Mergers and acquisitions & trade: A global value chains analysis*

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Abstract

The present article deals with how the insertion in international trade and Global Value Chains (GVCs) of countries affect their capacity of attracting foreign Mergers and Acquisitions (M&As). To this end, we combine data for bilateral M&As and trade in value added for the period 2001-2015 and estimate an augmented gravity equation. Results indicate that trade openness *per se* does not favour M&As. Nevertheless, bilateral free trade agreements, heterogeneity of destinations (sources) for exports (imports) of intermediate and final goods, and position and participation in global value chains are relevant for explaining bilateral M&As. Moreover, their role is significantly different depending on the level of development of the home and host countries.

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1 Introduction

During the past 30 years, Multinational Enterprises (MNEs) accelerated the relocation of their productive activities. Between 1988 and 2016, Foreign Direct Investment (FDI) grew sharply, evolving from 8.2% of the world's GDP to 35.1%[1]. This phenomenon made central the concept of Global Value Chains (GVCs), which refers to the fragmentation across border of different production processes often set by MNEs through FDI (Amador & Cabral, 2016). Trade in intermediate goods between MNEs affiliates or between MNEs and their partners hence represents an increasing share of international trade (Antràs & Yeaple, 2014). As a matter of fact, currently, intermediate goods account for nearly 44% of trade in goods (UNCTAD, 2017a), and MNEs control approximately 80% of the world's trade (UNCTAD, 2013).

At the same time, increasingly ambitious trade agreements have been negotiated, while we have also witnessed a surge in protectionist ideas. Recent examples of the former is the signature of the African Continental Free Trade Area or the Free Trade Agreement (FTA) between the European Union (EU) and Japan, while the Brexit vote or Trump's increase in tariffs on steel and aluminium imports stand as good examples of the latter.

Trade policies may not only have a direct effect on trade flows but also influence MNEs' investment decisions. Initially, FDI and trade can be considered as substitutes: horizontal FDI is expected to be driven by increasing trade costs and lower foreign competition (Horstmann & Markusen, 1987). However, FDI and trade may be complementary. In this case, decreasing trade costs and trade openness are expected to foster vertical capital inflows, export support and export platform FDI (Ekholm et al., 2007; Hanson et al., 2005; Krautheim, 2013). Through these FDI strategies, MNEs slice up the value chain across borders by setting subsidiaries that engage in specific economic activities (Krugman et al., 1995).

Despite the growing role of GVCs in the world's production since the beginning of the 90s (Timmer et al., 2014), the existing evidence on the nexus between FDI and host countries' trade openness is still ambiguous. Some studies find a positive rela-

[1]UNCTAD's statistics on FDI stock over GDP

tionship (e.g. Ramasamy & Yeung, 2010), while others report a non-significant (e.g. Kolstad & Villanger, 2008) or negative connection (e.g. Wheeler & Mody, 1992). Since FDI could potentially favour, for instance, economic growth or productivity (e.g. Alfaro et al., 2004; Ashraf et al., 2016), and countries' trade characteristics can be shaped through economic policy, it is relevant to further explore the nexus between FDI and trade.

The ambiguity in the results may be explained by the fact that the indicators commonly used to reflect trade openness, such as gross trade over GDP, give a poor insight into countries' trade characteristics and policy. FDI strategies which are positively linked with trade might not be necessarily attracted by trade openness *per se*, but by some specific involvements in trade and GVCs. For instance, the capacity of producing intermediates goods which are later used in the production process in other countries can favour vertical FDI (e.g. Braconier et al., 2005; Beugelsdijk et al., 2009). Alternatively, economies which can export goods to a wider number of countries are more likely to attract export platform FDI (e.g. Medvedev, 2012). Additionally, trade openness may also represent a higher level of foreign competition that would deter FDI (Wheeler & Mody, 1992). Trade openness indicators might be positively related with these dimensions but do not allow us to disentangle the relevance of each of these factors.

We extend the previous literature by accounting for the value added embedded in trade[2], the degree of heterogeneity of exports destinations and imports sources, for both final and intermediate goods and services, and the position and the degree of participation in GVC. These indicators are closely linked with the FDI strategies described above that result in the international fragmentation of production. The capacity of exporting to a wider number of countries is linked with the export platform FDI hypothesis. In addition, the heterogeneity of destinations for intermediate goods exports is also related with vertical FDI. In particular, if MNEs aim at incorporating firms located in countries that are specialized in the production of

[2]Trade in value added statistics are retrieved from the World Input-Output Database (WIOD). The WIOD allows us to unravel the value added embedded in trade and the flows which are consequence of two-way intermediate goods exchange. Subtracting the pure double counted flows from gross trade statistics gives a more precise measure of countries' trade openness and links with the rest of the world.

intermediates for only geographically concentrated productive sites, or for productive sites which are scattered across the globe. Alternatively, higher competition brought by imports from numerous countries entail lower expected profits, allowing us to test whether foreign competition through trade deters FDI. The GVCs participation and position indexes represent the degree in which and how gross exports incorporate domestic and foreign value added (Martínez-Galán & Fontoura, 2019), offering further insight on the relationship between FDI and the fragmentation of production across borders.

Another empirical concern comes from the fact that most of the previous studies deal with aggregated inward FDI, overlooking the heterogeneity of sources[3]. This is a limitation, since investment decisions by MNEs are shaped, among other factors, by bilateral transaction costs and economic sizes. Besides, aggregate inflows suffer from another shortcoming. Indeed, the literature (e.g. di Giovanni, 2005; Garrett, 2016; Jang, 2011) highlights that the determinants of FDI are likely to differ according to the home-host levels of development: if the countries involved are developed countries (North-North), developing countries (South-South) or if FDI flows from developed to developing countries (North-South) or from developing to developed countries (South-North). In this regard, the role of developing countries as a destination and a source of FDI has been rapidly increasing during the last two decades. On average, developing countries received 31% of all capital inflows and generated only 11% of all capital outflows in the 90s. During the period 2007-2016, these shares have shift drastically to 46% and 28% respectively[4].

Additionally, MNEs can either invest abroad through greenfield investment or through Merger and Acquisition (M&A). In turn, the choice of the mode of investment is conditioned by the motivations of the MNE and the host market characteristics (Gilroy & Lukas, 2006; Nocke & Yeaple, 2007). M&As make up for a growing share of total FDI flows, reaching 58% in 2016 against 26% in 2003. Besides, the relevance of each mode of entry is not homogeneous across the world. For non-EU developed economies and for EU15 countries, M&As' share of total inward FDI vol-

[3] See for example Asiedu (2002), Aizenman and Noy (2006), Botrić and Škuflić (2006), Chakrabarti (2001), Ramasamy and Yeung (2010) and Teixeira et al. (2017)

[4] UNCTAD's statistics on FDI flows.

ume (projects) is around 69% (40%). In the countries that joined the EU since 2004 and in developing countries, its relevance is significantly lower (21% for both groups)[5].

The present article goes beyond considering gross trade openness and the signature of FTAs as determinants of overall FDI. We focus on bilateral cross-border M&As and rely on macroeconomic trade indicators which provide new insight into how trade policies and involvement in GVCs affect the countries' capacity of attracting foreign acquisitions.

Results highlight that trade openness *per se* is not a driver of inward M&As, while FTAs, geographic concentration of exports and imports partners, and GVCs position and participation are relevant dimensions. Furthermore, reached evidence highlight that the nexus between trade characteristics and inward M&As is heavily dependent on the home-host level of development.

Our paper has four additional sections. Section II reviews the relationship between trade and FDI. In this section we highlight how countries' involvement in GVCs and trade may affect M&As. Section III describes the databases, indicators and methodology. Section IV reports the results and Section V offers some concluding remarks.

2 Literature review

The FDI literature presents arguments supporting both a substitution between FDI and exports for serving a foreign market, as well as a complementarity. Horizontal FDI takes place when a MNE reproduces its economic activity in a foreign market and seeks to serve this market by locating the production close to these consumers. One reason for following this strategy is the existence of competitive advantages (know-how or technological capabilities) that the MNE cannot transfer to third parties (i.e. arm length) or can be appropriated by competitors. This type of investments are more likely in oligopolistic markets with differentiated products (Caves, 1971; Hymer, 1976; Markusen, 1995). Also, horizontal FDI seeks to overcome trade

[5]Shares are calculated based on M&As data retrieved from Thomson Reuters and greenfield investment from UNCTAD (2017b) annex tables 19 and 22.

costs like transportation, tariffs or anti-dumping measures (Buckley & Casson, 1981; Horstmann & Markusen, 1987). The proximity-concentration trade-off theory indicates that the higher the trade costs and the larger the host economy, the more profitable will be this strategy (Brainard, 1997; Helpman, Melitz, & Yeaple, 2004; Kleinert & Toubal, 2010). Consequently, a countries' trade openness can deter this type of investment (Asiedu, 2002). In this regard, Wheeler and Mody (1992) argue that a low exposure to foreign competition through trade will also favour this type of investment as expected profits are higher.

Head and Ries (2008) develop a theoretical model in which M&As are an instrument to gain control of foreign assets. The model is founded in the principle that foreign investors bid for a fixed number of sites and the value they can add to the firm after acquisition varies across investors. Due to the predominance of conglomerate and horizontal M&As, Head and Ries (2008) argue that M&As are better explained by firms seeking to gain corporate control, rather than by vertical FDI which seeks to re-locate production for minimizing costs.

Nevertheless, there are channels through which trade openness and FDI may have a positive relationship. The theoretical models put forward by Bjorvatn (2004), Horn and Persson (2001) or Norbäck and Persson (2004) suggest that increasing trade costs would discourage cross-border M&As. The intuition behind is that although increasing trade costs can favour foreign takeovers seeking to avoid them, it will favour in a greater degree domestic M&As. Trade barriers make indigenous production advantageous and leads to increase the demand for local assets. This trend favours the willingness and capacity of acquisition by domestic firms in a larger extent than foreign ones. In contrast, economic integration may favour cross-border M&As as targets price decreases due to a surge in competition and aspirant MNEs entering the market are willing to pay a higher price and face a post-merger lower competition. Indeed, for FDI in general, and more rarely for the case of M&As, the literature highlights several channels through which trade liberalization attracts MNEs economic activity.

Through vertical FDI, MNEs set production networks; headquarters and subsidiaries perform specific activities rather than broad ones, and productive sites are linked via exports and imports (Hanson et al., 2005). MNEs are expected to be more likely to invest in countries which are well connected back through trade to their home country and the rest of the world's market (Aizenman & Noy, 2006; Ramasamy & Yeung, 2010). Moreover, due to the efficiency seeking nature of this type of investment, it is prone to be directed from wealthier to less affluent countries (Antràs & Yeaple, 2014; Botrić & Škuflić, 2006; Braconier et al., 2005; Hanson et al., 2005).

Braconier et al. (2005) highlight that through vertical FDI, MNEs slice up the value chain by exploiting the skilled and unskilled labour endowment differences across countries. The slice up of the value chain implies that, to produce a final good, several value adding productive stages are realised in different countries (Krugman et al., 1995). Following these arguments, Beugelsdijk et al. (2009) indicate that vertical FDI is associated with GVCs specialization, which leads MNEs' affiliates to participate in trade to be able to exploit each country competitive advantage.

Other works also put forward that through FDI MNEs set foreign affiliates which are connected through trade to develop specific economic activities. Clausing (2000) indicates that complementarity between FDI and trade in intermediates is plausible as MNEs invest in sales facilities and concentrate production activities in only one site. Antràs and Yeaple (2014) point that while MNEs' headquarters are specialized in R&D related activities, foreign subsidiaries mainly seek to supply goods abroad rather than back home. In a similar vein, Krautheim (2013) puts forward a model of export supporting FDI that refers to FDI into the wholesale and retail sector. Under this strategy, the MNE sets a subsidiary in the foreign country to import and distribute goods. Ekholm et al. (2007) present a model that insights into export platform FDI. This type of investment seeks to serve third countries through exports from the host country in which the MNE invests and is more likely to take place in countries and sectors which are highly integrated in GVCs (Amendolagine et al., 2019).

Similarly, M&As can be motivated to reduce production costs, as a more efficient firm acquires a less efficient one and lead countries to specialize in their competitive advantage (Chakrabarti et al., 2017; Erel et al., 2012; Neary, 2007). In addition, M&As serve MNEs as an instrument to diminish its dependence in external agents by internalizing upward or downward firms in the value chain, reducing in this way risk and transaction costs, and seek convergence in corporate governance (Erel et al., 2012; Hillman et al., 2009; Martínez-Galán & Fontoura, 2019; Rossi & Volpin, 2004). Moreover, through M&As MNEs are able to quickly acquire market knowledge, existing distribution networks and complementary assets from the target (Antràs & Yeaple, 2014; Blonigen et al., 2014; Nocke & Yeaple, 2007). Hijzen et al. (2008) argues and present evidence indicating that tariff jumping is to certain extend relevant for horizontal M&As, and accordingly shows that trade barriers have a larger negative impact for non-horizontal M&As.

As it can be gathered, there are several occasions in which FDI is an instrument used by firms to combine in a more profitable way the competitive resources available across borders (Gilroy & Lukas, 2006), which leads to setting different tasks from a firms' value chains across borders. This strategy is often followed by MNEs. For instance, Alfaro and Charlton (2009) illustrate, by using USA MNEs firm-level data, that vertical FDI represents a larger share of employment and number of subsidiaries than horizontal FDI. For the case of M&As, statistics reported by Hijzen et al. (2008) and Chakrabarti et al. (2017) indicate that pure horizontal investments only account for one third from cross-border M&As.

In terms of the relationship between bilateral trade liberalization (or bilateral trade) and FDI, several works report evidence of a substitution between both (e.g. Antràs & Yeaple, 2014; Blonigen, 2001; Brainard, 1997; Daniels & von der Ruhr, 2014; Jang, 2011), while others find a complementarity (e.g. Berger et al., 2013; Chiappini, 2016; Clausing, 2000; Habib & Zurawicki, 2002; Osnago et al., 2016; Paniagua & Sapena, 2014). In the case of M&As, existing evidence tends to support a complementarity with bilateral trade liberalization (e.g. Coeurdacier et al., 2009; Erel et al., 2012; Hyun & Kim, 2010; Rossi & Volpin, 2004) or find a non-significant relationship (e.g. di Giovanni, 2005).

Similarly, results are not conclusive when countries' overall trade openness is considered. Indeed, there is a relevant strand of the literature which provides evidence indicating that trade openness fosters inward FDI (Asiedu, 2002; Aizenman

& Noy, 2006; Botrić & Škuflić, 2006; Habib & Zurawicki, 2002; Martínez-Galán & Fontoura, 2019; Román et al., 2016; Medvedev, 2012; Ramasamy & Yeung, 2010; Teixeira et al., 2017). On the other hand, there are studies which report a non-significant (Kolstad & Villanger, 2008; Vijayakumar, Sridharan, & Rao, 2010) or negative relationship (Wheeler & Mody, 1992). By performing an Extreme Bound Analysis, Chakrabarti (2001) finds that trade openness is not a robust estimator of FDI. Beugelsdijk et al. (2009) show that trade openness has no significant impact on US foreign affiliates cross-border sales[6]. By analysing foreign subsidiary sales from 56 countries in 85 host countries, Braconier et al. (2005) find trade protectionism in the host country may have a positive and significant impact. However, in a similar analysis, Kleinert and Toubal (2010) reach a non-significant impact. Liargovas and Skandalis (2012) analyse how FDI inflows are affected by trade openness in 36 developing countries. Authors use eight different indicators of trade openness, and find that five have a significant positive impact, while the remaining three are not significant. By using a Bayesian Model and considering a broad set of determinants of FDI, Blonigen and Piger (2014) show that host countries' trade openness related variables might not play a relevant role in explaining bilateral FDI stocks, M&As or foreign affiliates sales.

In terms of export platform FDI, Ekholm et al. (2007) report that US European affiliates' exports to third countries increased as a share of their total sales with the EU accession. Similar conclusions are reached by other works which indicate that FDI flows are positively determined by the extended market which the signed FTA gives firms access to (e.g. Martínez, Bengoa, & Sánchez-Robles, 2012; Medvedev, 2012). For M&As, Coeurdacier et al. (2009) show that the EU integration fostered M&As from non-EU countries.

Finally, the empirical literature that directly addresses the relationship between FDI and GVCs is scarce. The existing evidence indicates that FDI has a positive impact on countries' GVCs participation (Buelens & Tirpák, 2017; Del Prete et al., 2018) and Martínez-Galán and Fontoura (2019) report that GVCs participation in-

[6]Cross-border sales are the sales made by the US foreign affiliate to subsidiaries in a country different from the host country.

creases inward FDI stock[7]. Moreover, Beugelsdijk et al. (2009) show, for US foreign affiliates, that GVC specialization is driven by exports within MNEs' foreign affiliates in terms of trade in intermediates, which are then further used for production. For the case of Sub-Saharan African countries and Vietnam, Amendolagine et al. (2019) demonstrate that GVC participation and upstream position (i.e. production of intermediates which are later incorporated in the production process in other countries) encourage foreign firms to use inputs from local suppliers. In line with this growing strand of the literature, several works suggest that countries' involvement in GVCs may serve as a localization advantage for attracting FDI (Amador & Cabral, 2016; Amendolagine et al., 2019; Martínez-Galán & Fontoura, 2019; UNCTAD, 2013)

The present paper aims to extend the literature which considers trade as a macroeconomic determinant of FDI (e.g. Blonigen & Piger, 2014; di Giovanni, 2005; Liargovas & Skandalis, 2012; Martínez-Galán & Fontoura, 2019; Medvedev, 2012; Paniagua & Sapena, 2014). For this purpose, we exploit a bilateral M&As database and a set of trade in value added and GVCs indicators, described in the following section, which represent different dimensions of countries' engagement in trade. In contrast to industry, firm or product level analysis[8], this approach allows us to consider a larger sample of pair of countries which are source and host of M&As.

3 Methodology and data overview

3.1 Trade and Global Value Chains

To measure the value added embedded in trade, we use the 2016 version of the World Input-Output Database (WIOD) which is available for the period 2000-2014 (See Timmer et al. (2012) for a full description of WIOD). The dataset is available

[7] Martínez-Galán and Fontoura (2019) include in their analysis 40 home and host countries for the period 2002-2011.

[8] As respectively in Chiappini (2016), Helpman et al. (2004) and Blonigen (2001).

for 28 EU countries and 14 other major economies[9], representing in this way 85% of the world's GDP (Stehrer et al., 2014) and 82% of the world's total exports. We follow the disaggregated accounting framework put forward by Wang et al. (2013) that decomposes gross exports into 16 measures grouped in four main components: (i) domestic value added absorbed abroad; (ii) foreign value added in exports; (iii) returned domestic value added; and (iv) pure double counted terms due to two-way intermediate goods flows.

In contrast to gross trade statistics, the WIOD allows to identify where the value of the different components of a good is produced and avoids the double counting of trade flows. Figure 1 puts forward an example, in which first country A exports an intermediate good for US$ 100. Second, country B processes it and exports back an intermediate good valued in US$ 140, and thirdly country A exports a final good valued in US$ 160. Gross trade statistics (GTS) account for trade flows by taking these figures. Alternatively, trade in value added statistics allows us to unveil where the value added (VA) is created. In this case, from the exporter's perspective, it would be: (1) US$ 100 VA is exported from A to B, (2) US$ 40 VA from B to A being the remaining US$ 100 the foreign value added (FVA) embedded in exports, and (3) US$ 20 value added exported from A to B, US$ 40 FVA embedded in exports and US$ and US$ 100 pure double counting due to final goods exports (DDC).

(Insert Figure 1 here)

Trade openness

Trade openness has been traditionally proxied by gross exports and imports over GDP (*gtradeo*). As an alternative, we use value added embedded in trade over GDP (*vatradeo*)[10]. The difference between both, is that the second excludes the double counted flows present in GTS which can lead to relatively overstate the trade openness of countries. Table 1 illustrates this difference. For the year 2014, table 1

[9]Our analysis considers 41 of the 42 available economies, since our M&As dataset does not include Malta as host country.

[10]*gtradeo* is retrieved from World's Bank Development Indicator database. *vatradeo* is calculated by dividing the value added embedded in trade by GDP based on the WIOD. To calculate the value added embedded in total trade we follow the decomposition put forward by Wang et al. (2013) and exclude in the pure double counted terms due to two-way intermediate goods flows.

compares countries' openness and ranking according to both indicators, and in the sixth column reports the difference between both indicators ($gtradeo - vatradeo$). As it can be gathered, the ranking of countries according to their trade openness differs whether *gtradeo* or *vatradeo* is used; hence, the share trade represents in the economy is also modified. Furthermore, from table 1 it can be gathered that the difference between countries' trade openness significantly differs. For instance, according to the *gtradeo* indicators the difference between Denmark and the Republic of Korea is of 7 percentual points, while in the case of the *vatradeo* indicator of only 0.3 percentual points.

(Insert Table 1 here)

Heterogeneity in export and imports partners

In order to approximate the heterogeneity of export (or import) partners of a host country, we propose using the Herfindahl-Hirschman Index (HHI):

$$HHI_{jt} = ShE_{j1t}^2 + ShE_{j2t}^2 + ... + ShE_{j41t}^2$$

where ShE_{j1t}^2 represents the exports in value added from country j to country 1 over total exports in value added made by country j to the world in year t. The HHI maximum value is 10,000 which would indicate that country j only exports to one country. The index is calculated separately for value added exports and imports in final goods (HHI_{jt}^{xf}, HHI_{jt}^{mf}) and intermediate goods (HHI_{jt}^{xi}, HHI_{jt}^{mi}).

Global value chains position and participation

To account for countries' position in GVCs (upstream or downstream), we use the following index proposed by Koopman et al. (2010):

$$GVCpos_{jt} = ln\left(1 + \frac{IV_{jt}}{E_{jt}}\right) - ln\left(1 + \frac{FVA_{jt}}{E_{jt}}\right)$$

where E_{jt} stands for gross exports, IV_{jt} denotes the indirect value added of exports and FVA_{jt} is the foreign value added embedded in exports. This indicator increases in value with the country's upstream position, i.e. the more the country produces inputs for others. By contrast, if it lies downstream the GVC, the share of FVA will be higher at the expense of IV, implying a higher reliance on foreign intermediate goods for producing final goods. Finally, we also use the index of Koopman et al. (2010) to measure the countries' participation in GVCs:

$$GVCpart_{jt} = \frac{IV_{jt} + FVA_{jt}}{E_{jt}}$$

3.2 Gravity equation

We test how the different trade indicators affect M&As by estimating an augmented gravity equation. The model allows to take into consideration the role of bilateral economic, cultural, institutional and geographic factors together with the trade indicators described in the previous section. The empirical success of gravity equations in explaining FDI led to the development of theoretical models with tractable implications (e.g. Head & Ries, 2008; Kleinert & Toubal, 2010; Krautheim, 2013). Based on this literature, we estimate the following specification to test which countries' trade characteristics affect foreign M&As:

$$MA_{ijt} = e^{\begin{pmatrix} \beta_0 + GDPsum_{ijt} + diffGDPpc_{ijt} + natres_{jt} + rulelaw_{it} \\ +rulelaw_{jt} + BIT_{ijt} + FTA_{ijt} + trade_{jt-1} + \lambda_{ij} + \lambda_t \end{pmatrix}} + \epsilon_{ijt} \quad (1)$$

where MA_{ijt} is the extensive (number of projects) margin of M&As from country i to country j in year t which at least entail the acquisition of 10% from the target firm. The extensive margin represents the capacity of creating new bilateral relationships, and is not affected by the "*lumpiness*" due to occasional mega-deals present in M&As statistics. For example, the $110 billion merger between Anheuser-Busch InBev and SABMiller represented 37% of the total M&As into UK in 2016 and more than 200 times the average M&A value into the country during the period 2012-2016. Bilateral M&As transactions are retrieved from Thomson Reuters, and the database covers the period 2001-2015. M&As projects are recorded at the firm level, a characteristic which significantly reduces the potential biases due to the use of tax haven countries as transit for investing in the final destination. The sample covers 41 host countries and 96 source countries (See table A from the appendix). The host economies represent more than 80% of the world's M&As projects during the period of study.

$GDPsum_{ijt}$ is the logarithm of the product of the Gross Domestic Product (GDP) from the source and host country, it is used as a proxy for supply and demand size (Paniagua & Sapena, 2014). It is expected to have a positive impact as M&As will become more numerous and larger as the size of both economies increases (Head & Ries, 2008). Then, the difference between the source and host country's GDP per capita ($diffGDPpc_{ijt} = ln(GDPpc_{it}) - ln(GDPpc_{jt})$) is a proxy for differences in population's wealth or capital-labour intensity between both (Beugelsdijk et al., 2009; Gómez-Herrera, 2012). $diffGDPpc_{ijt}$ can take negative values, as $GDPpc_{jt} > GDPpc_{it}$, or positive, $GDPpc_{it} > GDPpc_{jt}$. A positive coefficient indicates capital flows from more capital-intensive, or wealthier, countries towards more labour-intensive, or less affluent, economies. Moreover, to account for the existence of M&As driven by the acquisition of natural resources, we include the share of natural resources rents over GDP ($natres_{jt}$)[11]. These variables are retrieved from the World Bank's Development Indicators.

Furthermore, as in Head and Ries (2008) the institutional quality is proxied by rule of law in the source and host country ($rulelaw_{it}$, $rulelaw_{jt}$) from the World's Bank Governance Indicators. Institutional quality is likely to favour inward FDI as it reduces the costs of doing business (e.g. Wei, 2000). However, in this regard Erel et al. (2012) and Rossi and Volpin (2004) find that M&As' targets are more likely to be located in countries with weaker investor protection than the one prevailing in the country of the acquirers. The intuition is that M&As serve as a channel for

[11] It is the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents as a percentage of GDP.

worldwide convergence in corporate governance. In addition, certain degree of lower institutional quality might be preferred, or accepted, by MNEs driven by efficiency or natural resources seeking considerations (Adam & Filippaios, 2007; Egger & Winner, 2005). Thus, while a positive relationship is expected for outward M&As, its role is ambiguous for inward M&As.

We also account for whether a country pair has signed a Bilateral Investment Treaty (BIT_{ijt}) and a Free Trade Agreement (FTA_{ijt}). BIT is from Neumayer (2017) which is updated using UNCTAD's International Investment Agreements Navigator, and FTA is from the database named DESTA (Dür et al., 2014).

In equation (1), $trade_{jt-1}$ represent the trade and GVCs indicators described in the previous section. This variable is lagged one period as the overall trade and GVCs characteristics are not fully exogeneous. Nevertheless, it is worth highlighting that the endogeneity issue between FDI and trade is a major concern when unilateral FDI statistics are used (e.g. Aizenman & Noy, 2006) than when bilateral FDI statistics (e.g. Blonigen & Piger, 2014; Martínez-Galán & Fontoura, 2019). Descriptive statistics of all variables included in our model are available in table 2 and a correlation matrix is available in the appendix.

Country pair fixed effects (λ_{ij}) are included to overcome the endogeneity issue between bilateral FDI and the signature of BIT and FTA (Baier & Bergstrand, 2009; Bergstrand & Egger, 2013). Moreover, third-country effects, namely the multilateral resistance, central in the estimate of bilateral trade and FDI (Anderson & van Wincoop, 2003; Head & Ries, 2008) is also accounted for by the country pair fixed effects[12]. Furthermore, country pair fixed effects control for time-invariant determinants of bilateral M&As. Thereby, the model accounts for transaction costs and information asymmetries usually proxied by indicators such as cultural affinity, geographic distance or common legal origins. Then, year fixed effects (λ_t) control for global macroeconomic trends.

Following Silva and Tenreyro (2006), we estimate equation (1) using the Poisson Pseudo Maximum Likelihood (PPML) estimator. This strategy allows to include

[12]Due to collinearity, time-invariant host and source country fixed effects and country pair fixed effects cannot be included together.

in the analysis the zeros usually present in bilateral statistics[13] and overcome the heteroskedasticity issues that otherwise we would have by estimating a log model with Ordinary Least Squares. Clustered robust standard errors are calculated by pair of countries.

(Insert Table 2 here)

4 Results

4.1 Trade openness and GVCs

Results are reported in table 3. The coefficient of the independent variables other than the ones related with trade are in line with the literature. The demand and supply sizes boost M&As from more capital-intensive to less capital-intensive countries. As posited by Rossi and Volpin (2004), outward M&As are positively affected by source countries' institutional quality in terms of rule of law, while for the host country it plays an insignificant role. Targets can obtain substantial gains in terms of access to capital by being incorporated into a firm that operates with higher governance standards. Accordingly, this increases their willingness to sell out to MNEs from countries with better rule of law. Then, acquirer companies also benefit from the surplus created by the improvement in governance in the target company. Natural resource endowment is non-significant, which is not surprising. Although it may foster natural resource seeking M&As, it may also deter it due to the natural resource curse on FDI (Poelhekke & van der Ploeg, 2013). BIT also turn to have a non-significant effect. This is a somewhat counterintuitive result since BITs is expected to favour FDI by reducing risks for investors (Desbordes & Vicard, 2009). Nonetheless, the empirical evidence suggests that the significance and sign associated to BIT can vary depending on the sector of investment (Colen et al., 2016), the institutional distance between the source and host country (Falvey & Foster-McGregor, 2017), the intensity of bilateral FDI flows (Paniagua et al., 2015) or the level of development of signing countries (Berger et al., 2011).

In accordance with the predictions of the literature, bilateral trade liberalization

[13] In our database 57% of the observations are zeros.

in form of FTA has an overall positive impact on bilateral M&As, pointing out a complementarity rather than a substitution effect. Signing a FTA is expected to increase the number of M&As by at least 17%[14].

The overall gross trade openness (*gtradeo*) does not foster M&As as in Blonigen and Piger (2014). Alternatively, when the measure of trade in value added over GDP is used (*vatradeo*), a significant negative impact is reached as in Wheeler and Mody (1992) suggesting that cross-border M&As may be deterred by foreign competition. In addition, the difference in significance of both indicators highlights the relevance of measuring the value added as gross trade statistics may not reflect the real difference in trade openness between economies. The remaining trade host country trade indicators give further insight, and show how different trade channels affect M&As.

First, the concentration in exports final goods destinations (HHI^{xf}) reduces a countries' capacity of attracting M&As. This result supports the hypothesis of export platform FDI for the case of foreign takeovers, MNEs seek to integrate firms with market knowledge and located in countries with more heterogeneous final goods exports links. A 1% increase in the concentration can reduce M&As by 0.25%. If USA were to export to as fewer destinations as China, this could potentially imply a drop of 4.44% in the number of inward M&As[15]. In contrast, the concentration in the sources from where a country imports final goods is not significant. For HHI^{mf} a negative effect suggests the existence of M&As seeking to distribute foreign final goods in the host country. Alternately, this indicator can also have a positive impact, indicating that M&As are pulled towards countries where foreign competition is lower. Both mechanisms appear to cancel out each other.

The intermediate goods indexes are related with vertical M&As, and their expected impact is contradictory depending on how MNEs slice up their value chain across borders. A lower concentration in the destination of exports in intermediate goods (HHI^{xi}) can favour M&As which seek to control the production of intermediates for a broad set of productive sites across borders. However, higher concentration

[14]Based on the coefficient reported in column 4: $(e^{0.158} - 1)x100$

[15]In 2014 in USA $HHI^{xf} = 1091$ and in China $HHI^{xf} = 1285$.

might also attract vertical M&As if MNEs invest in producing intermediates which are then exported to be incorporated in production only in a few sets of countries. This last hypothesis would be in line with the slice up of GVCs in spiders or snakes[16]. Similar ambiguity is present in the case of intermediate goods imports (HHI^{mi}), in which additionally a higher concentration can favour M&As from MNEs that would be deterred by foreign competition in the supply of intermediates in the host country. Results in columns 5 and 6 show that a higher concentration in exports and imports in intermediates would favour cross-border M&As.

The coefficient associated with $GVCpos$ indicates a positive relationship between the upstreamness of exports and M&As[17]. Hence, favouring domestic value added in export of intermediates which are then used in the production process of the importer and which are then are re-exported would increase a country's capacity of creating new bilateral relationships through M&As. This would point M&As as a strategy used by MNEs to internalize production of intermediates which are central in GVCs. Then, as in Martínez-Galán and Fontoura (2019) for FDI stocks, $GVCpart$ has a significant positive impact, suggesting that countries' involvement in GVCs makes them more attractive to M&As.

(Insert Table 3 here)

4.2 North and Southern M&As

Previous analysis highlighted and reported evidence indicating that the determinants of FDI differ depending on the home-host countries' level of development (e.g. Aleksynska & Havrylchyk, 2013; Demir & Hu, 2016; di Giovanni, 2005; Garrett, 2016; Hyun & Kim, 2010; Jang, 2011). However, little attention has been paid on how host countries trade characteristics may differently affect M&As from and into

[16]Baldwin and Venables (2013) describe two different configurations that take place with the slice up of the value chain. The snake refers to the production process divided in different stages, transiting the good sequentially through upstream to downstream stages. Alternatively, in the spider is the configuration production in which different parts are produced in different countries and then are exported to one country in which the final good is assembled. Authors highlight that often the unbundling of manufacturing processes entails a combination of both configurations.

[17]This result contrasts the lack of significance reached by Martínez-Galán and Fontoura (2019) for FDI stocks.

developing countries[18]. Thus, to conserve space, our analysis focusses only on this dimension.

In order to address whether countries' trade and GVCs characteristics have a different impact depending on the home-host country level of development, we interact FTA_{ijt} and $trade_{jt-1}$ with a set of dummies which represent takeovers between North-South (NS_{ij}), South-North (SN_{ij}) and South-South (SS_{ij}) countries, being in this way North-North M&As our benchmark[19]. The joint impact and significance impact are calculated and tested. The following sum of coefficient test is used: $t = \frac{(\beta_i+\beta_j)}{\sqrt{\sigma_i^2+\sigma_j^2-2xCov(\beta_i,\beta_j)}}$. Table 4 reports the results from the regressions[20] and table 5 from the sum of coefficient test.

North-North M&As

Signing a FTA only appears to foster takeovers between developed countries (North-North). Then, in the remaining cases (South-North, North-South and South-South), the sum of coefficients it is non-significant (see table 5). In fact, in columns 4, 6, 7 and 8 in table 4 the coefficient associated with $FTA_{ijt}xSS_{ij}$ is significant and negative. It may be the case that deeper agreements which include, for instance, provisions on competition, private property protection and trade in services are the ones which foster bilateral M&As[21]. Contrary to this, FTAs between developing countries tend to be shallower than the ones signed between developed countries (Dür et al., 2014), and thus more likely to favour trade over M&As. However, how the different provisions included in FTAs affect M&As is beyond the scope of the present article.

Trade openness (*gtradeo*, *vatradeo*) have a significant negative impact only for North-North M&As. According to Wheeler and Mody (1992), this result would be expected if MNEs are deterred by foreign competition. Results from HHI^{mi}

[18] According to our M&As database, M&As from developing countries increased from 9% of the world's M&As projects in 2001 to 20% 2015. The share of the world's Inward M&As into developing countries evolved from 21% to 26%.

[19] Countries classification is made following the UNCTAD. Developing, transition and less developed countries are classified as developing countries.

[20] The coefficients associated to the control variables remain unchanged and thus not reported for brevity, but available under request.

[21] See for example Berger et al. (2013), di Giovanni (2005) and Osnago et al. (2016) on how the characteristics of bilateral trade agreements may affect FDI.

in column 6 indicate that the competition brought by intermediate imports from numerous countries is the one likely to deter M&As from one developed country into another. Alternatively, for the North-North case HHI^{mf} does not have a significant impact. The positive and significant coefficient associated with HHI^{xi} in column 5 from table 4 indicates that MNEs seek to acquire firms which produce intermediate goods which are later exported to a few set of countries. In this way, for the North-North M&As case, trade in intermediates goods appears to drive M&As. Then, GVC participation ($GVCpart$) and position ($GVCpos$) are not significant.

North-South M&As

M&As from the North to the South do not seem to be significantly affected by the host countries' level of trade openness. On the one hand, the capacity of serving a wider number of countries through exports in final goods (HHI^{xf}) seems to attract export platform M&As and involvement in GVCs ($GVCpart$) would significantly foster M&As. On the other hand, the positive and significant coefficient from HHI^{mf} suggests that Northern takeover are prone to be deterred by heterogeneous foreign competition in final goods. As in the North-North case, but with a significantly higher coefficient, the concentration of exports in intermediates goods boost North-South M&As.

South-North M&As

As regards South-North M&As, they seem to be driven by export platform M&As seeking to distribute final and intermediate goods. Both concentration indexes (HHI^{xf}, HHI^{xi}) are negative and significant, suggesting that the capacity of exporting final and intermediate goods to high number of countries is a dimension which propels Southern M&As into developed countries. In addition, host countries' participation in GVCs is also a significant driver, but the GVC position is not.

South-South M&As

South-South M&As appear to be favoured by the heterogeneity in the sources of final goods imports and fostered by the concentration in intermediate goods exports destinations. The first result may indicate the predominance of export supporting M&As, that is to say, takeovers in the wholesale and retail sector (Krautheim, 2013), while the second the objective of MNEs to internalize in their value chain the production of intermediate goods which are later exported to be processed in a few countries. Trade openness, involvement in GVCs and GVCs position are all not significant.

(Insert Table 4 here)

(Insert Table 5 here)

4.3 Robustness analysis

Most of the results from the robustness analysis are reported in the online appendix. We have estimated equation (1) and its extension with the home-host countries' level of development interaction for different specifications in the independent variables and samples[22]. For the sake of brevity, in this section we only comment the robustness of the trade and GVCs indicators.

Excluding the most open economies

The first robustness check tests whether the findings reached in tables 3 and 4 are not driven by those countries which are particularly open to trade. To address this issue, we exclude from the sample the top 10 most open economies in 2014 according to the *gtradeo* indicator (see table 1).

Most of the results reported in table 3 are robust, only *vatradeo* loses significance. Regarding the analysis which accounts for home-host countries level of development, the robustness analysis tend to confirm the results reached in table 4. However, some differences do arise. For North-North M&As, HHI^{xf} becomes significant and

[22] In addition, we regress all the trade indicators in period t instead of $t-1$, which implies analysing M&As that took place during the period 2000-2014. Overall, results are identical to ones reported in tables 3 and 4. To conserve space, we do not comment them, estimates are available upon request.

negative and HHI^{mf} turns significant and positive, providing evidence of the export platform M&As and the negative impact of competition brought by imports in final goods in the case of takeovers between developed economies. Then, for the case of South-North M&As, HHI^{mi} becomes significant and negative. This indicates that MNEs from developing countries seem to be also interested in localizing in countries in which they can access, or distribute, a wide variety of intermediate goods inputs.

Omitted variables

The second robustness check consists of testing whether the estimated models suffer from omitted variables bias. To this end, we extend equation (1) by adding bilateral real exchange rate ($reerd_{ijt}$), exchange rate volatility ($eervol_{jt}$), inflation ($inflation_{jt}$) and taxes payable by enterprises and corporations in the source and host country (tax_{it}, tax_{jt}), and we replace the indicator of rule of law with political stability ($polstab_{it}$, $polstab_{jt}$). A country's depreciation of the exchange rate is expected to increase inward FDI, in the case of cross-border M&As it implies that MNEs can acquire domestic assets at a lower price. Alternatively, the role of exchange rate volatility is not clear (see di Giovanni (2005) for an overview). Inflation is a proxy for countries' macroeconomic stability, thus high inflation is expected to deter FDI (e.g. Buckley et al., 2007). Taxes which are payable by corporations increase the costs of doing business. All else being equal, it would be expected that FDI will flow from countries with higher to lower taxes (e.g. Devereux & Griffith, 1998; di Giovanni, 2005). Then, political stability is related to the risk that a sovereign host government will unexpectedly change "rules" under which businesses operate as well as with the degree of violence a country has (e.g. Busse & Hefeker, 2007). Instability, both in the source and host country, is expected to limit investment from MNEs.

Exchange rate and taxes data are retrieved from the International Monetary Fund's International Financial Statistics database and inflation and political stability are from the World Bank's Development Indicators. Exchange rates measures are calculated following di Giovanni (2005). The bilateral real exchange rate indicator ($reerd_{ijt}$) is the log difference of period t and $t-1$, representing the depreciation/appreciation rate. The volatility measure ($eervol_{jt}$) is constructed by first taking the log difference of the end-of-month nominal exchange rate[23]. Then, the standard deviation is calculated for 5 years preceding each period t.

Estimates of the added variables to equation (1) are in line with the literature (see table 6). Host countries' depreciation of the real exchange rate ($reerd_{ijt}$) increase their capacity of attracting M&As, while exchange rate volatility ($eervol_{jt}$) is insignificant. Then, the level of inflation has a negative impact ($inflation_{jt}$), and political stability from the source and host country have a positive effect ($polstab_{it}$, $polstab_{jt}$). The level of taxes payable by corporation increases the number of M&As projects from the source country (tax_{it}), while it hampers the capacity of attracting M&As (tax_{jt}).

Before commenting the estimates related to the trade and GVCs variables, it is worth highlighting that due to the availability of the independent variables added to our model, the sample of analysis is substantially reduced to 13,122 observations. Result in table 6 partially confirm the findings from table 3. FTA, value added trade openness ($vatradeo$) and the Herfindahl-Hirschman Index for the destination of exports of final goods (HHI^{xf}) become insignificant. Then, the remaining indicators (HHI^{xf}, HHI^{mi}, $GVCpos$, $GVCpart$) are positive and significant as in table 3.

(Insert Table 6 here)

The reduction in the sample size particularly affects the reliability of the estimates which refer to the determinants of investment depending on the home-host country level of development. Thus, findings of the extended model available in tables 7 and 8 should be taken with caution. Estimates confirm that host countries' capacity of exporting final goods to a wide number of countries (HHI^{xf}) boosts North-South M&As. In addition, the concentration of exports' destination in intermediate goods (HHI^{xi}) increases North-North and North-South M&As, but deters South-North M&As. Furthermore, North-North M&As are prone to be deterred by increasing heterogeneity of import of intermediate good sources (HHI^{mi}) and North-South by the heterogeneity of import of final good sources (HHI^{mf}).

[23]Monthly nominal exchange rate is used because consumer price indexes are not available at the monthly frequency for most countries.

Finally, results buttress that Southern countries GVCs participation ($GVCpart$) boosts M&As from developed countries.

(Insert Table 7 here)

(Insert Table 8 here)

Alternative trade openness measure

Finally, we use the trade openness measure proposed by Squalli and Wilson (2011) named composite trade share (CTS). In contrast to the usual trade openness indicator predominantly used by the literature and in the present work, CTS also captures the relevance of a country to world trade:

$$CTS_{jt} = \frac{(X+M)_{jt}}{\frac{1}{n}\sum_{i=1}^{n}(X+M)_{it}} \frac{(X+M)_{jt}}{GDP_{jt}}$$

where X and M are respectively exports and imports. This indicator is calculated using gross trade and value-added trade statistics, CTS and $CTvaS$ respectively.

Estimates for CTS and $CTvaS$ confirm that countries' trade openness does not increase their capacity of attracting M&As. In fact, for the whole sample and for M&As between developed countries (North-North), CTS and $CTvaS$ have a negative and significant impact.

5 Concluding remarks

The present study contributes to the previous literature by addressing how countries' trade and GVCs characteristics affect inward cross-border M&As. The focus goes beyond considering trade openness, and accounts for the first time the heterogeneity in the destinations of exports and of the sources of imports, for intermediate and final goods, countries' GVCs position, and the degree of involvement in GVCs. This exercise is based on a bilateral M&As and trade in value added databases, covering the period 2001-2015 and more than 80% of the world's M&As deals and trade.

To summarise, our results indicate that countries' overall trade openness does not drive inward M&As. On the whole, it appears that trade openness hampers

M&As between developed countries. Nevertheless, reached results highlight several channels through which countries' trade policy and involvement in GVCs affect their capacity of attracting foreign capital. FTA appear to boost M&As only between developed countries, suggesting that comprehensive FTA might be necessary in order to enjoy a complementarity between M&As and trade. Moreover, diversifying the destinations of export in final goods particularly fosters M&As between countries with different level of development (North-South and South-North). Alternatively, in the case of intermediate goods, reached results suggest that MNEs mostly seek to internalize in their GVCs those countries which produce intermediates just for a few set of countries. In fact, evidence indicates that countries in the upstream of the GVC are prone to receive a higher number of M&As projects. Also, findings show that GVC participation is a localization advantage; a higher participation appears to particularly increase takeovers between countries with different level of development.

In addition, results indicate that M&As from developed countries are prone to be impeded by increasing heterogeneous foreign competition through imports. Developing countries which source final goods from a wider number of countries appear to receive less Northern M&As. Then, in the North-North case, MNEs seem to be deterred by competition through imports in intermediate goods.

Our findings emphasise that trade openness is an indicator that is too broad to address the link between M&As and trade. Alternative measures of countries' engagement in exports, imports and GVCs are necessary to address the complex relationship between FDI and the international fragmentation of production. Furthermore, this work stresses that the impact of countries' trade characteristics and policies on M&As are likely to be dependent on the home-host country level of development. All in all, a wider span of destination countries, data at the sectoral level or considering greenfield investments would be an interesting complement to the present analysis.

Appendix

Table A: Country sample

Developed countries (North)		**Developing countries (South)**		
Australia	**Italy**	Argentina	Kazakhstan	Saudi Arabia
Austria	**Japan**	Bahamas	Kenya	Serbia
Belgium	**Jordan**	Bahrain	**Korea, Rep.**	Seychelles
Bulgaria	**Latvia**	Belarus	Kuwait	Singapore
Canada	**Lithuania**	Bolivia	Lebanon	South Africa
Croatia	**Luxembourg**	Bosnia and Herzegovina	Malaysia	Sri Lanka
Cyprus	*Malta*	Botswana	Mauritius	Thailand
Czech Republic	**Netherlands**	**Brazil**	**Mexico**	Trinidad and Tobago
Denmark	New Zealand	Chile	Morocco	Tunisia
Estonia	**Norway**	**China**	Namibia	**Turkey**
Finland	**Poland**	Colombia	Nigeria	Ukraine
France	**Portugal**	Costa Rica	Oman	United Arab Emirates
Germany	**Slovakia**	Dominican Republic	Pakistan	Uruguay
Greece	**Slovenia**	Ecuador	Panama	Venezuela
Hungary	**Spain**	Egypt	Papua New Guinea	VietNam
Iceland	**Sweden**	Georgia	Peru	Zambia
India	**Switzerland**	Ghana	Philippines	Zimbabwe
Indonesia	**United Kingdom**	Guatemala	Qatar	
Ireland	**United States of America**	Hong Kong	Romania	
Israel		Jamaica	**Russian Federation**	

Note: Countries in bold are those which are available in the WIOD, being source and destination of M&As. Malta is only available in our database as a source of M&As.

Table B: Correlation matrix

	MA_{ijt}	$GDPsum_{ijt}$	$diffGDPpc_{ijt}$	$natres_{jt}$	$rulelaw_{it}$	$rulelaw_{jt}$	BIT_{ijt}	$FTAijt_{ijt}$	$gtradeo_{jt-1}$	$vatradeo_{jt-1}$	HHI^{xf}_{jt-1}	HHI^{mf}_{jt-1}	HHI^{xi}_{jt-1}	HHI^{mi}_{jt-1}	$GVCpos_{jt-1}$
$GDPsum_{ijt}$	0.2731	1													
$diffGDPpc_{ijt}$	0.0634	-0.0148	1												
$natres_{jt}$	0.0116	0.0934	0.1738	1											
$rulelaw_{it}$	0.155	0.0016	0.6266	-0.0187	1										
$rulelaw_{jt}$	0.0593	0.0284	-0.5936	-0.4269	-0.036	1									
BIT_{ijt}	-0.1211	-0.0601	-0.0392	0.0025	-0.2691	-0.2312	1								
FTA_{ijt}	0.0105	-0.2774	0.0674	-0.2146	0.1972	0.0601	0.0353	1							
$gtradeo_{jt-1}$	-0.1032	-0.457	-0.0718	-0.2659	0.0897	0.2544	0.0374	0.2651	1						
$vatradeo_{jt-1}$	-0.1077	-0.4531	-0.0573	-0.2282	0.0908	0.2345	0.0444	0.2571	0.9847	1					
HHI^{xf}_{jt-1}	-0.006	0.0703	0.1148	0.1846	-0.0059	-0.1848	-0.0989	-0.1498	-0.1206	-0.1111	1				
HHI^{mf}_{jt-1}	-0.0111	0.1203	-0.0338	0.0659	-0.0067	0.0206	-0.1846	-0.1499	-0.0257	-0.0148	0.7809	1			
HHI^{xi}_{jt-1}	-0.021	0.0287	0.0052	0.1106	0.0019	0.0041	-0.1369	-0.0848	0.0103	0.0223	0.8871	0.7792	1		
HHI^{mi}_{jt-1}	-0.0193	-0.0368	-0.0126	0.025	0.0056	0.0112	-0.1419	-0.0657	0.133	0.1454	0.7531	0.8443	0.7337	1	
$GVCpos_{jt-1}$	0.0842	0.2725	0.0034	0.5541	-0.069	-0.1669	0.0146	-0.221	-0.6988	-0.7014	-0.2265	-0.2582	-0.2971	-0.3678	1
$GVCpart_{jt-1}$	-0.0919	-0.3901	-0.0899	-0.1497	0.0886	0.2056	0.015	0.265	0.858	0.8438	-0.2205	-0.0645	-0.0417	0.0712	-0.5584

Note:Authors' own calculation.

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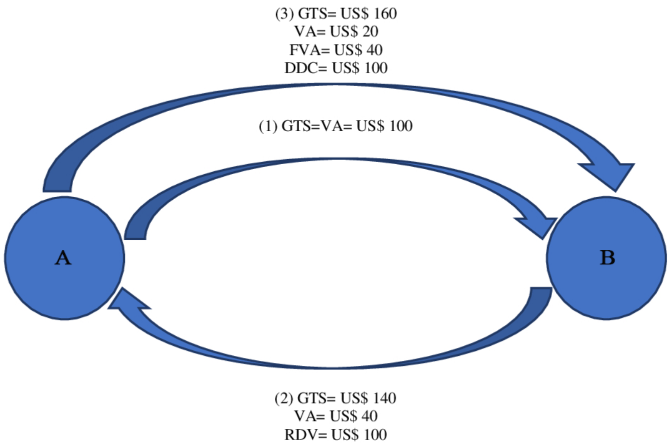
Figures

Figure 1: Trade in value added example



Note: Authors' own elaboration. Example of the difference between gross trade statistics (GTS) and value added (VA) statistics. FVA is the foreign value added embedded in exports, RDV is the returned domestic value added and DDC is the pure double counting of trade flows.

Tables

Table 1: Countries' gross and value-added trade openness ranking

	tradeo	tradeo ranking	vatradeo	vatradeo ranking	gtradeo -vatradeo
Luxembourg	382.3%	1	278.7%	1	103.6%
Ireland	208.2%	2	159.8%	2	48.4%
Slovak Republic	180.3%	3	127.4%	4	52.9%
Hungary	168.9%	4	128.1%	3	40.9%
Belgium	164.7%	5	115.6%	7	49.1%
Estonia	162.3%	6	118.0%	6	44.3%
Lithuania	160.1%	7	114.9%	8	45.2%
Czech Republic	158.7%	8	118.8%	5	40.0%
Netherlands	154.3%	9	99.0%	11	55.3%
Slovenia	144.2%	10	103.1%	9	41.1%
Bulgaria	131.0%	11	101.8%	10	29.1%
Latvia	122.9%	12	86.5%	12	36.4%
Cyprus	122.1%	13	78.9%	14	43.1%
Switzerland	116.9%	14	80.4%	13	36.5%
Austria	103.5%	15	78.9%	15	24.7%
Denmark	102.3%	16	77.7%	17	24.5%
Korea, Rep.	95.3%	17	77.4%	18	17.9%
Poland	93.7%	18	78.4%	16	15.3%
Croatia	88.7%	19	73.2%	19	15.5%
Sweden	85.8%	20	68.7%	21	17.1%
Germany	84.5%	21	67.3%	22	17.2%
Romania	82.8%	22	70.0%	20	12.8%
Portugal	80.0%	23	62.2%	24	17.8%
Finland	75.4%	24	64.3%	23	11.1%
Norway	68.6%	25	58.1%	25	10.4%
Greece	67.1%	26	50.1%	28	17.0%
Mexico	65.0%	27	49.6%	29	15.4%
Canada	64.1%	28	55.9%	26	8.1%
Spain	63.0%	29	50.2%	27	12.8%
France	60.5%	30	48.7%	30	11.8%
United Kingdom	58.5%	31	47.3%	31	11.2%
Italy	55.8%	32	46.5%	32	9.2%
Turkey	51.4%	33	46.2%	33	5.3%
India	48.9%	34	33.5%	38	15.4%
Indonesia	48.1%	35	43.5%	34	4.6%
Russian Federation	47.7%	36	40.6%	35	7.1%
China	44.9%	37	37.3%	36	7.5%
Australia	42.6%	38	37.3%	37	5.3%
Japan	37.5%	39	32.3%	39	5.3%
United States	30.2%	40	23.2%	40	7.0%
Brazil	24.7%	41	22.9%	41	1.8%

Note: Authors' own elaboration based on World Bank Development Indicators and WIOD databases. Where *gtradeo* is the percentage of gross trade over GDP and *vatradeo* is the share of the value added embedded in trade over GDP. *gtradeo* and *vatradeo* ranking represent the ranking of countries from the most to the least open economy. Then, $gtradeo - vatradeo$ is the difference between both indicators.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min	Max
MA_{ijt}	2.73	11.99	0	307
$GDPsum_{ijt}$	53.63	2.23	44.45	60.26
$diffGDPpc_{ijt}$	-0.12	1.47	-4.8	4.8
$natres_{jt}$	2.04	3.44	0	19.54
$rulelaw_{it}$	1.48	0.22	0.52	1.74
$rulelaw_{jt}$	1.51	0.20	0.97	1.74
BIT_{ijt}	0.48	0.50	0	1
FTA_{ijt}	0.54	0.50	0	1
$gtradeo_{jt-1}$	4.28	0.53	2.99	5.95
$vatradeo_{jt-1}$	4.07	0.48	2.88	5.63
HHI^{xf}_{jt-1}	7.02	0.52	6.26	9.01
HHI^{mf}_{jt-1}	7.01	0.40	6.27	8.41
HHI^{xi}_{jt-1}	6.94	0.52	6.19	8.88
HHI^{mi}_{jt-1}	6.94	0.42	6.22	8.26
$GVCpos_{jt-1}$	-0.02	0.10	-0.32	0.29
$GVCpart_{jt-1}$	-0.99	0.15	-1.34	-0.55

Note: Authors' own elaboration. All variables with exception of $natres$, BIT, FTA and $GVCpos$ are expressed in logarithms. Before taking the logarithm, the original index from rule of law in converted to be non-negative.

Table 3: M&As, trade and GVCs

Maijt	(1) gtradeo	(2) vatradeo	(3) HHIxf	(4) HHImf	(5) HHIxi	(6) HHImi	(7) GVCpos	(8) GVCpart
$GDPsum_{ijt}$	0.821***	0.802***	0.815***	0.827***	0.867***	0.843***	0.811***	0.903***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)	(0.10)	(0.09)
$diffGDPpc_{ijt}$	0.664***	0.677***	0.714***	0.662***	0.599***	0.652***	0.675***	0.639***
	(0.15)	(0.14)	(0.14)	(0.15)	(0.16)	(0.15)	(0.14)	(0.15)
$natres_{jt}$	0.005	0.005	-0.000	-0.001	-0.005	-0.001	0.002	-0.012
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$rulelaw_{it}$	1.651***	1.652***	1.689***	1.671***	1.648***	1.660***	1.642***	1.645***
	(0.60)	(0.60)	(0.61)	(0.61)	(0.59)	(0.60)	(0.59)	(0.59)
$rulelaw_{jt}$	0.605	0.696	0.622	0.729	0.583	0.753	0.579	0.833
	(0.72)	(0.74)	(0.70)	(0.73)	(0.68)	(0.75)	(0.72)	(0.76)
BIT_{ijt}	-0.101	-0.094	-0.138	-0.115	-0.077	-0.107	-0.099	-0.174
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
FTA_{ijt}	0.192**	0.194**	0.200**	0.186**	0.158*	0.185**	0.191**	0.179**
	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)	(0.08)	(0.08)
$trade_{jt-1}$	-0.221	-0.246*	-0.259**	0.094	0.378**	0.268**	1.204**	1.358***
	(0.14)	(0.15)	(0.13)	(0.12)	(0.17)	(0.14)	(0.58)	(0.52)
Fixed effects				λ_{ij}, λ_t				
Obs.	26616	26616	26616	26616	26616	26616	26616	26616
R^2	0.948	0.948	0.949	0.948	0.949	0.948	0.948	0.949

Notes: Empirical results of the PPML estimate of equation (1), where the dependent variable (MA_{ijt}) is the number of M&As projects from country i to country j in year t during the period 2001-2015. The estimate includes country pair fixed effects (λ_{ij}) and year fixed effects (λ_t).
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: M&As, trade and GVCs by home-host country level of development

MA_{ijt}	(1) $gtradeo$	(2) $vatradeo$	(3) HHI^{xf}	(4) HHI^{mf}	(5) HHI^{xf}	(6) HHI^{mi}	(7) $GVCpos$	(8) $GVCpart$
FTA_{ijt}	0.280***	0.287***	0.328***	0.288***	0.246***	0.301***	0.281***	0.352***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.06)	(0.07)	(0.07)
xNS_{ij}	-0.004	-0.036	-0.077	-0.085	-0.063	-0.067	0.043	-0.269
	(0.25)	(0.26)	(0.29)	(0.24)	(0.32)	(0.28)	(0.25)	(0.32)
xSN_{ij}	-0.175	-0.191	-0.243	-0.181	-0.091	-0.203	-0.172	-0.266*
	(0.16)	(0.15)	(0.16)	(0.16)	(0.15)	(0.15)	(0.16)	(0.16)
xSS_{ij}	-0.357	-0.374	-0.269	-0.421**	-0.254	-0.430***	-0.352*	-0.354*
	(0.23)	(0.23)	(0.18)	(0.17)	(0.17)	(0.16)	(0.21)	(0.20)
$trade_{jt-1}$	-0.204*	-0.333**	0.158	-0.039	0.279**	0.475***	0.598	0.419
	(0.12)	(0.15)	(0.14)	(0.14)	(0.13)	(0.16)	(0.47)	(0.35)
xNS_{ij}	-0.078	0.109	-0.860**	0.640**	0.826**	-0.454	2.924	3.176***
	(0.38)	(0.43)	(0.36)	(0.28)	(0.39)	(0.39)	(2.81)	(0.78)
xSN_{ij}	0.152	0.481	-1.072***	-0.145	-0.925***	-0.946**	0.488	1.558**
	(0.30)	(0.33)	(0.32)	(0.36)	(0.27)	(0.38)	(1.36)	(0.70)
xSS_{ij}	0.035	0.292	-0.142	-0.347	0.589	-0.694	0.168	0.123
	(0.38)	(0.48)	(0.29)	(0.28)	(0.36)	(0.43)	(2.31)	(1.00)
Fixed effects				λ_{ij}, λ_t				
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	26616	26616	26616	26616	26616	26616	26616	26616
R^2	0.948	0.948	0.950	0.949	0.950	0.948	0.949	0.951

Notes: Empirical results of the PPML estimate of equation (1), where the dependent variable (MA_{ijt}) is the number of M&As projects from country i to country j in year t during the period 2001-2015. The estimate includes country pair fixed effects (λ_{ij}) and year fixed effects (λ_t).
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Sum of coefficients test

	xNS	xSN	xSS
FTA	0.276	0.105	-0.077
	(0.24)	(0.15)	(0.22)
$gtradeo$	-0.282	-0.052	-0.169
	(0.40)	(0.28)	(0.33)
$vatradeo$	-0.224	0.148	-0.041
	(0.45)	(0.30)	(0.43)
HHI^{xf}	-0.701**	-0.914***	0.016
	(0.29)	(0.29)	(0.29)
HHI^{mf}	0.600**	-0.184	-0.386*
	(0.25)	(0.33)	(0.23)
HHI^{xi}	1.105**	-0.646**	0.868**
	(0.44)	(0.26)	(0.39)
HHI^{mi}	0.022	-0.470	-0.219
	(0.35)	(0.35)	(0.43)
$GVCpos$	3.522	1.085	0.766
	(2.73)	(1.26)	(2.28)
$GVCpart$	3.595***	1.977***	0.542
	(0.87)	(0.77)	(1.02)

Notes: The test of the sum of coefficient from table 4. The sum of coefficients for FTA are from estimates in column 1.
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Extended model

MA_{ijt}	(1) $gtradeo$	(2) $vatradeo$	(3) HHI^{xf}	(4) HHI^{mf}	(5) HHI_{xf}	(6) HHI_{mi}	(7) $GVCpos$	(8) $GVCpart$
$GDPsum_{ijt}$	1.040***	1.056***	1.109***	1.124***	1.101***	1.115***	0.968***	1.259***
	(0.19)	(0.19)	(0.20)	(0.20)	(0.19)	(0.20)	(0.20)	(0.19)
$diffGDPpc_{ijt}$	1.029***	1.010***	0.987***	0.966***	0.934***	0.984***	1.086***	0.904***
	(0.22)	(0.23)	(0.23)	(0.24)	(0.23)	(0.23)	(0.21)	(0.23)
$reerd_{jt}$	-0.090**	-0.093**	-0.101**	-0.102**	-0.095**	-0.096**	-0.095**	-0.094**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$eervol_{jt}$	-0.023	-0.027	-0.058	-0.094	-0.081	-0.087	-0.052	-0.044
	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
$inflation_{jt}$	-0.029**	-0.030**	-0.030**	-0.032**	-0.031**	-0.031**	-0.026**	-0.028**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
$natres_{jt}$	0.010	0.010	0.007	0.010	0.007	0.005	0.007	-0.004
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
$polstab_{it}$	0.732***	0.730***	0.722***	0.725***	0.712***	0.689**	0.733***	0.632**
	(0.27)	(0.27)	(0.27)	(0.28)	(0.26)	(0.28)	(0.27)	(0.27)
$polstab_{jt}$	1.156***	1.132***	1.077***	0.971***	1.030***	1.067***	1.237***	1.207***
	(0.30)	(0.30)	(0.30)	(0.32)	(0.30)	(0.30)	(0.30)	(0.26)
tax_{it}	0.106***	0.106***	0.107***	0.106***	0.105***	0.107***	0.107***	0.105***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
tax_{jt}	-0.039*	-0.042*	-0.043**	-0.045**	-0.041*	-0.037*	-0.047**	-0.031
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
BIT_{ijt}	0.797	0.802	0.799	0.785	0.787	0.780	0.792	0.789
	(0.51)	(0.51)	(0.52)	(0.51)	(0.50)	(0.51)	(0.51)	(0.52)
FTA_{ijt}	0.105	0.108	0.118	0.108	0.053	0.115	0.100	0.133
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
$trade_{jt-1}$	-0.275	-0.214	-0.037	0.230	0.419**	0.370**	2.240***	1.814***
	(0.21)	(0.20)	(0.14)	(0.23)	(0.17)	(0.18)	(0.86)	(0.63)
Fixed effects				λ_{ij}, λ_t				
Obs.	13122	13122	13122	13122	13122	13122	13122	13122
R^2	0.931	0.931	0.932	0.932	0.933	0.932	0.931	0.934

Notes: Empirical results of the PPML estimate of equation (1) including exchange rates, inflation, political stability and taxes, where the dependent variable (MA_{ijt}) is the number of M&As projects from country i to country j in year t during the period 2001-2015. The estimate includes country pair fixed effects (λ_{ij}) and year fixed effects (λ_t).
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Extended model, by home-host country level of development

MAijt	(1) gtradeo	(2) vatradeo	(3) HHIxf	(4) HHImf	(5) HHIxf	(6) HHImi	(7) GVCpos	(8) GVCpart
FTA_{ijt}	0.210**	0.203**	0.194**	0.184**	0.143	0.210***	0.228**	0.224***
	(0.08)	(0.08)	(0.08)	(0.09)	(0.10)	(0.08)	(0.09)	(0.08)
xNS_{ij}	-0.354	-0.340	-0.227	-0.070	-0.182	-0.272	-0.460	0.026
	(0.32)	(0.37)	(0.28)	(0.26)	(0.25)	(0.32)	(0.34)	(0.26)
xSN_{ij}	-0.644***	-0.674***	-0.636***	-0.615***	-0.354	-0.688***	-0.646***	-0.704***
	(0.25)	(0.24)	(0.24)	(0.23)	(0.23)	(0.25)	(0.25)	(0.25)
xSS_{ij}	2.701	-1.734	5.975	5.419	2.987	18.045	8.119***	-2.240
	(5.20)	(4.53)	(4.62)	(6.44)	(6.14)	(13.42)	(1.97)	(1.52)
$trade_{jt-1}$	0.005	-0.184	0.240	-0.026	0.281**	0.367**	0.794	0.936**
	(0.17)	(0.18)	(0.16)	(0.18)	(0.12)	(0.18)	(0.70)	(0.47)
xNS_{ij}	-1.598*	-0.198	-1.269**	2.160***	1.567***	0.216	10.112***	4.496***
	(0.87)	(0.83)	(0.58)	(0.65)	(0.56)	(0.95)	(3.06)	(0.94)
xSN_{ij}	-0.342	-0.045	-0.301	-0.234	-1.444***	-0.230	2.960	-0.200
	(0.53)	(0.56)	(0.43)	(0.63)	(0.46)	(0.67)	(1.88)	(1.22)
xSS_{ij}	-1.190	0.339	-0.476	0.056	-0.727	-1.111	-2.072	-1.132
	(1.14)	(1.08)	(0.59)	(0.63)	(0.81)	(1.74)	(4.05)	(1.40)
Fixed effects				λ_{ij}, λ_t				
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	13118	13118	13110	13111	13111	13113	13114	13110
R2	0.932	0.931	0.935	0.934	0.936	0.932	0.934	0.936

Notes: Empirical results of the PPML estimate of equation (1) including exchange rates, inflation, political stability and taxes, where the dependent variable (MA_{ijt}) is the number of M&As projects from country i to country j in year t during the period 2001-2015. The estimate includes country pair fixed effects (λ_{ij}) and year fixed effects (λ_t).
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Sum of coefficients test

	xNS	xSN	xSS
FTA	-0.144	-0.434*	2.911
	(0.29)	(0.23)	(5.21)
gtradeo	-1.59*	-0.337	-1.186
	(0.88)	(0.52)	(1.13)
vatradeo	-0.383	-0.230	0.154
	(0.83)	(0.54)	(1.05)
HHIxf	-1.028**	-0.061	-0.236
	(0.51)	(0.41)	(0.61)
HHImf	2.135***	-0.260	0.030
	(0.67)	(0.60)	(0.60)
HHIxi	1.848***	-1.163***	-0.446
	(0.60)	(0.44)	(0.77)
HHImi	0.583	0.137	-0.744
	(0.92)	(0.65)	(1.74)
GVCpos	10.906***	3.754**	-1.278
	(3.09)	(1.72)	(3.95)
GVCpart	5.432***	0.736	-0.196
	(1.07)	(1.31)	(1.45)

Notes: The test of the sum of coefficient from table 7. The sum of coefficients for FTA are from estimates in column 1.
Robust standard error in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.