4.375	-4.071	23.791	78490
$\log(\text{GDP}_{i,s,t}\text{GDP}_{j,s,t})$ in services	14.648	4.403	1.386	27.659	85312
$\log\left(\frac{\text{Exp}_{ij,s,t}}{\text{GDP}_{i,s,t}\,\text{GDP}_{j,s,t}}\right)$ (for manufacturing)	-22.251	3.166	-35.472	-12.491	72207

Data Sources for explaining variables:

- Civil Liberties ($\text{CivLib}_{i,t}$) are from Freedom House.

- Geographical variables, Common language dummies, trade data and aggregate GDPs are from World Bank (Nicita and Olarreaga (2007)).

- Sectoral GDPs are from OECD Stan.

- Market capitalization data (aggregate and sectoral) are from Thomson Datastream.

- Corporate taxation data ($\text{EATR}_{j,t} - \text{EATR}_{i,t}$) are from M. Devereux's webpage.

- Regulation data are from Indicators of Product Market Regulation from OECD (see OECD website). See descriptive statistics below on the sectoral index (Tables 16 and 17).

- Credit to GDP are from the World Bank Indicators.

Sector	Mean	Std	Min	Max
1 - Manufacture of Food, Beverages and Tobacco	0.11	0.03	0.07	0.18
2 - Textile, Wearing Apparel and Leather Industries	0.1	0.03	0.05	0.17
3 - Manufacture of Wood and ...	0.11	0.03	0.06	0.17
4 - Manufacture of Paper and ...	0.1	0.03	0.06	0.17
5 - Manufacture of Chemicals and ...	0.12	0.03	0.06	0.18
6 - Non-Metallic Mineral Products	0.11	0.03	0.07	0.19
7 - Basic Metal Industries & ...	0.11	0.04	0.06	0.22
8 -Machinery and Equipment	0.1	0.03	0.06	0.17
9 - Transport Equipment	0.1	0.03	0.06	0.18
Manufacturing sectors	0.11	0.03	0.05	0.22
1 - Transport and Storage	0.36	0.14	0.16	0.7
2 - Communication	0.33	0.08	0.22	0.57
3 - Electric, Gas and Water Supply	0.4	0.17	0.17	0.9
5 - Hotels and Restaurant	0.08	0.02	0.05	0.14
6 7 - Wholesale and Retail Trade	0.38	0.12	0.19	0.59
8 9 10 - Financial services	0.31	0.07	0.17	0.45
Service sectors	0.31	0.15	0.05	0.9
All	0.19	0.14	0.05	0.9

Table 17: Descriptive statistics on Product Market Regulation by sectors, 1998-2003

	All				Manufact.		Service	
Country	Mean	Std	Min	Max	Mean	Std	Mean	Std
Austria	0.25	0.15	0.12	0.62	0.15	0.02	0.39	0.14
Belgium	0.21	0.14	0.08	0.51	0.12	0.01	0.34	0.13
Finland	0.18	0.13	0.07	0.49	0.09	0.01	0.31	0.13
France	0.25	0.18	0.09	0.74	0.14	0.01	0.41	0.19
Germany	0.19	0.1	0.1	0.45	0.12	0.01	0.29	0.1
Greece	0.25	0.19	0.07	0.69	0.14	0.04	0.43	0.2
Ireland	0.21	0.2	0.07	0.9	0.1	0.01	0.37	0.24
Italy	0.24	0.16	0.1	0.7	0.14	0.02	0.38	0.16
Netherlands	0.15	0.11	0.07	0.7	0.08	0.01	0.25	0.12
Portugal	0.23	0.14	0.08	0.61	0.14	0.01	0.36	0.14
Spain	0.2	0.12	0.07	0.59	0.13	0.01	0.3	0.14
Eᴍᴜ	0.19	0.14	0.05	0.9	0.11	0.03	0.31	0.15
Denmark	0.15	0.11	0.06	0.53	0.08	0.01	0.26	0.11
Sweden	0.14	0.1	0.05	0.4	0.07	0.01	0.24	0.09
United Kingdom	0.14	0.1	0.06	0.42	0.08	0.01	0.23	0.11
Eᴜ	0.2	0.15	0.05	0.9	0.11	0.03	0.32	0.16
Canada	0.15	0.11	0.07	0.38	0.08	0.01	0.26	0.1
Japan	0.2	0.14	0.09	0.59	0.11	0.01	0.34	0.14
New Zealand	0.14	0.08	0.07	0.36	0.09	0.01	0.21	0.07
Norway	0.23	0.13	0.12	0.56	0.14	0.01	0.35	0.13
Switzerland	0.19	0.14	0.07	0.6	0.1	0.01	0.31	0.16
United States	0.14	0.1	0.06	0.35	0.08	0.01	0.23	0.09
All	0.19	0.14	0.05	0.9	0.11	0.03	0.31	0.15

Table 18: Descriptive statistics on Product Market Regulation by country (using the sectoral indicator), 1998-2003

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