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SUMMARY

Cross-border mergers and acquisitions activities (M&As) sharply increased over the last two decades, partly as a result of financial liberalization policies, government policies and regional agreements. 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) policy-makers 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; (4) the service industry has not yet fully benefited from European integration because the level of protection and barriers to entry in the services sector act as a strong deterrent to cross-border M&As in services.

— *Nicolas Coeurdacier, Roberto A. De Santis and Antonin Aviat*

Cross-border mergers and acquisitions and European integration

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London Business School; European Central Bank; Paris School of Economics

1. INTRODUCTION

Among developed countries, the largest share of foreign direct investment (FDI) takes the form of cross-border mergers and acquisitions (M&As). The latter skyrocketed in the 1990s reaching a peak in 2000, amid booming stock markets and financial liberalization worldwide. They declined sharply in 2001–2003, before rebounding thereafter following closely the cyclical developments in the world economy (see Figure 1).¹ Traditionally, developed countries, and in particular the developed countries of the European Union (EU) 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 US\$465 billion cross-border M&As, 47% and 23% of

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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.

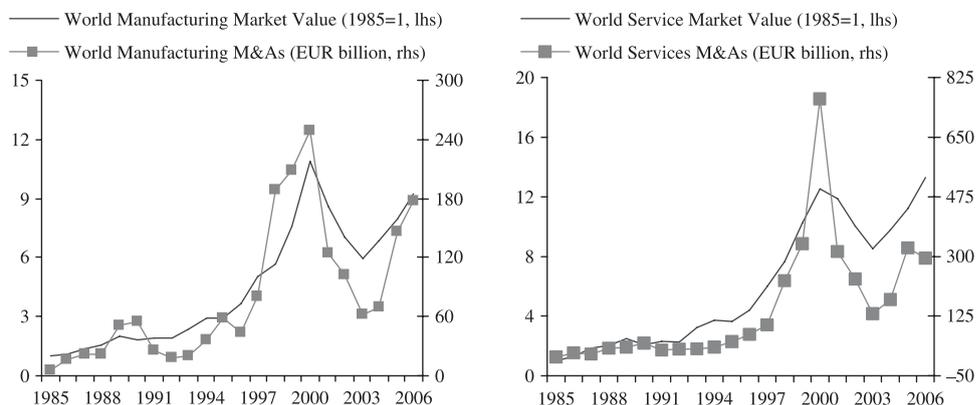


Figure 1. Cross-border M&As in manufacturing and services and stock market developments

Source: Thomson Financial.

which respectively pertain to EU15 and US firms either as acquirer or as target countries (UNCTAD, 2006).

In this paper, we investigate how the process of financial and trade liberalization within the EU and the European Monetary Union (EMU) has fostered cross-border M&As among their members and with the rest of the world.

The theoretical economic arguments of why regional trade agreements (such as EU/EMU) can trigger cross-border merger waves have been recently put forward by Neary (2007a, 2007b). He argues that, by fostering competition, trade liberalization can favour an environment, whereby low-cost firms find it profitable to acquire/merge with high-cost firms. If a monetary union enhanced goods competition across countries (through a reduction in trade costs, the elimination of the exchange rate risk and improved price transparency), then it might also trigger cross-border merger waves.

However, in addition to the ‘trade liberalization channel’, a monetary union facilitates the movement of equity capital by boosting financial integration, through the reduction of the cost of capital, the elimination of exchange rate risk, the sharing of common trading platforms and integration in post-trading market infrastructure. Moreover, if a monetary union reduces macroeconomic uncertainty by removing exchange rate volatility and stabilizing inflation, then cross-border capital investment would be considered to be less risky. All in all, regional economic and monetary agreements can have an impact on cross-border M&As through (1) an increase in its profitability, as regional agreements increase market size and promote competition, and (2) a reduction in financial transaction costs related to financial integration.

From this perspective, the Single European Market in 1992 and the Third Stage of EMU in 1999 constitute important experiments to evaluate the impact of regional agreements on capital reallocation. We jointly investigate the impact on cross-border

M&As of joining the EU (the EU effect), whose single market formally removes the remaining barriers to free movements of capital, labour, goods and services within the European Economic Community; and the impact of adopting the euro (the EMU effect), whose introduction has eliminated the exchange rate risk and enhanced financial integration.

While the impact of EMU on trade in goods,² portfolio flows³ and FDI⁴ has attracted a great deal of attention from policy-makers and scholars, such analysis has not been performed for capital reallocation through cross-border M&As. While there is some anecdotal evidence that trade liberalization and deeper market integration coincide with episodes of cross-border M&As waves (see European Commission, 1996), it remains an important empirical question. 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? Which sectors have been mostly affected? 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 policy-makers, as most countries try to provide incentives to attract FDI. This study can help by evaluating better their policies. The institutional environment is of a particular interest for cross-border M&As since they are affected by various regulations at the country or regional level, such as competition and trade policy, corporate and capital taxes, various restrictions to capital movements across borders, protection of certain industries. In particular, 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 such policies on cross-border M&As, we construct a unique database for ten acquiring manufacturing sectors and ten acquiring service sectors located in 21 different countries targeting foreign assets in 32 different host countries

² See Rose (2000), Micco, Stein and Ordonez (2003), Flam and Nordstrom (2003), Baldwin and Taglioni (2006), Baldwin (2006).

³ See Coeurdacier and Martin (2006), De Santis (2006), De Santis and Gerard (2006), Lane (2006).

⁴ Petroulas (2007) 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), Schiavo (2007) and Brouwer *et al.* (2008) 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 on the impact of EMU may be somewhat upwardly biased ranging between 20% and 30%.

(over the 1985–2004 period). Specifically, an acquiring manufacturing firm (sector) can merge with or acquire foreign firms whose main activity can be classified (1) in the same sector of the acquiring firm ('within mergers'), or (2) 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. M&As that occurred within sectors includes mostly horizontal mergers while mergers across sectors can be seen as vertical mergers.⁵

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 yet been agreed (OECD, 2002). The General Agreement on Trade in Services (GATS) is the only agreement at the international level that regulates and liberalizes trade in financial services as well as investment of financial services providers.⁶ The GATS agreement was negotiated in the Uruguay Round (1986–94). 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 5 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 product market regulations on cross-border M&As.

The key empirical findings can be summarized as follows: (1) EMU helped the restructuring of capital within the same sector of manufacturing activity, particularly among euro area firms; (2) joining the EU implies adopting the Single European Market Act, which favoured both horizontal and vertical mergers; (3) policy-makers 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. As expected, the degree of market regulations plays a key-role for M&As in the service sector (but not for manufacturing).

⁵ We must be cautious with this interpretation since cross-border M&As are aggregated at the 2-digit level and some M&As within the same sector might be of vertical nature.

⁶ 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).

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). We find that cross-border M&As inside the euro area has increased in those sectors which also registered an increase in goods trade owing to EMU; this result suggests that the ‘trade liberalization channel’ emphasized by Neary (2007a, 2007b) has been operating within EMU. 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). As this increase in acquisitions of European firms from the rest of the world is not linked to trade patterns across sectors, we believe it is mostly driven by a fall in financial transaction costs to acquire European assets. The European integration effects are not found in the service industry. We provide evidence that the high degree of product market regulations in services hindered entry of foreign firms in national markets. Hence, goods trade barriers in the service industry also hamper the reallocation of cross-border equity capital.

The industrial organization 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; Neary, 2007a):⁷ (1) high-Tobin’s q firms are those with the best technology and seek to expand their capital stock;⁸ (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) 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 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, and 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 M&As within a given sector (horizontal) or across different sectors (vertical).

We analyze the determinants of cross-border M&As in a gravity framework. We use Poisson maximum likelihood method, which allows for a tractable approach

⁷ See Nocke and Yeaple (2007) and Head and Ries (2007) for additional references on theoretical industrial organization issues.

⁸ 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 Tobin’s q to show that capital reallocation between firms is procyclical. De Santis *et al.* (2004) and Baker *et al.* (2008) argue that the q -theory of investment can also translate in higher FDI outflows and find that a rise in the domestic stock market led to an increase in outward FDI to the United States. 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 .

regarding firms' location decision problems (Guimarães *et al.*, 2003; Head and Ries, 2007). We are aware of the following papers investigating the determinants of cross-border M&As using gravity:⁹ (1) Di Giovanni (2005) and Head and Ries (2007), who, using respectively Tobit and the Poisson maximum likelihood method, find financial depth, cultural and geographical proximity to be important determinants of aggregate M&As; (2) Berger *et al.* (2004), who, using Tobit, look at determinants of cross-border transaction values in the financial sector; (3) Hijzen *et al.* (2008) and Focarelli and Pozzolo (2008), who 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. We use the key determinants of M&As identified in these papers as controls in our regressions.

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 investigates the role of trade and trade barriers (product market regulations). Section 6 presents some additional results and robustness checks regarding the roles of corporate taxation, EMU, financial depth and distance. Section 7 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.¹⁰ 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 between country i and j ($M\&A_{ij}$) is:

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

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 M&A, t_{ij} denotes transaction costs between markets i and j (note that t_{ij} can be a multi-dimensional vector) and $\varepsilon_{s_{ij}}$ is a random term of unobserved firm level characteristics independently distributed with Type I Extreme value cumulative distribution ($CDF(\varepsilon_{s_{ij}}) = \exp(-\exp(-\varepsilon_{s_{ij}}))$).

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

⁹ A review of the literature in management science can be found in Shimizu *et al.* (2004).

¹⁰ See also Guimarães *et al.* (2003).

$$p_{ij} = \exp(\pi_i - \sigma t_{ij}) B_j^{-1},$$

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:

$$E(M\mathcal{E}A_{ij}) = m_i \exp(\pi_i - \sigma t_{ij}) k_j B_j^{-1}$$

where B_j is a measure of the ‘financial remoteness’ of market j . The interpretation of this term is clear-cut: (1) the higher the discounted value of the expected profits of all other potential buyers or (2) 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 like the ‘market potential’ (or ‘supplier access’). We can rewrite the last equation as follows:

$$E(M\mathcal{E}A_{ij}) = \exp\{\log(m_i) + \log(k_j) - \log(B_j) + \pi_i - \sigma t_{ij}\}$$

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.

$$M\mathcal{E}A_{ij,s,t} = e^{\alpha_i + \alpha_j + \alpha_s + \alpha_t} (GDP_{j,s,t} GDP_{i,s,t})^\beta \mathcal{Z}_{ij,s,t}^\theta \eta_{ij,s,t}$$

where $M\mathcal{E}A_{ij,s,t}$ denote M&As between source country i (acquirer) and host country j (target) at time t in sector s ; $GDP_{i,s,t}$ (resp. $GDP_{j,s,t}$) stands for the market size of sector s in country i (resp. j); $\mathcal{Z}_{ij,s,t}$ is a set of control variables (linked to expected profitability of firms, transactions costs and other barriers) that might affect cross-border M&As and α_i , α_j , α_s and α_t 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.¹¹

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 controlling 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 $\mathcal{Z}_{ij,s,t}$, we assume that they are a function of geography, institutions and financial variables capturing expected profitability of firms. Variables are described in detail in the following subsections.

¹¹ For other theoretical foundations of gravity models for FDI, see also Bergstrand and Egger (2007) and Ramondo (2007).

2.2. Description of the data on cross-border M&As

We construct an annual panel of cross-border M&As of completed transactions in the manufacturing sector and services at SITC2 classification 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 (ten manufacturing sectors and ten service sectors) are described in Table A1 of the Appendix.

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 €458 billion, of which services accounted for about two-thirds. 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 A2 and A3 of the Appendix).

The most important acquiring manufacturing sectors in terms of size accounting for almost three-quarters of global M&As in manufacturing are (1) chemicals, petroleum, coal, rubber and plastic products, (2) machinery and equipment, and (3) food, beverages and tobacco. For services, one-third of world M&A in services involved electric, gas and water supply as acquiring sectors, with Japan being very active. The second most important sector is financial intermediation excluding banking and insurance, with the United States playing a prominent role.

We divide the 20 years’ sectoral observations in two main groups:

- 1 M&As occurring within the same sector (‘within sectors’): acquirer and target firms belong to the same sector.
- 2 M&As occurring 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 the 2-digit 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

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. 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 ($\log(GDP_{i,s,t} GDP_{j,s,t})$), but none of the results depend on this restriction.

As for transaction costs, the empirical literature on trade and FDI flows suggests to control for geography and cultural proximity. Accordingly, we use the bilateral geographical distance between the main cities of country i and country j denoted by $Distance_{ij}$ and a dummy $Border_{ij}$, which equals one when the two countries share a common border.¹² We also use the dummy $Common\ Language_{ij}$, which equals one if the two countries share a common language.

We assess the role of European integration using dummy variables as in the trade literature (see Baldwin, 2006, for a survey). To test a structural change due to EMU, we use two additive dummies constructed as follows: $EMU_{i,t}EMU_{j,t}$ is equal to one if both countries belong to EMU at time t and zero otherwise; $nonEMU_{i,t}EMU_{j,t}$ is equal to one when the host country j belongs to the euro area, 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 non-euro area and euro area countries (unilateral financial liberalization) and to test the existence of a structural break. 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 the analysis. A similar set of dummies is used to study the effect of EU: $EU_{i,t}EU_{j,t}$ is equal to one if both countries belong to the EU at time t and zero otherwise; $nonEU_{i,t}EU_{j,t}$ is equal to one when the target belongs to the EU but not the acquirer.

We control for the expected profitability of the acquiring firm by using the average market capitalization over GDP of the acquirer country i in a given sector s at time t : $\log(MarketCapitalization_{i,s,t} / GDP_{i,s,t})$. A neoclassical model of investment predicts that countries/sectors with higher Tobin's q increase their capital stock also through M&As (see Jovanovic and Rousseau, 2008). One could argue that Tobin's q should be better 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/sectors for which data is available, the market-to-book ratio is highly correlated with market-to-GDP ratio: the correlation coefficient is as high as 0.9.¹³

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 *et al.*, 2008), $\log(MarketCapitalization_{j,s,t} / GDP_{j,s,t})$. The use of the market capitalization to GDP ratio of acquirer and target sectors can also help controlling for equity bubbles, which *ex post* was particularly evident at the turn of the century. Data on 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). Summary statistics are reported in Table A4 of the Appendix.

¹² Geographical distance is taken from the data set on manufacturing trade of the World Bank (Nicta and Olarreaga, 2007).

¹³ Note that this correlation should be unity if the capital-output ratio were constant.

Following Rossi and Volpin (2004), Di Giovanni (2005) and Alfaro *et al.* (2007, 2008), we also control for the quality of institutions in the source (resp. host) country by means of an indicator of civil liberties, $Civil\ Liberties_{i,t}$ (resp. $Civil\ Liberties_{j,t}$) 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. The Civil Liberties index 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, because reliable institutions enhance transparency, and sound legal and political systems offer a less uncertain environment to investors. 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).

Moreover, we study the role played by trade and trade barriers (product market regulations). Using the world database of international trade at the product level (BACI) provided by CEPII, we study whether comparative advantage revealed by goods trade activity has promoted cross-border M&As. We also look at the sectoral impact of the European integration on goods trade and compare the results with those obtained for sectoral M&As.

As for the trade barriers, the OECD has constructed a 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 enterprises, legal and administrative barriers to entrepreneurship, and barriers to international trade and investment.¹⁴

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 the annual period between 1975 and 2003. Given that the correlation between the aggregate indicators for services and the

¹⁴ Data on product regulations are available only for OECD countries (see Indicator of Product Market Regulations on the OECD website for data source). For additional and detailed information on such indicators see also ECB (2006).

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 dimension of regulations matters most for cross-border M&As. The descriptive statistics indicate that services are strongly regulated particularly in Greece, France and Austria and less so in New Zealand, the UK and the US (see Table A5 of the Appendix). Though by a far lower degree, similar results are valid also in manufacturing. On average, euro area countries are relatively more regulated.

(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; 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 imputed from those in services using input-output tables. The indicators suggest that electricity, gas and water supply, wholesale and retail trade, transport and storage are the most regulated service sectors, while hotels and restaurant are highly deregulated.

Finally, we study the role played by some other potential barriers to cross-border M&As such as corporate taxation and country's financial systems. We assess the role of corporate taxation using annual effective corporate tax rates constructed by Devereux and Griffith (2003) for a wide range of OECD countries.¹⁵ As for the countries' financial depth, we use the ratio of domestic credit to GDP in the target and acquiring country at a given date provided by the World Development Indicators of the World Bank.

2.4. Specification and methodology

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

$$\begin{aligned} \log(M\mathcal{E}A_{ij,s,t}) = & \alpha_i + \alpha_j + \alpha_s + \alpha_t + \beta_1 \log(GDP_{j,s,t} / GDP_{i,s,t}) + \beta_2 \log(Distance_{ij}) \\ & + \beta_3 Border_{ij} + \beta_4 CommonLanguage_{ij} + \beta_5 CivilLiberty_{i,t} \\ & + \beta_6 CivilLiberty_{j,t} + \beta_7 \log(MarketCapitalization_{i,s,t} / GDP_{i,s,t}) \\ & + \beta_8 \log(MarketCapitalization_{j,s,t} / GDP_{j,s,t}) + \theta' z_{ij,s,t} + \gamma_1 EMU_{i,t} EMU_{j,t} \\ & + \gamma_2 NonEMU_{i,t} EMU_{j,t} + \delta_1 EU_{i,t} EU_{j,t} + \delta_2 NonEU_{i,t} EU_{j,t} \end{aligned}$$

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 *et al.* (2002).

where the alphas are the fixed-effects, which control for unobservable country/sector characteristics, and $z_{j,s,t}$ is a set of additional controls variables, such as corporate taxation, product market regulations and credit. Moreover, we jointly investigate the impact on cross-border M&As of joining the EU, whose single market formally removes the remaining barriers to free movements of capital, labour, goods and services within the EEC; and the impact of adopting the euro, whose introduction should have facilitated the movement of capital by not only enhancing competition among firms via the direct impact on goods trade, but also 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).

Once we have taken into account data attrition caused by the control variables, we are left with about 8000 observations in each manufacturing and service sectors. Given that we consider ten sectors in manufacturing (resp. ten in services), approximately 80 000 observations, are used in the main specifications, of which only about 5% are non-zero.

As explained by Razin and Sadka (2007a, 2007b), Tobit estimators are consistent if the presence of zeros is due to measurement errors. While M&As data are certainly subject to some measurement errors (i.e. some M&As might not be recorded by Thomson Financial), most of the zeroes are ‘true zeros’ in the sense that no M&As occurred that year for a given sector s and a given country-pair $\{i,j\}$. In this case, Tobit estimators are biased. Therefore, we use Poisson Maximum-Likelihood estimators throughout the analysis (see Guimarães *et al.*, 2003; Santos Silva and Tenreiro, 2006; and Head and Ries, 2007).¹⁶

Being concerned with the large amount of zeros, 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 Sections 6.2–6.3 of the paper).

3. CROSS-BORDER M&As IN MANUFACTURING SECTORS

The results of the benchmark specification for manufacturing obtained using Poisson quasi-MLE are shown in column 1 of Table 1. Common language and border dummies are significant. The estimates of the common language dummy are fully in line with previous estimates of Head and Ries (2007).¹⁷ The border dummy has a positive sign

¹⁶ Razin and Sadka (2007a, 2007b) also show the bias in OLS or Tobit estimations and correct it using an alternative method based on a Heckman-selection model.

¹⁷ We also tested a dummy variable for a common legal system following La Porta *et al.* (1998 and 2006), but this variable was not significant.

Table 1. Cross-border M&As in manufacturing and services: The role of institutions and Tobin's q

| | Manufacturing | | | Services | | |
|---|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | All | Within sectors | Across sectors | All | Within sectors | Across sectors |
| $\text{Log}(GDP_{i,s,t} / GDP_{j,s,t})$ | 0.812*** (0.177) | 0.883*** (0.228) | 0.690*** (0.248) | 0.155 (0.217) | 0.142 (0.298) | 0.052 (0.223) |
| $\text{Log}(\text{distance}_{i,j})$ | -0.056 (0.125) | -0.059 (0.156) | -0.101 (0.244) | -0.075 (0.177) | -0.218 (0.201) | -0.096 (0.187) |
| $\text{Border}_{i,j}$ | 0.392* (0.226) | 0.646** (0.299) | -0.152 (0.383) | 1.303*** (0.348) | 1.413*** (0.391) | 1.101*** (0.375) |
| $\text{Common language}_{i,j}$ | 0.580*** (0.164) | 0.226 (0.233) | 1.192*** (0.233) | 0.648*** (0.239) | 1.100*** (0.300) | 0.256 (0.343) |
| $EMU_{i,t} / EMU_{j,t}$ | 0.940*** (0.336) | 1.090** (0.430) | 0.377 (0.368) | -0.399 (0.280) | -0.569 (0.410) | -0.167 (0.355) |
| $\text{Non}EMU_{i,t} / EMU_{j,t}$ | 0.599** (0.249) | 0.519 (0.331) | 0.882** (0.364) | 0.448 (0.540) | 0.827 (0.697) | -0.305 (0.369) |
| $EU_{i,t} / EU_{j,t}$ | 1.132** (0.564) | 1.091 (0.691) | 1.410*** (0.525) | 0.598 (0.382) | 0.470 (0.375) | 0.585 (0.531) |
| $\text{Non}EU_{i,t} / EU_{j,t}$ | 0.868* (0.451) | 0.967* (0.517) | 0.876 (0.544) | -0.295 (0.575) | -1.006 (0.624) | 0.678 (0.593) |
| $\text{Civil Liberties}_{i,t}$ | -0.096 (0.208) | -0.284 (0.273) | 0.200 (0.285) | 0.238 (0.314) | 0.167 (0.408) | 0.295 (0.306) |
| $\text{Civil Liberties}_{j,t}$ | -0.714*** (0.238) | -0.355 (0.271) | -1.44*** (0.361) | 0.150 (0.260) | 0.349 (0.391) | -0.136 (0.214) |
| $\text{Log}(\text{MarketCapitalization}_{i,s,t} / GDP_{i,s,t})$ | 0.557*** (0.097) | 0.413*** (0.105) | 0.811*** (0.202) | 0.535*** (0.174) | 0.648** (0.286) | 0.407** (0.198) |
| $\text{Log}(\text{MarketCapitalization}_{j,s,t} / GDP_{j,s,t})$ | -0.120 (0.085) | -0.100 (0.100) | -0.180 (0.119) | 0.110 (0.073) | 0.181** (0.084) | -0.016 (0.093) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. 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. The number of observations is 76 642 in manufacturing and 83 034 in services. Observations are clustered within country pairs.

contrary to the large negative effect discussed in the trade literature (McCallum, 1995; Anderson and van Wincoop, 2003; Balistreri and Hillberry, 2007). This means that it is not capturing a trade cost, but a positive adjacency effect. 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; Head and Ries, 2007, Hijzen *et al.*, 2008). 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.¹⁸ Second, the majority of countries in the 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 smaller among developed markets. Finally, the specification includes a border dummy and common language dummies which are partly collinear with distance.¹⁹ We investigate further the role of distance in Section 6.5.

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

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, $\gamma_1 = 0.94$) and M&As from non-euro area countries towards euro area countries (unilateral financial liberalization, $\gamma_2 = 0.6$). The magnitude of these effects is large since the single currency has raised respectively intra-euro area cross-border M&As by 155% 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%.²⁰

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, 2006; 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

¹⁸ In a 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.

¹⁹ Without border and common language, the elasticity of distance is significant, yet much lower than previous estimates: -0.255 (s.e.: 0.103).

²⁰ Given the functional form and the definition of the two EMU dummies, the additional EMU effect between euro area countries is computed as follows $e^{\gamma_1 - \gamma_2} - 1$.

well performed. First, we control for the common preferential trade agreement (i.e. 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 sector's market capitalization). Still, it can be argued that EMU dummies are capturing the impact of some omitted variables. In the next sections, we will try a number of potential candidates (taxation and product market regulations).²¹

Moreover, we run some additional robustness checks in Section 6.2, focusing on the impact of EMU over time by controlling for unobservable factors among euro area countries that have been constant over time. Results hardly change.

The results concerning the EU effects are similar to those described for EMU. $\delta_1 = 1.13$ and $\delta_2 = 0.87$ are of similar magnitude; everything else equal, the EU Single Market has mostly increased M&As towards the EU from all countries in the world.

These results are indirect evidence of Neary (2007a, 2007b) who argues that trade liberalizations should trigger M&A waves. In particular, it can explain the initial quantitatively enormous impact of EMU/EU that we find: the acquisition of one firm increases the incentive for another to be acquired due to the endogenous fall in competition and thus until 'all the small and relatively inefficient firms in the sector have been acquired' (see Neary, 2007a and 2007b). This suggests that the effect should be hump-shaped, which will be confirmed in Section 6.2. In the next section, we will investigate further the channel through which EU/EMU affected cross-border M&As.

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 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 this study 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 channels linked to trade liberalization or financial integration.

²¹ We also control for bilateral nominal exchange rate volatility. Results remain invariant and this additional control was not significant (non-reported).

How do results change when considering horizontal and vertical cross-border M&As separately? Results with such decomposition are shown in columns 2 and 3 of Table 1. 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 the 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 than boosting the formation of conglomerate activities between euro area sectors.

Overall, we have weak evidence that the EU fostered M&As between EU countries in addition to the unilateral financial liberalization effect. Both EU binary variables are very similar in magnitude in both horizontal and vertical mergers of the manufacturing sector. However, reducing the number of completed transactions, by cutting the sample in two, increases the standard errors of the variables capturing the EU effects associated with (1) intra-EU horizontal activity and (2) extra-EU vertical mergers targeting EU firms; thereby making some of the coefficients statistically significant only at 10–15% confidence interval.

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

4. CROSS-BORDER M&As IN SERVICES

Using the same country sample, the same sample period and the same methodology, we also study the determinants of cross-border M&As in services and report the first set of results in the last three columns of Table 1.

One could argue that we do not control for market sizes properly, given that the impact of GDPs is small and not statistically significant. We can show that most of the impact of market sizes is through the source and host country/sector fixed-effects.²² GDP changes in the service sector are very smooth making it harder to identify their impact over time.

Unlike in manufacturing, European integration (captured by EU and EMU dummies) has not fostered cross-border reallocation of capital in the service industry. The service industry in Europe is far less liberalized than manufacturing (see Appendix Table A5): large trade costs and barriers to foreign entry remain in service sectors, which could explain why we find no impact of EU/EMU of cross-border M&As in services. We will investigate further this hypothesis in Section 5.

²² We obtain coefficients on $\log(GDP_{i,t} / GDP_{j,t})$ equal to 0.733 (s.e.: 0.068) when excluding fixed effects.

Although distance is not significant,²³ 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 positive ‘adjacency’ effect obtained for manufacturing, but the elasticities for services are much larger. 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 this may have important consequences for the negotiation of cross-border M&As deals, particularly in the service sector.

We also find that cross-border M&As in 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. 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 waves in stock markets developments in triggering cross-border reallocation of capital across the globe.

5. TRADE LIBERALIZATION AND CROSS-BORDER M&As

While the previous section identifies large effects of EMU and EU on cross-border M&As in manufacturing, the channel through which this happened remains unclear. In this section, we provide evidence that the ‘trade liberalization channel’ emphasized theoretically by Neary (2007a, 2007b) has been operating within European countries. Neary (2007a, 2007b) argues that trade liberalization can trigger cross-border M&As, whereby low-cost firms acquire high-cost enterprises. Hence, the impact of EMU and EU on cross-border M&As in both manufacturing and services can be partly rationalized if we deepen our understanding on the effect of regional integration on trade flows and on the role of product trade barriers on cross-border M&As.

The link between trade liberalization, European integration, comparative advantage and cross-border M&As is based on general equilibrium principles, which cannot be easily tested empirically, given the lack of instruments and the need for a multiregional empirical model. Therefore, we study the trade liberalization argument indirectly using the gravity approach. First, we look at the role of comparative advantage revealed by manufacturing trade to validate the mechanisms highlighted by Neary. Second, we study the trade mechanism associated with European integration by investigating whether the trade sectors positively affected by EMU are the same sectors that are more engaged in cross-border M&As (see Section 5.1). We cannot

²³ When excluding the border and common language dummies, which are partly collinear with geographical distance, the elasticity measuring the impact of distance on cross-border M&As becomes significant and equal to -0.487 (s.e.: 0.160). When also excluding the EU dummies, this elasticity is equal to -0.540 (s.e.: 0.133).

look at trade in services due to lack of data. Finally, we assess whether trade barriers measured by the degree of product market regulation indicators in the target countries have been influencing cross-border M&As in both manufacturing and services (see Section 5.2).

5.1. The ‘trade liberalization channel’ in manufacturing

Firms seek to merge with their rivals in order to reduce competition in the market and increase their profit margins. The theoretical model by Neary (2007a) predicts that international differences in technology generate incentives for bilateral mergers in which low cost firms absorb high-cost firms located in another country. As a result, cross-border M&As facilitate more specialization in the direction of comparative advantage, moving production and trade patterns close to what would prevail in a competitive Ricardian world. However, relative autarchic prices are not observable. Therefore, empirical trade literature relies on revealed comparative advantage (RCA) measures to assess specialization patterns of countries. The most widely used RCA measure is the Balassa index (BI), which is a sectoral relative export measure in terms of world exports: $BI_{i,s,t} = (X_{i,s,t} / \sum_i X_{i,s,t}) / (\sum_i X_{i,s,t} / \sum_i \sum_s X_{i,s,t})$, where $X_{i,s,t}$ denotes sectoral exports s of country i at time t . Based on Neary’s (2007a) model, acquiring (target) firms operate in sectors with a high (low) revealed comparative advantage, as measured by the Balassa index (see Neary, 2007b and Brakman, Garretsen and van Marrewijk, 2008).

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 multinational firms’ sales and less for investment, as the latter requires an adjustment period before it is translated into production. Moreover, the Balassa index is a relative measure based on sectoral exports, thereby further reducing the problem of the simultaneity bias. Thus, we can run the previous regression and control for the Balassa index of the acquirer and target sectors at date t . The results for manufacturing are shown in Table 2.

While we could find a strong positive relationship between cross-border M&As and the Balassa index of the acquiring firm, the relationship between cross-border M&As and revealed comparative advantage of the target firm is not negative as suggested by Neary (2007a).²⁴ Specifically, the Balassa index of the acquiring firm is strongly statistically significant and robust across the various specifications ranging between 0.34 and 0.40. According to the findings, a competitive firm in the international markets aims to become a global player by merging or acquiring foreign firms, thereby

²⁴ Brakman *et al.* (2008), who tested the implications of Neary’s model using the number of completed cross-border M&As deals among the USA, UK, the Netherlands, Australia and France at the 2-digit level (about 12 000 observations), even found that target firms are operative in sectors with a strong comparative advantage.

Table 2. Cross-border M&As in manufacturing and the Balassa index

| | All M&As | | | Within sectors M&As | | |
|--|----------------------|----------------------|----------------------|---------------------|---------------------|---------------------|
| $\text{Log}(\text{GDP}_{i,s,t} / \text{GDP}_{j,s,t})$ | 0.816*** (0.183) | 0.562*** (0.201) | 0.672*** (0.203) | 0.920*** (0.237) | 0.700*** (0.267) | 0.837*** (0.249) |
| $\text{Log}(\text{distance}_{i,j})$ | -0.059 (0.128) | -0.058 (0.128) | -0.072 (0.129) | -0.067 (0.159) | -0.065 (0.161) | -0.078 (0.161) |
| $\text{Border}_{i,j}$ | 0.429* (0.232) | 0.430* (0.233) | 0.395* (0.236) | 0.696** (0.308) | 0.698** (0.311) | 0.650** (0.311) |
| $\text{Common language}_{i,j}$ | 0.555*** (0.167) | 0.550*** (0.167) | 0.526*** (0.168) | 0.191 (0.240) | 0.190 (0.240) | 0.159 (0.242) |
| $\text{EMU}_{i,t} \text{EMU}_{j,t}$ | 0.912** (0.343) | 0.884** (0.344) | 0.887** (0.354) | 1.052** (0.447) | 1.024** (0.446) | 1.038** (0.464) |
| $\text{NonEMU}_{i,t} \text{EMU}_{j,t}$ | 0.546** (0.250) | 0.502** (0.249) | 0.506** (0.250) | 0.452 (0.342) | 0.417 (0.345) | 0.429 (0.350) |
| $\text{EU}_{i,t} \text{EU}_{j,t}$ | 0.846 (0.567) | 0.834 (0.565) | 0.795 (0.561) | 0.763 (0.684) | 0.751 (0.682) | 0.717 (0.676) |
| $\text{NonEU}_{i,t} \text{EU}_{j,t}$ | 0.652 (0.454) | 0.636 (0.453) | 0.617 (0.445) | 0.695 (0.509) | 0.679 (0.509) | 0.672 (0.500) |
| $\text{Civil Liberties}_{i,t}$ | 0.067 (0.232) | 0.034 (0.231) | 0.062 (0.233) | -0.121 (0.291) | -0.146 (0.292) | -0.109 (0.296) |
| $\text{Civil Liberties}_{j,t}$ | -0.719*** (0.238) | -0.735*** (0.236) | -0.767*** (0.235) | -0.358 (0.284) | -0.371 (0.281) | -0.413 (0.282) |
| $\text{Log}(\text{MarketCapitalization}_{i,s,t} / \text{GDP}_{i,s,t})$ | 0.572*** (0.096) | 0.480*** (0.098) | 0.489*** (0.097) | 0.434*** (0.108) | 0.365*** (0.109) | 0.374*** (0.117) |
| $\text{Log}(\text{MarketCapitalization}_{j,s,t} / \text{GDP}_{j,s,t})$ | -0.142 (0.091) | -0.142 (0.088) | -0.102 (0.083) | -0.116 (0.105) | -0.115 (0.103) | -0.076 (0.097) |
| $\text{Balassa index}_{i,s,t}$ | | 0.403*** (0.099) | 0.376*** (0.100) | | 0.375*** (0.131) | 0.336** (0.133) |
| $\text{Balassa index}_{j,s,t}$ | | | -0.193 (0.285) | | | 0.005 (0.373) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. 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. The number of observations is 63 848 when excluding the Balassa indices or when using the Balassa index of the acquiring sector and 61 132 when using the Balassa indices of both the acquiring and target sectors. Observations are clustered within country pairs.

implicitly reducing the fiercer competition. The results also indicate that the coefficients on all other variables remain robust compared to the benchmark regressions in Table 1 and replicated in Table 2 given that the number of observation declines by one-fifth. This result suggests that M&As are partly driven by comparative advantage as advocated by Neary (2007a).

If EMU and EU dummies are implicitly capturing the impact of trade liberalization, this can be investigated by comparing the impact of EMU on the individual manufacturing sectors in both bilateral goods trade and cross-border M&As. One should expect that sectors in which trade has increased the most following EMU/EU are those where M&As have also increased the most. In other words, mergers should occur in sectors where competition became fiercer due to a larger fall of trade costs following EMU/EU. We split the sample in half according to the effect of EMU on trade activities. The five sectors, whose trade has been strongly positively affected by EMU, are: 1 – Food, beverages and tobacco; 2 – Textile, wearing apparel and leather industries; 4 – Paper and paper products, printing and publishing; 5 – Chemicals and chemical, petroleum, coal, rubber; 7 – Basic metal industries and fabricated metal products. These sectors recorded an average increase in bilateral trade flows of 22% due to EMU and are also those which recorded a strong positive increase in cross-border M&As after EMU, particularly of horizontal nature (see Panel A in Table 3).²⁵ The other five sectors have on average recorded a decline in trade flows after EMU of a similar magnitude, but the impact on cross-border M&As within the euro area in these sectors has been negligible. This result suggests that a large part of the increase of M&As among EMU members is due to a strengthening of competition following trade integration within the EMU. Indeed, if EMU had made M&As more profitable through a fall in financial transaction costs inside the euro area, one should not expect such a differential impact across sectors.

Similar conclusions can be drawn when splitting the EU effect between sectors whose bilateral trade has been positively affected after joining the EU from those not affected. Interestingly, the sectors recording an increase in goods trade after joining the EU are those also positively affected by EMU (see Panel B in Table 3). Moreover, the sectors and countries that recorded a boost in trade due to the EU also registered a sharp increase in cross-border M&As among EU firms.

Finally, it is worth pointing out the sizeable goods trade diversion effect of European integration on some specific sectors: 3 – Wood and wood products, including furniture; 6 – Non-metallic mineral products, except petroleum and coal; 8 – Machinery and equipment; 9 – Transport equipment; 10 – Other manufacturing industries. The manufacturing exports of these sectors from non-EU firms to EU countries have declined on average by 88.5% due to the EU over the period 1999–2004. Moreover, exports of these manufacturing goods from non-euro area firms to

²⁵ 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.

Table 3. Cross-border M&As and trade flows in manufacturing

| | Goods trade flows | All M&As | Within sectors M&As | Across sectors M&As |
|--|----------------------|---------------------|---------------------|---------------------|
| Panel A | | | | |
| $EMU_{i,t} EMU_{j,t}$ if impact on trade flows is positive | 0.261*** (0.076) | 1.359*** (0.439) | 1.561*** (0.557) | 0.561 (0.397) |
| $EMU_{i,t} EMU_{j,t}$ if impact on trade flows is not positive | -0.153*** (0.053) | 0.172 (0.358) | 0.182 (0.464) | 0.120 (0.419) |
| $NonEMU_{i,t} EMU_{j,t}$ | -0.139*** (0.050) | 0.605** (0.249) | 0.529 (0.332) | 0.883*** (0.364) |
| $EU_{i,t} EU_{j,t}$ | 0.186 (0.120) | 1.144** (0.565) | 1.107 (0.692) | 1.413*** (0.525) |
| $NonEU_{i,t} EU_{j,t}$ | -0.642*** (0.150) | 0.866* (0.453) | 0.962* (0.520) | 0.876 (0.544) |
| Panel B | | | | |
| $EMU_{i,t} EMU_{j,t}$ if impact on trade flows is positive | 0.096** (0.047) | 1.147*** (0.440) | 1.256** (0.540) | 0.529 (0.448) |
| $EMU_{i,t} EMU_{j,t}$ if impact on trade flows is not positive | -0.015 (0.052) | 0.522 (0.396) | 0.712 (0.519) | 0.167 (0.398) |
| $NonEMU_{i,t} EMU_{j,t}$ | -0.143*** (0.050) | 0.610** (0.247) | 0.533 (0.329) | 0.884** (0.363) |
| $EU_{i,t} EU_{j,t}$ if impact on trade flows is positive | 0.481*** (0.165) | 1.464** (0.594) | 1.593** (0.728) | 1.458** (0.570) |
| $EU_{i,t} EU_{j,t}$ if impact on trade flows is not positive | -0.025 (0.114) | 0.742 (0.550) | 0.500 (0.636) | 1.358** (0.543) |
| $NonEU_{i,t} EU_{j,t}$ | -0.632*** (0.148) | 0.872* (0.448) | 0.976* (0.514) | 0.876 (0.543) |

Notes: Gravity models on bilateral trade flows. Controls of Table 1 excluding market capitalization to GDP ratios are included, but not reported. Gravity models on bilateral cross-border M&As at sectoral level. Controls of Table 1 are included, but not reported. Country dummies of acquiring countries and target countries, sectoral dummies, and time-dummies are included but not reported. Estimation using Poisson-QMLE estimators. Standard errors in parentheses. Statistical significance at the 10% (resp. 5% and 1%) level are denoted by * (resp. ** and ***). Estimation with robust standard errors. The number of observations is 59 632 for goods trade and 76 642 for cross-border M&As. The trade sectors positively affected by EMU are: 1 – Food, beverages and tobacco; 2 – Textile, wearing apparel and leather industries; 4 – Paper and paper products, printing and publishing; 5 – Chemicals and chemical, petroleum, coal, rubber; 7 – Basic metal industries and fabricated metal products.

the euro area have further declined by 15.6% due to EMU. Such a negative effect has not materialized in asset trade diversion. On the contrary, European integration has also promoted equity capital inflows from the rest of the world.

Overall, our results suggest that the increase of M&As in manufacturing between EMU/EU members (preferential liberalization) has been driven by a deeper product market competition and trade integration within the zone, in line with the arguments put forward by Neary (2007a). However, the increase in M&As towards EU/EMU from all over the world (unilateral liberalization) does not seem to be related with trade patterns. We argue that this is due to a deeper financial integration of Europe with the rest of the world (through the reduction of the cost of capital, the elimination of exchange rate risk, the sharing of common trading platforms), although we cannot identify the channel more precisely. In the service sector, EMU/EU had no effect on cross-border M&As. We think that this is due to large remaining trade barriers in these sectors (see below for some evidence) and thus even among European countries. Unfortunately we cannot directly link M&As to trade in services as we did for manufacturing due to lack of data.

5.2. The role of product market regulations in services

A complementary approach to study the links between trade and M&As is to investigate the role of trade barriers and product market regulations on cross-border M&As. Therefore, we make use of product market regulation indicators. The latter consist of 16 indicators grouped in three main categories: state control, barriers to entrepreneurship and barriers to trade and investment. These three main indicators are in turn further aggregated to obtain an overall indicator of product market regulation. These indicators are a synthesis of regulations that have the potential to reduce or increase the intensity of product market competition and therefore they are useful to assess their impact on cross-border M&As.

The key results are shown in Table 4, which includes (but it does not report) the control variable of Table 1. Despite the fact that the number of observations decline by almost one-quarter, the estimates of the control variables are not affected.

The impact of product market regulations on M&As in the manufacturing sector is generally very weak. The sectoral variable $\log(\text{sectoral regulation}_{j,s,t})$ that measures the potential costs of service regulations on a given manufacturing sector is not significant (not even correctly signed, see Panel A). The economy-wide indicator of regulation $\log(\text{aggregate regulation}_{j,t})$ is correctly signed but not significant (see Panel B). Only regulations excluding public ownership, a variable mainly capturing the degree of oligopoly in a country, is somewhat statistically significant (see Panel C).

These results capture the impact of services regulations (for which institutional information is available) on the manufacturing sectors using input-output tables. To a certain extent, therefore, their impact on cross-border M&As in manufacturing might be downward biased due to measurement errors. However, we believe that

Table 4. Cross-border M&As in manufacturing and services: The role of product market regulations

| | Manufacturing | | | Services | | |
|--|--------------------|-------------------|--------------------|---------------------|---------------------|---------------------|
| | All | Within sectors | Across sectors | All | Within sectors | Across sectors |
| | Panel A | | | | | |
| $\text{Log}(\text{sectoral regulation}_{j,s,t})$ | 0.237 (0.692) | 0.366 (0.932) | 0.289 (0.893) | -1.27*** (0.295) | -1.47*** (0.456) | -1.25*** (0.314) |
| | Panel B | | | | | |
| $\text{Log}(\text{aggregate regulation}_{j,t})$ | -0.569 (0.693) | -0.904 (0.878) | -0.116 (0.954) | -1.14** (0.564) | -1.74*** (0.621) | -0.570 (0.592) |
| | Panel C | | | | | |
| $\text{Log}(\text{aggr. Reg. exc. Pub.Own}_{j,t})$ | -0.975* (0.521) | -1.093 (0.675) | -0.983 (0.858) | -1.58** (0.656) | -2.01*** (0.766) | -0.908 (0.597) |
| | Panel D | | | | | |
| $\text{Log}(\text{entry barriers}_{j,t})$ | -0.474 (0.349) | -0.600 (0.454) | -0.359 (0.526) | -1.19*** (0.434) | -1.23** (0.550) | -0.987** (0.420) |
| | Panel E | | | | | |
| $\text{Log}(\text{public ownership}_{j,t})$ | 0.389 (0.310) | 0.183 (0.350) | 0.704** (0.349) | -0.116 (0.346) | -0.282 (0.343) | 0.015 (0.334) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. Estimation using Poisson-QMLE estimators. Controls of Table 1 are included, but not reported. 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. The number of observations is 60,506 in manufacturing and 68 02 in services. Observations are clustered within country pairs.

regulations play a lower role in manufacturing; as such activities have been strongly liberalized, particularly since the beginning of the 1990s.

Conversely, we expect the role of product market regulations to be a key determinant in services, as most sectors are strongly protected. This is confirmed by the data (see last three columns of Table 2): 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 sectoral (see Panel A) or the aggregate (see Panel B) indicators. Interestingly, the percentage of shares owned by the government is not an impediment for cross-border M&As in services (see Panel E), while lower competition in the domestic economy (see Panel C) and/or tougher entry regulations (see Panel D) reduce the degree of foreign investment.

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 (e.g. business services, transport, telecommunications and electricity) of manufacturing activities. Therefore, policies aiming at liberalizing the service sector can have a quantitatively large impact on cross-border M&As: according to the estimate on total cross-border M&As (and using the aggregate index; see Table 4, column (4), panel (3)), *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.

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 EU, similar to the single market for goods.²⁶ If this directive helps liberalizing trade in services, it might trigger a new wave of cross-border M&As.

We interpret the large impact of product market regulation in the service industry as suggestive of the key role played by competition and trade policies in shaping cross-border M&As (in line with the results regarding EMU/EU in the manufacturing sectors). However, one might be cautious with such an interpretation since product market regulation indicators might be correlated with some other unobservable variables that might also affect cross-border M&As (such as the level of financial development, labour market institutions, etc.).

We focus the analysis on cross-border M&As. It would be very interesting assessing whether other forms of foreign entry (through trade or greenfield investment) are

²⁶ 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.

affected negatively in a similar way by product market regulations or, to the contrary, whether such alternative modes are used as a substitute for cross-border M&As to enter in highly regulated economies. Indeed, anecdotal evidence shows that European governments are more active in restricting foreign acquisitions than in limiting greenfield FDI.

6. ROBUSTNESS CHECKS

6.1. The role of corporate taxation

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 .

The impact of the difference in corporate tax rates has the expected sign and is strongly significant only for manufacturing; 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 *et al.*, 2005). 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 (while keeping the taxes in the source country constant) reduces horizontal cross-border M&A in manufacturing 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, even though the sample is now halved.

6.2. The EMU effects 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 upwardly (see Glick and Rose, 2002; Baldwin and Taglioni, 2006).

Following this literature, the robustness checks require the use of additional dummy variables and are carried out keeping all the controls of the regressions used in 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-border M&As within EMU countries before the introduction of EMU. We report the results in Panel A of Table 5. 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, is of the same magnitude as reported in Table 1.²⁷

Second, in order to assess how the EMU effects have evolved over time, 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 2003–2004. As shown in Panel B of Table 5, 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 much less pronounced in 2003–2004. Moreover, as expected, the same interaction dummy is no different from zero in 1997–98 (not reported). We conduct the same exercise using aggregate data (data aggregated across sectors), in order to limit the number of zeros. The results reported in the last three columns of Table 3 confirm the large EMU effects over the period 1999–2002 and a smaller impact at the end of the sample. This result suggests that the huge increase of cross-border M&As within the euro area due to EMU is temporary; at the same time, the time series information available after 1999 is too short to estimate with precision the permanent steady-state increase. This result is in line with Neary (2007a), according to which following trade liberalizations cross-border M&As are likely to come in waves, with an initially large impact.

6.3. EMU effects: Extensive versus the intensive margins

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. To identify the two margins, we use aggregate data (data aggregated across sectors) of bilateral cross-border M&As, as they have a lower number of zeros.

To assess whether EMU has influenced the decision to engage in M&As for 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 ($1_{(M\&A_{ij,t}>0)}$) and we run a logit estimation adding such dummy to the specification reported in Table 1 (see Table 6, column 2).

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.

Table 5. Cross-border M&As in manufacturing: The role of EMU in the time dimension

| | Sectoral | | | Aggregate | | |
|---|---------------------|---------------------|--------------------|---------------------|---------------------|--------------------|
| | All | Within sectors | Across sectors | All | Within sectors | Across sectors |
| | Panel A | | | | | |
| $EMU_{i,t} EMU_{j,t}$ | 0.839** (0.377) | 0.914** (0.464) | 0.603 (0.393) | 1.000*** (0.435) | 1.216** (0.521) | 0.366 (0.399) |
| $NonEMU_{i,t} EMU_{j,t}$ | 0.650** (0.256) | 0.615* (0.332) | 0.789** (0.359) | 0.771*** (0.238) | 0.890** (0.312) | 0.603** (0.305) |
| | Panel B | | | | | |
| $EMU_{i,t} EMU_{j,t} X I_{I=1999,2000}$ | 1.002* (0.519) | 1.039* (0.607) | 0.450 (0.393) | 1.190** (0.568) | 1.391** (0.669) | 0.188 (0.409) |
| $EMU_{i,t} EMU_{j,t} X I_{I=2001,2002}$ | 1.117*** (0.369) | 1.788*** (0.476) | 0.407 (0.510) | 1.414*** (0.394) | 2.203*** (0.493) | 0.460 (0.517) |
| $EMU_{i,t} EMU_{j,t} X I_{I=2003,2004}$ | 0.190 (0.479) | 0.225 (0.585) | -0.026 (0.771) | 0.645 (0.407) | 0.854* (0.496) | -0.285 (0.690) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. Estimation using Poisson-QMLE estimators. Controls of Table 1 are included, but not reported. 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. Number of observations is 76 642 for sectoral manufacturing and 10 046 for aggregate manufacturing. Observations are clustered within country pairs.

Table 6. Aggregate cross-border M&As in manufacturing: The role of EMU, intensive versus extensive margins

| | OLS-non zero | Logit |
|--------------------------|----------------------------------|------------------------------|
| | $\text{Log}(M\&A_{ij,t})$ (1) | $1_{(M\&A_{ij,t}>0)}$ (2) |
| $EMU_{i,t} EMU_{j,t}$ | 0.293 (0.198) | 0.364*** (0.160) |
| $NonEMU_{i,t} EMU_{j,t}$ | 0.480*** (0.186) | -0.240 (0.154) |

Notes: Gravity models on bilateral cross-border M&As at aggregate level. 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 at aggregate level are included, but not reported. Country dummies of acquiring countries and target countries, 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.

To assess whether EMU affected the volume of M&As for a given country (‘intensive margin’), we run a standard OLS gravity regression, which excludes the zero transactions (see Table 6, column 1), as it gives the impact of EMU on the size of M&As conditionally on observed transactions.

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 6, column 2). The ‘extensive margin’ effect is large since the probability of M&As between two euro area countries has increased by about 45% 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.²⁸ The ‘intensive margin’ effect is around 35% (Table 6, column 1). This decomposition confirms the previous results. If we add the two margins, cross-border M&As (in value) have doubled between euro area countries ($e^{0.293+0.364} = 1.93$), while non-euro area M&As targeting the euro area have risen by about one-quarter ($e^{0.480-0.240} = 1.27$). Namely, the EMU effect between euro area countries in addition to the general tendency to invest in the euro area would amount to about 52% ($= 1.93/1.27 - 1$).

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 has become more like one bigger economy, and this encouraged M&As also from non-euro area countries.

²⁸ The estimate of the dummy $EMU_{i,t} EMU_{j,t}$ is smaller than the one of the dummy $nonEMU_{i,t} EMU_{j,t}$, but they are not statistically different.

6.4. The role of financial depth and Tobin's q

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), looking at aggregate cross-border M&As, finds them to be a function of aggregate stock market capitalization. He also controls for credit to GDP ratio of the acquirer, but the latter variable is 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 on the basis that deep liquid markets provide firms with access to capital necessary to undertake investment projects, which they might otherwise have to forego.

We can show that (1) the fixed-effects control for the degree of financial development across countries and (2) the changes over time of the acquiring sector's market capitalization to GDP ratio is more related to changes in the profitability of investments of the acquiring sector (as in a standard q -theory of investment).

We investigate this hypothesis by running the same regressions with and without fixed-effects at a 2-digit disaggregation and add two additional controls for financial depth: domestic credit over GDP of source and target countries. 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.

Regressions in Table 7 (see columns 1 to 3) indicate that countries with deeper financial markets have a more intense M&A activity, both as acquirer and target 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 country fixed effects, the only variable which remains statistically significant is the acquiring sector's market capitalization to GDP ratio (Table 7; columns 4 to 6).

This evidence suggests that financial deepening is an important driver of cross-border M&As (both for source and host countries), but this effect cannot be identified across time, as countries' financial depth changes smoothly across time. Across time, only changes in expected profitability of the acquiring sector affect significantly cross-border M&As, supporting the Tobin's q theory of investment.

6.5. The role of geography

The impact of distance on cross-border M&As is found to be very small, 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; Head and Ries, 2007; Hijzen *et al.*, 2008). We test two competitive explanations for this result: first, as already argued, the sample is mostly restricted to developed

Table 7. Cross-border M&As in manufacturing and services: The role of financial deepening and Tobin's q

| | Without country fixed effects | | | With country fixed effects | | |
|--|-------------------------------|---------------------|---------------------|----------------------------|-------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Manufacturing | | | | | |
| $\text{Log}(\text{MarketCapitalization}_{i,s,t} / \text{GDP}_{i,s,t})$ | 0.506*** (0.051) | | 0.470*** (0.049) | 0.557*** (0.097) | | 0.563*** (0.099) |
| $\text{Log}(\text{MarketCapitalization}_{j,s,t} / \text{GDP}_{j,s,t})$ | 0.229*** (0.048) | | 0.244*** (0.048) | -0.120 (0.085) | | -0.130 (0.083) |
| $\text{Log}(\text{DomesticCredit}_{i,t} / \text{GDP}_{i,t})$ | | 0.469*** (0.100) | 0.185* (0.108) | | 0.157 (0.183) | 0.090 (0.169) |
| $\text{Log}(\text{DomesticCredit}_{j,t} / \text{GDP}_{j,t})$ | | 0.729*** (0.094) | 0.682*** (0.090) | | 0.269 (0.271) | 0.237 (0.280) |
| | Services | | | | | |
| $\text{Log}(\text{MarketCapitalization}_{i,s,t} / \text{GDP}_{i,s,t})$ | 0.562*** (0.068) | | 0.533*** (0.066) | 0.535*** (0.174) | | 0.530*** (0.176) |
| $\text{Log}(\text{MarketCapitalization}_{j,s,t} / \text{GDP}_{j,s,t})$ | 0.515*** (0.052) | | 0.487*** (0.053) | 0.110 (0.073) | | 0.098 (0.071) |
| $\text{Log}(\text{DomesticCredit}_{i,t} / \text{GDP}_{i,t})$ | | 0.330*** (0.092) | 0.154 (0.104) | | 0.181 (0.292) | 0.248 (0.260) |
| $\text{Log}(\text{DomesticCredit}_{j,t} / \text{GDP}_{j,t})$ | | 0.532*** (0.090) | 0.279** (0.113) | | -0.057 (0.201) | -0.053 (0.200) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. Estimation using Poisson-QMLE estimators. Controls of Table 1 excluding country dummies in columns (1) to (3) are included, but not reported. Sectoral dummies and time-dummies are always 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. Number of observations is 74 283 for manufacturing and 80 654 for services. Observations are clustered within country pairs.

countries and if distance proxies some information asymmetries, it is likely that information costs are less related to distance for those markets. Second, a large share of M&As 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 Table A1 for the classification) by simply interacting the variable $\log(\text{Distance}_{ij})$ with a dummy which is equal to one when the target country is a developed country. As shown in Table 8 (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.

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. While for developed markets, geography played no role over the whole period, the impact of distance has decreased over time only

Table 8. Cross-border M&As in manufacturing and services: The role of geography

| | Manufacturing | | Services | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (1) | (2) |
| | Panel A | | | |
| Developing countries | -0.452*** (0.126) | | -0.518*** (0.156) | |
| Before 1995 | | -0.521*** (0.148) | | -0.527*** (0.183) |
| After 1995 | | -0.459*** (0.126) | | -0.518*** (0.156) |
| | Panel B | | | |
| Developed countries | -0.026 (0.131) | | 0.008 (0.198) | |
| Before 1995 | | -0.015 (0.137) | | 0.024 (0.212) |
| After 1995 | | -0.030 (0.138) | | 0.006 (0.199) |

Notes: Gravity models on bilateral cross-border M&As at sectoral level. Estimation using Poisson-QMLE estimators. Controls of Table 1 excluding distance are included, but not reported. 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. Number of observations is 76 642 for manufacturing and 83 034 for services. Observations are clustered within country pairs.

slightly when the target is a developing country and the acquiring sector belongs to manufacturing (see Table 8, column 2 and 4). This implies that monitoring or information costs remain a predominant obstacle to cross-border M&As towards emerging markets.

7. CONCLUSIONS

We study the determinants of cross-border mergers and acquisition activities (M&As) over the 1985–2004 period in ten manufacturing and ten 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 trade and financial liberalization in Europe in triggering cross-border M&As.

The empirical results suggest that European integration have positively influenced the world developments of cross-border M&As of the manufacturing sector. We can safely argue that institutional changes such as the EU single market and the EMU 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. 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%). Therefore, EMU had the effect typical of unilateral financial liberalization and fostered the reallocation 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 than boosting the formation of conglomerate activities between sectors. We find that this increase in ‘horizontal’ cross-border M&As within the euro area occurred in sectors where the EMU had the largest effect on trade. In line with Neary (2007a), this suggests that cross-border M&As in the EMU have been following trade patterns. We have also found that the large average effects rather hide a hump-shape development with an initial jump in transactions. As suggested by Neary (2007a), as a result of trade liberalization, low-cost firms merge with or acquire high-cost firms, thus generating waves in M&As. These results are very indicative particularly for countries which have recently joined the EU and EMU or might join in the near future. They might attract sizeable foreign equity capital 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&A decisions of entrepreneurs. We find support for this hypothesis when testing the impact of various measures of product market regulation indicators 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. 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. The results suggest that, by deregulating product markets in services, governments can act and be successful to attract foreign equity capital in such sector. This implies that large structural changes will most likely occur as cross-border barriers are dismantled in the service industry, raising the question of the coordination of such policies within regional agreements. Needless to say that M&As may lead to more oligopolistic market structures, which can ultimately affect consumer welfare, and therefore deserves (and receives) regulatory scrutiny.

In this context, the Bolkenstein directive on services in the EU adopted in December 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. Obviously, it is premature to assess the degree of accomplishment of the Bolkenstein directive as well as to disentangle the potential effect of such directive on cross-border M&As. However, it might be worth noting that in 2007 cross-border intra-euro area M&As in services almost tripled with respect to both the average period 2000–2006 and the previous year, respectively from €40–50 billion to €140 billion. At the same time, cross-border intra manufacturing activities contracted.

We also 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. Finally, the empirical results of this paper suggest 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.

Discussion

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The deepening of European integration and the creation of the EMU have been associated with a surge in M&As across participating countries. This paper checks

the statistical significance and robustness of such association using very detailed data on cross-border M&As. It also tries to identify the channels through which the relation may have worked.

Two channels are investigated: the straightforward ‘financial liberalization channel’ due to the reduction in transaction costs and the ‘trade liberalization channel’ due to the reduction in the barriers to international trade. The authors’ conclusion is that the latter channel has been the most important one as M&As have increased the most in those sectors where also international trade has increased the most. I have two comments. The first is that the logic underpinning the trade liberalization channel deserves further empirical scrutiny. This logic is derived from a recent theoretical contribution by Peter Neary (2007a) proposing an analytical framework that shows how changes in market structure accompany the process of trade and capital market liberalization when these lead to tougher competition. Introducing strategic interactions in an otherwise standard model of comparative advantage, Neary concludes that trade liberalization can trigger international merger waves, in the process encouraging countries to specialize and trade more in accordance with comparative advantage. This happens because in his framework M&As are assumed to be the only way industries can restructure. If new players were allowed to enter the restructuring industry, Neary’s argument would unfold. This caveat generates interesting implications in terms of the sectoral pattern of industry restructuring that could be exploited for further empirical analysis. From a policy perspective, such analysis would shed light on the relative importance of domestic and international competition in driving industrial restructuring. The second comment concerns the sharp dichotomy that the paper seems to imply between the financial liberalization channel and the trade liberalization channel. In Neary’s argument these are not really antithetic. As financial liberalization allows M&As to act as instruments of comparative advantage, there is no role for the trade channel if the financial one is shut down. Accordingly, the conclusions of the paper on the relative importance of the two channels should be handled with care.

Morten Ravn

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Coeurdacier, De Santis and Aviat have written an interesting paper on the determinants of cross-border M&A flows. Cross-border M&As constitute a subset of FDI flows and are the dominating component of such cross-border investments among OECD economies. The authors pay particular attention to the impact of integration of European goods markets and of financial markets on the cross-border M&A flows. They examine a very interesting dataset on cross-border M&As and show that European integration has worked as a phenomenal catalyst of M&A activity in the EU, especially among firms in the manufacturing sector. Not only does the single market appear to have significantly promoted M&A activity, but they also find a large impact of the single currency. These results are important for economic policy and

the paper adds significantly to the list of empirical findings regarding the economic impact of European integration.

International capital flows

International capital markets allow investors to spread their investments across locations in order to maximize the return on their savings and facilitate the smoothing of consumption over time and across states of nature. During the development process, countries open to inflows of foreign capital can expand their stock of productive capital faster than countries that must entirely rely on domestic resources.

FDI flows appear particularly important. An FDI inflow not only expands the domestic capital stock, but may also bring along with it other benefits such as access to new technologies, improved management techniques, training of workers, etc. The expansion of the capital stock should benefit the host country (since most of the value added ends up paying for labour services) and added benefits (technology spill-overs and so on) should simply make these gains for the home economy even higher.

The simplest of theories would have it that capital flows from capital-rich countries to capital-poor countries in response to return differentials driven by cross-country differences in capital stocks (capital-labour ratios). This simple story, however, does not fare well empirically since cross-country (North-South) capital flows should be much bigger than observed in the data if capital-labour ratios were the only determinants of such cross-border movements of capital (see Lucas, 1990).

For that reason macroeconomists have for some time turned their attention to identifying factors that either affect the return on capital (and therefore the size and direction of capital flows over and above the influence of capital-labour ratios themselves), or factors that limit the flows of capital despite differences in the return on capital. Figure 2 illustrates a simple way of understanding this dichotomy. Suppose there are two countries in the world economy, home and foreign. The total world capital stock is fixed and given by the number K^W . We measure the home economy's capital stock, K^h , on the horizontal axis as the distance from the origin. The foreign capital stock is then measured as the distance from K^W to K^h . On the vertical axis we indicate the return on capital in the two countries. Assuming declining marginal returns implies that the domestic return is declining in K^h while the foreign return is increasing in K^F . Assume first that the two countries are symmetric in terms of returns (indicated by r_h and r_f) and that the home economy is capital-poor (its initial capital stock is given by K_0^h). Since foreigners can increase their returns on capital by investing in the domestic economy rather than in their own, there should therefore be an FDI inflow to the domestic economy.

What might hinder such an inflow of capital to the domestic economy? The first group of factors are those that are associated with return differences not due to differences in capital-labour. If the foreign economy is more productive than the domestic economy, there might be little reason for foreigners to divert capital to the

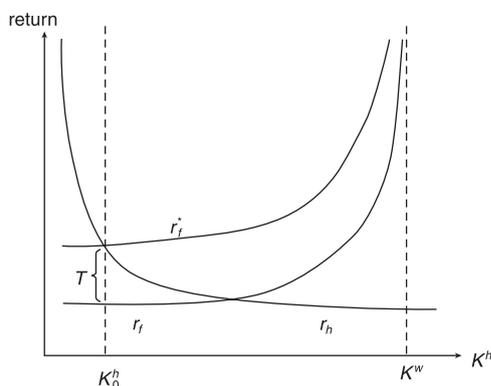


Figure 2. The determinants of international capital flows

domestic economy. We indicate this possibility by the return schedule r_f^* which is drawn in such a way that the productivity difference exactly makes up for the capital intensity difference between home and abroad. What might lead to such productivity differences? The obvious candidates are aspects such as human capital, technology, goods market structures, government policies (regulation, trade policies etc.), and political and economic institutions.

The other possibility is the existence of impediments to the free flow of capital. We can think of such impediments giving rise to a wedge – an implicit tax – so that capital flows occur only when return differentials exceed this wedge. This is indicated in the figure by the vertical distance T , which is drawn so that it makes up exactly for the return difference even when the two countries are symmetric. This wedge puts sand in the wheel of the international allocation of capital preventing an efficient outcome (at least in terms of the allocation of capital). This wedge consists of aspects such as impediments to financial flows, sovereign debt issues, or informational issues. Some of these aspects may, however, simply slow down capital movements rather than limit the long-run impact of return differentials. Informational issues, for example, may dissolve over time thus simply slowing down the speed of adjustment of capital flows. This distinction may suggest that one takes dynamics serious.

This dichotomy is useful because it suggests an approach to estimating the determinants of capital flows. The reduced form approach in the current paper can indeed be thought of as determining these factors.

Mergers and acquisitions

The current paper focuses upon the determinants of a subset of FDI flows: M&As. Cross-border M&As occur when a foreign company either purchases a domestic company or when the foreign and the domestic companies jointly agree to merge into one single company. Therefore, M&As involve the change of ownership of two

existing companies (rather than a foreign economy directly setting up a new activity in the domestic economy as in the case of greenfield FDI). This does not prevent an expansion of the capital stock as in the simple example above. For that reason, it might be useful to think about broader motives for capital flows than the simple return on investment considerations that I went through above.

In particular, it demands some considerations related to the theory of the firm and industrial organization. It would take me too long to cover all the ground here, but given the authors' analysis, it is useful to highlight Neary's (2007) industrial organization (IO) trade analysis of M&As. Neary shows how M&As may occur in oligopolistic markets in response to trade liberalization (or other cross-country changes in cost structures). He examines a model with Cournot competition in which firms are homogeneous within a country sector but possibly heterogeneous across countries and sectors.

Heterogeneity is important since it is well known that M&As are unprofitable in the homogeneous oligopoly model unless this activity creates a monopoly. In Neary's model, trade impediments allow high cost firms to survive, but when removed, low cost firms have an incentive to take over foreign high cost firms. This M&A activity increases prices but roots out inefficient high cost firms (which are subsequently closed down in Neary's model) and leads to a downward pressure on wages. A testable prediction is that M&A flows should be positively correlated with trade flows as exporting low cost firms are also the firms that have an incentive to purchase foreign high cost firms.

This paper

In considering the authors' analysis, it is worthwhile to keep in mind the dichotomy discussed above together with the special features of M&A flows just highlighted. Coeurdacier *et al.* adopt a gravity approach which can be thought of as a reduced form approach to the estimation (and identification) of the impact of the two sets of factors discussed above on cross-border M&A flows. Their primary controls are measures of market size, 'geography', measures of Tobin's (average) q , and institutional controls for the quality of institutions, for EU membership, and for EMU membership, respectively. We may think of Tobin's q , the quality of institutions and EU membership as being factors that control for return differences (and in the latter case, a direct catalyst of M&As). Distance, border and language indicators may be thought of as affecting returns directly (due to transportation costs etc.), but are probably also related to institutions, and perhaps to informational issues.

EMU membership appears most likely as a component of the wedge. For example, currency matching rules used to prevent pension funds from freely allocating their portfolios; this restriction has now less bite within the euro area. It is less clear how the single currency should directly affect *M&A activity* apart from lowering marginally transactions costs and perhaps improving the extent of price transparency across borders (which in turn may improve goods market competition).

The authors later extend the list of controls to include the Balassa index which measures the direction of trade and therefore is related to Neary's theory of mergers, product market regulation measures, and financial market development indicators. Each of these measures may be thought of as return difference indicators.

In their estimations they distinguish between cross-border M&A flows in manufacturing and in services, and between horizontal and vertical transactions (within or between 2-digit sectors). The sector level aspect of the analysis is clearly a valuable aspect of the analysis since it allows one to take into account issues related to comparative advantage (although one might wonder if a 2-digit analysis is sufficiently refined). Given that the dataset includes a large number of 'zeros' (no M&A flows between two particular sector-country pairs), the authors adopt a (quasi) Poisson maximum likelihood estimator (QPML estimator). I will consider this estimation approach below.

Trade and M&A flows: the evidence

The authors find strong support for a positive impact of EU membership on cross-border M&A transactions but only within the manufacturing sector. Moreover, EU membership appears to be a pull-factor: What matters is whether the host country is a member of the internal market. One interpretation of this result is that it lines up with Neary's theory of mergers: EU membership means lower trade barriers and this stimulates M&As. Indeed, the authors provide further evidence of this line of reasoning. When they introduce the Balassa index, the direction of trade is a strong predictor of cross-border M&As while the EU membership dummy decreases in size and loses statistical significance. Moreover, while EU membership appears to matter only for the manufacturing sector, the direction of trade indicator matters for cross-border M&As in both manufacturing and in services. This might be interpreted as indicating that sectors in countries with comparative advantage engage in M&A purchases in countries with comparative disadvantages.

One worry about these results is endogeneity but the authors back up the analysis with a comparison between the impact of trade integration on bilateral trade flows and the impact of trade integration on M&A flows. Although the results are not entirely clear, it suggests at least some mild evidence in favour of the idea that M&A activities are related to trade and comparative advantage. I think that this is nice and a convincing part of the paper, which also has supporting evidence in other recent work (see e.g. Brakman, Garretsen and van Marrewijk, 2005).

Manufacturing versus services

Another result that deserves highlighting, is the contrasting results for the cross-border M&A flows in the manufacturing sector and in the service sector. To take a few examples, EU membership is a pull factor as far as cross-border M&A flows is concerned in the

manufacturing sector but not in services, political institutions matter in the manufacturing sector but not in services, and various measures of the lack of product market deregulation are important determinants of cross-border M&A flows in services but not in manufacturing. These results indicate that although M&A flows in services are large, they are still severely hampered by the lack of international trade and competition in this sector. This result, in my view, is important for economic policy and it might indicate that services still have a way to go before it allows for an efficient cross-country allocation of capital.

The lack of gravity and the strong impact of EMU

Two other results, however, are less convincing in my view. First, the authors find that EMU membership is a strong catalyst of M&A inflows in the manufacturing sector (but not in services). This is the case even after controlling for the Balassa index. Quantitatively, the EMU effect is large. M&A flows between two EMU flows are 155% higher than between non-EMU members, and as a pull factor itself, EMU membership is associated with an 80% increase in M&A inflows. Secondly, in contrast to earlier studies in the trade literature and in the M&A literature, they find no significant ‘gravity’ effects (in the sense that the distance indicator is insignificant).

The first of these results is, in my view, puzzling because it is unclear exactly why the single currency should have a large impact on M&A flows. After all, we are talking about a monetary phenomenon. It would come as no surprise to find a large impact of EMU membership on portfolio flows (due to exchange rate risk considerations, currency matching regulation of pension funds etc.), but it is not really straightforward to see why the single currency should have a large impact on firms’ incentives to buy (or merge with) foreign competitors. It would have been more credible to find that EMU speeds up adjustments to return differentials (as I return to below), but this cannot be investigated using the pooled estimator adopted by NRA. The second result, the lack of gravity, is puzzling mainly because it stands in contrast to much of the literature. One might add to this that if there is no gravity, why estimate a gravity equation, but I will not go that far.

I will suggest a unified answer to these two puzzles. I admit that the answer leaves open other questions, but I think it at least indicates that one might have to be a bit careful with drawing too strong conclusions about the EMU effects and the lack of gravity. The answer I will suggest is motivated by Razin *et al.* (2005) and in order to get to it, I need to return to the estimation procedure. The authors follow the suggestion of Santos Silva and Tenreyro (2006) and use the QPML estimator. This estimator, as argued by Santos Silva and Tenreyro (2006), addresses the inconsistency of standard estimates of the parameters of constant elasticity models when log-linearized in the face of heteroscedasticity (as usually adopted in the gravity literature). Moreover, this estimation approach allows one to deal with the fact that there are many zeros in the dataset.

Table 9. Gravity and EMU reconsidered

| Variable | Estimator | |
|-------------------------|-----------|-----------|
| | QPML | Heckman |
| Distance | -0.015 | -0.430*** |
| $EMU_{i,t}EMU_{j,t}$ | 1.101*** | 0.559 |
| $NonEMU_{i,t}EMU_{j,t}$ | 0.696*** | 0.473 |

Nevertheless, this estimator, as traditional approaches in this literature, treats the zero observations as exogenous. I am not sure that this is a reasonable assumption. It is likely that zero observations arise due to endogenous selection into potential targets. Such a phenomenon arises if, for example, M&A is associated with fixed costs (see Razin *et al.*, 2005). Of course, it is possible that such considerations have little empirical relevance, but one cannot *a priori* conclude against the possibility of endogenous selection.

Table 9 reports the estimates of key parameters when estimating, in turn, the impact of distance and EMU using either the authors' estimator or the Heckman two-step estimator. The data I used for this are not as good as those studied by Coeurdacier *et al.* since I was able to obtain only aggregate M&A flows. Nevertheless, the results are sufficiently suggestive that they command reporting. Column 1 reports the estimates of the distance indicator and of the EMU variables while column 2 reports the results for the Heckman estimator of the coefficients on these variables. These estimates are amazingly different. The coefficient on distance is zero (both in terms of its point estimate and in terms of statistical significance) when estimated with the QPML estimator but negative and highly statistically significant when estimated with the Heckman estimator. Thus, endogenous selection does seem to be an issue as far as the conclusion regarding the lack of gravity is concerned.²⁹

The results are – once again – starkly different across estimators when we examine the impact of the EMU indicators. The QPML estimator indicates a large and significant impact of EMU membership regardless of whether only the host country is an EMU member or whether both the host and the source countries are EMU members. Thus the aggregate data supports the sector level results. However, when we control for selection effects, the EMU effects decline (significantly) in size and become statistically insignificant. The quantitative impact of adopting the Heckman estimator is, thus, economically and statistically very significant.

Admittedly the data studied in Table 9 are of a lower quality than those studied by Coeurdacier *et al.*, and it is also well known that identification might be problematic in the case of the Heckman estimator. However, the results are sufficiently strong that

²⁹ Both estimators include fixed effects and controls for GDP, common border, common language, EU membership and political institutions.

it seems on its own to draw some attention to the fact that the authors' results may be very sensitive to selection issues. I conclude from this that more research is needed before we can firmly conclude in favour of EMU's catalytic role and against the idea that gravity matters for M&A flows.

Dynamics

Let me finish by highlighting a possible extension of the analysis. Given the time-series aspect of the dataset, I think that it might have been interesting to examine the results coming from dynamic panel estimators. There are many reasons why dynamics might be important. First, it is likely that there are serious adjustment costs associated with the flow of capital across countries. Such adjustment costs imply that firms will spread their cross-border investments over time in response to changes in investment opportunities. Moreover, it is well known that mergers often occur in 'waves'. For that reason, it is highly likely that the errors of the pooled regressor are autocorrelated and that proper estimation of the M&A process requires the introduction of a partial adjustment mechanism.³⁰

I have no exact guess on how the introduction of dynamics might affect the estimates, but I am quite sure that taking such an approach would bring further insights. In particular, introducing dynamics may potentially shed further light on the return and wedge factors that I discussed earlier. In particular, some of the wedges may act more as short-run factors that lower the speed of adjustment of M&A flows to return difference than long-run factors and the dynamic panel estimator might potentially allow one to estimate these factors. To take one example, the single currency may potentially have acted as such a short-run factor since it probably has improved the transparency of goods and capital markets and therefore has increased the speed of adjustment of cross-border capital flows to return differentials.

Conclusion

The authors have written a very interesting piece on international capital flows. The results have important implications for economic policy for they suggest that trade integration is key for an efficient cross-country allocation of capital. The authors also show quite forcefully that there is a long way to go before service sectors become as integrated as manufacturing sectors. As made clear, I am more sceptical about the results concerning the impact of European monetary integration and the lack of gravity. I think it is likely that the single currency may simply have increased the elasticity of international (EMU) capital flows to cross-country differences in returns (and in the determinants of merger flows according to, e.g., IO theories). That is, the EMU impact may simply have had a short-run impact on cross-border M&A flows

³⁰ Brakman *et al.* (2005) note that the errors are serially correlated.

(rather than a long-run increase in these flows). The rather bleak outlook for the economy at the moment may help shed further light on this issue; if the elasticity story is correct, we should see a large correction of M&A flows in case the EMU area enters a recessionary period.

Panel discussion

Following the discussants, several panel members wondered whether M&As are actually beneficial for countries. Clemens Fuest urged the authors to discuss FDI motives and consequences, as countries are not always eager to attract acquisitions, fearing employment losses. Hans-Werner Sinn agreed that M&As might not be beneficial and that some countries, for example Poland, do not like foreign ownership of firms. On the role of corporate taxation on cross-border investments, Fuest also noticed that while tax incentives are relevant for Greenfield FDI, in the case of M&As they really matter only as far as double taxation is an issue. Jacques Melitz noticed that very few determinants are significant for services (i.e. common border and language). This could mean that information issues are extraordinarily important in the case of services, a point which would deserve more attention, maybe by including more precise explanatory variables than the common language one. Diego Puga noticed that exports and outsourcing could be alternatives to M&As, and that as M&As they are affected by economic integration and institutions. Hans-Werner Sinn closed the panel round with a comment on the possible sources of the results by noticing that EMU could affect M&As because it eliminates currency exchange rate risk: indeed, the establishment of a European capital market and the equalization of interest rates are major achievements of EMU, and apply to all sorts of investments.

APPENDIX

Table A1. Countries and sectors

| Countries | |
|--|---|
| <i>Source Countries (21)</i> | <i>Target Countries (32)</i> |
| Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxemburg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, South Korea, UK, US | <i>Developed Countries (21)</i> Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxemburg, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, UK, US |
| | <i>Developing Countries (11)</i> Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, South Korea, Turkey |
| Sectors | |
| Manufacturing (10) | Services (10) |
| 1 – Food, beverages and tobacco | 1 – Transport and storage |
| 2 – Textile, wearing apparel and leather industries | 2 – Communication |
| 3 – Wood and wood products, including furniture | 3 – Electric, gas and water supply |
| 4 – Paper and paper products, printing and publishing | 4 – Education, health, social and personal service activities |
| 5 – Chemicals and chemical, petroleum, coal, rubber and plastic products | 5 – Hotels and restaurant |
| 6 – Non-metallic mineral products, except petroleum and coal | 6 – Wholesale trade |
| 7 – Basic metal industries and fabricated metal products | 7 – Retail trade |
| 8 – Machinery and equipment | 8 – Banking |
| 9 – Transport equipment | 9 – Insurance |
| 10 – Other manufacturing industries | 10 – Other financial intermediation |

Table A2. Cross-border in M&As in manufacturing: sectoral and geographical breakdown (1987–2004, %, €billion)

| Sectors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Annual average €billion |
|---------------------------------|------|------|-----|------|------|-----|------|------|------|-----|----------------------------|
| Percentage share | | | | | | | | | | | |
| World | | | | | | | | | | | |
| 1987–1992 | 18.2 | 1.7 | 1.0 | 5.9 | 26.5 | 6.9 | 5.3 | 25.9 | 7.8 | 0.9 | 32 020 |
| 1993–1998 | 12.1 | 1.2 | 0.6 | 5.1 | 36.8 | 5.8 | 4.8 | 19.8 | 12.9 | 0.9 | 71 363 |
| 1999–2004 | 19.3 | 0.6 | 1.1 | 3.5 | 26.9 | 5.0 | 6.9 | 26.9 | 9.5 | 0.2 | 129 835 |
| Intra plus extra euro area | | | | | | | | | | | |
| 1987–1992 | 11.7 | 1.0 | 0.4 | 2.9 | 38.1 | 8.8 | 3.0 | 26.5 | 7.6 | 0.0 | 10 755 |
| 1993–1998 | 8.2 | 1.9 | 0.7 | 5.7 | 31.0 | 9.7 | 3.4 | 14.4 | 24.7 | 0.4 | 25 764 |
| 1999–2004 | 17.2 | 0.8 | 1.7 | 2.8 | 27.9 | 9.7 | 6.7 | 21.1 | 11.7 | 0.1 | 46 158 |
| Denmark, Sweden, United Kingdom | | | | | | | | | | | |
| 1987–1992 | 29.4 | 2.5 | 0.7 | 5.4 | 23.7 | 7.9 | 5.7 | 15.3 | 7.6 | 1.9 | 10 265 |
| 1993–1998 | 10.1 | 0.5 | 0.0 | 2.7 | 59.2 | 4.1 | 4.0 | 11.6 | 5.9 | 1.8 | 22 424 |
| 1999–2004 | 35.2 | 0.2 | 0.3 | 3.2 | 37.6 | 3.0 | 4.4 | 13.1 | 2.5 | 0.3 | 36 446 |
| United States | | | | | | | | | | | |
| 1987–1992 | 24.3 | 0.8 | 1.8 | 16.7 | 16.5 | 2.4 | 4.6 | 19.2 | 12.8 | 0.8 | 4862 |
| 1993–1998 | 15.0 | 0.7 | 0.5 | 6.9 | 26.6 | 3.8 | 7.3 | 30.9 | 7.6 | 0.8 | 16 705 |
| 1999–2004 | 7.0 | 0.6 | 0.6 | 2.3 | 21.7 | 2.0 | 6.0 | 45.0 | 14.8 | 0.1 | 32 460 |
| Canada | | | | | | | | | | | |
| 1987–1992 | 4.2 | 7.0 | 9.8 | 3.9 | 4.7 | 0.0 | 3.4 | 58.1 | 8.7 | 0.3 | 1138 |
| 1993–1998 | 35.4 | 0.4 | 3.5 | 7.9 | 8.0 | 1.3 | 4.2 | 35.4 | 3.8 | 0.0 | 4322 |
| 1999–2004 | 8.1 | 0.0 | 3.8 | 6.4 | 5.6 | 0.1 | 24.6 | 47.5 | 3.6 | 0.4 | 8317 |
| Japan | | | | | | | | | | | |
| 1987–1992 | 5.6 | 0.9 | 0.0 | 3.4 | 21.9 | 6.5 | 10.3 | 47.7 | 3.0 | 0.8 | 4759 |
| 1993–1998 | 9.2 | 3.4 | 0.0 | 0.7 | 5.4 | 1.8 | 15.0 | 55.5 | 8.4 | 0.6 | 1301 |
| 1999–2004 | 28.1 | 1.0 | 0.0 | 2.9 | 3.0 | 6.3 | 5.3 | 34.5 | 18.8 | 0.1 | 4780 |
| Norway | | | | | | | | | | | |
| 1987–1992 | 27.5 | 9.4 | 0.0 | 0.2 | 36.9 | 0.0 | 1.0 | 5.8 | 18.6 | 0.6 | 169 |
| 1993–1998 | 7.2 | 20.0 | 0.0 | 23.0 | 26.8 | 0.1 | 5.9 | 7.5 | 3.1 | 6.5 | 374 |
| 1999–2004 | 2.7 | 0.9 | 0.0 | 43.7 | 39.8 | 0.4 | 0.0 | 12.2 | 0.3 | 0.0 | 1558 |

Notes: 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 Petroleum, Coal, Rubber and Plastic Products; 6 – Manufacture of Non-Metallic Mineral Products, except Products of Petroleum and Coal; 7 – Basic Metal Industries and Fabricated Metal Products; 8 – Machinery and Equipment; 9 – Transport Equipment; 10 – Other Manufacturing Industries.

Source: Thomson Financial (SDC Platinum).

Table A3. Cross-border in M&As in services: sectoral and geographical breakdown (1987–2004, %, €billion)

| Sectors | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Annual average €billion |
|---------------------------------|------|------|------|-----|------|------|------|------|------|------|----------------------------|
| Percentage share | | | | | | | | | | | |
| World | | | | | | | | | | | |
| 1987–1992 | 3.7 | 12.2 | 1.8 | 3.8 | 8.3 | 4.1 | 4.9 | 11.2 | 14.3 | 35.8 | 29 514 |
| 1993–1998 | 4.3 | 18.0 | 10.6 | 1.6 | 6.5 | 5.7 | 5.3 | 9.3 | 11.6 | 27.3 | 85 280 |
| 1999–2004 | 1.9 | 36.6 | 10.3 | 0.6 | 8.0 | 2.0 | 2.6 | 12.2 | 6.6 | 19.1 | 328 239 |
| Intra plus extra euro area | | | | | | | | | | | |
| 1987–1992 | 2.3 | 10.4 | 1.6 | 3.9 | 3.1 | 4.6 | 3.9 | 16.9 | 25.0 | 28.3 | 10 345 |
| 1993–1998 | 2.1 | 12.7 | 9.5 | 0.8 | 2.3 | 5.3 | 5.2 | 12.0 | 23.4 | 26.8 | 32 462 |
| 1999–2004 | 1.7 | 30.5 | 14.1 | 0.8 | 9.5 | 1.3 | 3.4 | 14.9 | 9.5 | 14.4 | 149 820 |
| Denmark, Sweden, United Kingdom | | | | | | | | | | | |
| 1987–1992 | 5.3 | 21.8 | 4.3 | 3.6 | 17.9 | 3.6 | 5.1 | 6.3 | 7.4 | 24.8 | 8241 |
| 1993–1998 | 5.7 | 30.8 | 3.0 | 1.1 | 6.5 | 4.8 | 11.4 | 7.9 | 3.9 | 24.8 | 19 313 |
| 1999–2004 | 1.4 | 56.4 | 5.9 | 0.5 | 4.7 | 2.1 | 1.6 | 8.2 | 2.3 | 16.7 | 108 546 |
| United States | | | | | | | | | | | |
| 1987–1992 | 3.0 | 8.2 | 0.0 | 3.5 | 9.5 | 2.8 | 1.7 | 4.9 | 8.3 | 58.1 | 5542 |
| 1993–1998 | 4.4 | 15.1 | 19.2 | 2.7 | 11.2 | 4.6 | 2.0 | 6.7 | 4.3 | 29.8 | 26 512 |
| 1999–2004 | 2.6 | 13.2 | 10.4 | 0.5 | 9.6 | 3.4 | 2.6 | 13.8 | 4.2 | 39.7 | 52 450 |
| Canada | | | | | | | | | | | |
| 1987–1992 | 1.9 | 15.0 | 0.0 | 1.0 | 2.6 | 1.7 | 0.6 | 5.2 | 1.5 | 70.6 | 1723 |
| 1993–1998 | 13.1 | 23.1 | 3.4 | 3.0 | 10.4 | 1.0 | 0.4 | 12.4 | 7.6 | 25.7 | 4781 |
| 1999–2004 | 5.7 | 10.6 | 9.3 | 1.5 | 15.3 | 1.2 | 2.6 | 14.3 | 30.0 | 9.5 | 9332 |
| Japan | | | | | | | | | | | |
| 1987–1992 | 5.0 | 0.6 | 0.0 | 6.4 | 2.2 | 7.1 | 15.0 | 19.5 | 13.3 | 30.7 | 3472 |
| 1993–1998 | 0.0 | 6.8 | 0.0 | 0.2 | 4.7 | 57.6 | 1.1 | 7.7 | 2.8 | 18.9 | 1524 |
| 1999–2004 | 0.0 | 71.3 | 0.3 | 0.0 | 3.8 | 9.5 | 1.6 | 0.7 | 0.4 | 12.3 | 6011 |
| Norway | | | | | | | | | | | |
| 1987–1992 | 27.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.1 | 37.9 | 33.8 | 179 |
| 1993–1998 | 24.6 | 9.3 | 26.3 | 0.0 | 14.0 | 9.2 | 4.4 | 0.0 | 0.2 | 12.0 | 315 |
| 1999–2004 | 6.0 | 55.8 | 0.1 | 0.5 | 2.2 | 2.1 | 1.3 | 3.8 | 1.0 | 27.3 | 1688 |

Notes: 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.

Source: Thomson Financial (SDC Platinum).

Table A4. Descriptive statistics

| | Mean | Std dev. | Min | Max | Number observ. | Non zeros |
|---|---------|----------|---------|---------|----------------|-----------|
| Manufacturing | | | | | | |
| $M\&A_{ij,st}$ (€millions) | 11.249 | 293.754 | 0 | 54 223 | 121 200 | 4188 |
| $M\&A_{ij,st}$ 'within sectors' (€mil.) | 7.158 | 218.142 | 0 | 32 875 | 121 200 | 2645 |
| $M\&A_{ij,st}$ 'across sectors' (€mil.) | 2.630 | 179.813 | 0 | 53 450 | 121 200 | 1319 |
| $\text{Log}(GDP_{i,st} / GDP_{j,st})$ | 11.848 | 4.375 | -4.071 | 23.791 | 78 490 | 78 490 |
| $\text{Log}(\text{MarketCapitalization}_{i,st} / \text{GDP}_{i,st})$ | 1.678 | 2.286 | 0 | 9.572 | 92 820 | 66 761 |
| $\text{Log}(\text{MarketCapitalization}_{j,st} / \text{GDP}_{j,st})$ | 1.943 | 2.514 | 0 | 10.686 | 79 008 | 58 939 |
| $\text{Log}(\text{Exp}_{ij,st} / \text{GDP}_{i,st} \text{ GDP}_{j,st})$ | -22.251 | 3.166 | -35.472 | -12.491 | 72 207 | 72 207 |
| $\text{Log}(\text{distance}_{ij})$ | 7.602 | 0.989 | 4.190 | 9.325 | 121 200 | 121 200 |
| Border_{ij} | 0.0621 | 0.241 | 0 | 1 | 121 200 | 7530 |
| $\text{Common language}_{ij}$ | 0.0358 | 0.185 | 0 | 1 | 121 200 | 4340 |
| $\text{Civil Liberties}_{i,t}$ | 1.456 | 0.689 | 1 | 5 | 121 200 | 121 200 |
| $\text{Civil Liberties}_{j,t}$ | 1.888 | 1.196 | 1 | 7 | 112 800 | 112 800 |
| $EATR_{j,t} - EATR_{i,t}$ | -0.005 | 0.104 | -0.4314 | 0.4314 | 51 560 | 51 500 |
| Services | | | | | | |
| $M\&A_{ij,st}$ (€millions) | 21.839 | 759.002 | 0 | 206 354 | 105 000 | 5043 |
| $M\&A_{ij,st}$ 'within sectors' (€mil.) | 12.953 | 722.265 | 0 | 206 354 | 105 000 | 2840 |
| $M\&A_{ij,st}$ 'across sectors' (€mil.) | 3.092 | 89.268 | 0 | 11 705 | 105 000 | 1600 |
| $\text{Log}(GDP_{i,st} / \text{GDP}_{j,st})$ | 14.648 | 4.403 | 1.386 | 27.660 | 85 312 | 85 312 |
| $\text{Log}(\text{MarketCapitalization}_{i,st} / \text{GDP}_{i,st})$ | 1.367 | 2.099 | 0 | 9.568 | 96 950 | 72 550 |
| $\text{Log}(\text{MarketCapitalization}_{j,st} / \text{GDP}_{j,st})$ | 1.263 | 2.032 | 0 | 9.568 | 85 330 | 63 752 |
| $\text{Log}(\text{distance}_{ij})$ | 7.634 | 1.026 | 4.190 | 9.325 | 105 000 | 105 000 |
| Border_{ij} | 0.0686 | 0.253 | 0 | 1 | 105 000 | 7200 |
| $\text{Common language}_{ij}$ | 0.0458 | 0.209 | 0 | 1 | 105 000 | 4800 |
| $\text{Civil Liberties}_{i,t}$ | 1.464 | 0.715 | 1 | 5 | 105 000 | 105 000 |
| $\text{Civil Liberties}_{j,t}$ | 1.646 | 0.955 | 1 | 5 | 101 640 | 10 640 |
| $EATR_{j,t} - EATR_{i,t}$ | -0.002 | 0.105 | -0.4314 | 0.4314 | 57 720 | 57 720 |

Table A5. Descriptive statistics on product market regulation, 1998–2003

| Sectoral disaggregation | | | | |
|--|------|----------|------|------|
| | Mean | Std dev. | Min | Max |
| 1 – Food, beverages and tobacco | 0.11 | 0.03 | 0.07 | 0.18 |
| 2 – Textile, wearing apparel and leather industries | 0.10 | 0.03 | 0.05 | 0.17 |
| 3 – Wood and wood products, including furniture | 0.11 | 0.03 | 0.06 | 0.17 |
| 4 – Paper and paper products, printing and publishing | 0.10 | 0.03 | 0.06 | 0.17 |
| 5 – Chemicals and chemical, petroleum, coal, rubber and plastic products | 0.12 | 0.03 | 0.06 | 0.18 |
| 6 – Non-metallic mineral products, except petroleum and coal | 0.11 | 0.03 | 0.07 | 0.19 |
| 7 – Basic metal industries and fabricated metal products | 0.11 | 0.04 | 0.06 | 0.22 |
| 8 – Machinery and equipment | 0.10 | 0.03 | 0.06 | 0.17 |
| 9 – Transport equipment | 0.10 | 0.03 | 0.06 | 0.18 |
| Manufacturing | 0.11 | 0.03 | 0.05 | 0.22 |
| 1 – Transport and storage | 0.36 | 0.14 | 0.16 | 0.70 |
| 2 – Communication | 0.33 | 0.08 | 0.22 | 0.57 |
| 3 – Electric, gas and water supply | 0.40 | 0.17 | 0.17 | 0.90 |
| 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 |
| Services | 0.31 | 0.15 | 0.05 | 0.90 |

| Country disaggregation | | | | | | | | |
|-------------------------------|----------------------------|----------|------|------|---------------|----------|----------|----------|
| | Manufacturing and services | | | | Manufacturing | | Services | |
| | Mean | Std dev. | Min | Max | Mean | Std dev. | Mean | Std dev. |
| 1 – Austria | 0.25 | 0.15 | 0.12 | 0.62 | 0.15 | 0.02 | 0.39 | 0.14 |
| 2 – Belgium | 0.21 | 0.14 | 0.08 | 0.51 | 0.12 | 0.01 | 0.34 | 0.13 |
| 3 – Finland | 0.18 | 0.13 | 0.07 | 0.49 | 0.09 | 0.01 | 0.31 | 0.13 |
| 4 – France | 0.25 | 0.18 | 0.09 | 0.74 | 0.14 | 0.01 | 0.41 | 0.19 |
| 5 – Germany | 0.19 | 0.10 | 0.10 | 0.45 | 0.12 | 0.01 | 0.29 | 0.10 |
| 6 – Greece | 0.25 | 0.19 | 0.07 | 0.69 | 0.14 | 0.04 | 0.43 | 0.20 |
| 7 – Ireland | 0.21 | 0.20 | 0.07 | 0.90 | 0.10 | 0.01 | 0.37 | 0.24 |
| 8 – Italy | 0.24 | 0.16 | 0.10 | 0.70 | 0.14 | 0.02 | 0.38 | 0.16 |
| 9 – Netherlands | 0.15 | 0.11 | 0.07 | 0.70 | 0.08 | 0.01 | 0.25 | 0.12 |
| 10 – Portugal | 0.23 | 0.14 | 0.08 | 0.61 | 0.14 | 0.01 | 0.36 | 0.14 |
| 11 – Spain | 0.20 | 0.12 | 0.07 | 0.59 | 0.13 | 0.01 | 0.30 | 0.14 |
| 12 – Denmark | 0.15 | 0.11 | 0.06 | 0.53 | 0.08 | 0.01 | 0.26 | 0.11 |
| 13 – Sweden | 0.14 | 0.10 | 0.05 | 0.40 | 0.07 | 0.01 | 0.24 | 0.09 |
| 14 – United Kingdom | 0.14 | 0.10 | 0.06 | 0.42 | 0.08 | 0.01 | 0.23 | 0.11 |
| 15 – Canada | 0.15 | 0.11 | 0.07 | 0.38 | 0.08 | 0.01 | 0.26 | 0.10 |
| 16 – Japan | 0.20 | 0.14 | 0.09 | 0.59 | 0.11 | 0.01 | 0.34 | 0.14 |
| 17 – New Zealand | 0.14 | 0.08 | 0.07 | 0.36 | 0.09 | 0.01 | 0.21 | 0.07 |
| 18 – Norway | 0.23 | 0.13 | 0.12 | 0.56 | 0.14 | 0.01 | 0.35 | 0.13 |
| 19 – Switzerland | 0.19 | 0.14 | 0.07 | 0.60 | 0.10 | 0.01 | 0.31 | 0.16 |
| 20 – United States | 0.14 | 0.10 | 0.06 | 0.35 | 0.08 | 0.01 | 0.23 | 0.09 |

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