Comparing the Impacts of Some North-North and North-South Trade Agreements on Trade in Services

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This paper employs a theoretically and robust gravity model of trade to analyze the effects of some North-North and North-South trade agreements on services. More precisely, we focus on twenty-three services trade agreements based on this distinction. We use a worldwide sample covering the period 1985-2016 with aggregated and disaggregated data for nine services sectors (transport, travel, communication, computer and information, construction, finance, insurance, personal, cultural and recreational services, other business services). We estimate trade creation and trade diversion effects where these latter have not been enough investigated empirically at the level of exchanges of services. We also examine the effects of the depth of these trade agreements on services trade through WTO-X core provisions. The results indicate that trade agreement effects on trade in services have dissimilar effects and vary across regions, sectors and depth.

Trade agreements – Services – WTO-X – Gravity

Comparaison des impacts des accords commerciaux Nord-Nord et Nord-Sud sur le commerce des services

Cet article a recours à un modèle de gravité fondé théoriquement et robuste empiriquement afin d'analyser les effets de certains accords commerciaux Nord-Nord et Nord-Sud relatifs aux services. Plus précisément, nous nous focalisons sur 23 accords commerciaux liés aux services. Nous utilisons un échantillon monde couvrant la période 1985-2016 avec des données agrégées et sectorielles pour 9 secteurs concernant les services (transport, voyages, communication, ordinateur et information, construction, finance, assurance, services personnels, culturels et récréationnels, autres services commerciaux). Nous estimons donc les effets de création et de détournement du commerce au niveau des échanges de services. Nous examinons aussi les effets de la profondeur de ces accords commerciaux relatifs aux services par le biais des dispositions OMC-X. Les résultats montrent que ces accords commerciaux liés aux services ont des effets différents et qu'ils varient selon les régions, les secteurs et la profondeur desdits accords.

Accords commerciaux – Services – OMC-X – Gravité

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1. Introduction

"The dynamism and importance of trade in services contrast sharply with the slow pace of recent WTO negotiations in this area"[1]. We currently attend to the growing expansion of regional trade agreements (RTAs) where 151 trade agreements in services exist under the GATS (Article V) against more than 300 agreements concerning goods. Whatever the nature of countries, North-North, North-South and South-South trade agreements covering services appear more and more. We attempt to assess the trade effects of services RTAs on intra-bloc (trade creation) and extra-bloc exports (trade diversion) for some North-North and North-South services trade agreements across sectors and the depth of trade agreements. We decided to focus on these trade agreements because services trade data are notorious for the low availability of data for developing countries[2]. While fewer trade agreements deal with services, the share of world trade covered by these latter is higher for services than for goods. The purpose of this paper is to study whether trade agreements in services increase or decrease trade between member countries but also with non-member countries because preferential services liberalisation seems to affect as well as members and non-members. We also examine the "deep integration" effect of these trade agreements in services though unexplored WTO-X provisions because barriers to trade in services exceed market access and national treatment commitments. We finally show that trade agreements applied to services are country and sector-specific, where the impact of these trade agreements according to the studied trading partners allows us to contribute to the debate on building blocks or stumbling blocks with respect to multilateral liberalisation in services. To our knowledge, this paper is one of the first to compare some North-North and North-South trade agreements at the sectoral level for services trade.

This heterogeneous aspect has been sometimes underestimated by the literature despite the possible presence of dissimilar trade effects of RTAs. Vicard [2009], Vicard [2012], Kohl [2014], Kohl and Trojanowska [2015] demonstrate that characteristics of trade agreements (form, design, member countries) explain the heterogeneity effect on trade in goods. Behar and Cirera-i-Crivillé [2013] find different impacts of North-North, North-South and South-South agreements on bilateral trade flows with a greater effect for these latter compared with North-South trade agreements. Gil-Pareja *et al.* [2014] show dissimilar impacts between nonreciprocal preferential trade agreements (GSP, AGOA, EBA, ACP-EU, CBI) on trade due to the different degrees of preferences.

The comparison of North-North and North-South trade agreements is not common in trade services contrary to goods. The literature underlines the importance of dissimilar trade effects of trade agreements because of the

1. Marchetti J., Roy M. [2013], The new kid on the block: The trade in services agreement, *VOX CEPR Policy Portal*.
2. We decided not retain South-South trade agreements due to the lack of observations.

nature of trading partners. Indeed, the "natural trading partners" hypothesis argues that closer countries trade more due to lower trading costs. Baier and Bergstrand [2004] provide interesting findings where larger and more simi-lar countries trade more allowing to exploit economies of scale and com-parative advantages. Nevertheless, Ethier [1998], Krueger [1999] show that developing countries belonging to North-South trade agreements have greater spillover effects compared with South-South trade agreements due to larger market access and higher factor endowments complementarity.

Moreover, few studies take into account the effects of content of trade agreements covering an ever wider number of measures other than tariffs, particularly for services. Horn *et al.* [2010] examine the scope of trade agreements through WTO+ (obligations under the mandate of the WTO) and WTO-X provisions (obligations outside WTO commitments). Because of this distinction, Kohl *et al.* [2016] show that WTO+ provisions have a trade promoting effect whereas WTO-X provisions are not, because they are not yet legally enforceable. Dür *et al.* [2014] find that deep trade agreements increase trade flows between member countries based on a new database[3], the Design of Trade Agreements (DESTA). Hofmann *et al.* [2017] underline that the depth and content of trade agreements vary across regions and incomes level of trading partners. For instance, North-North trade agree-ments have deeper provisions than North-South and South-South agree-ments. Mattoo *et al.* [2017] estimate the impact of deeper trade agreements (WTO+ and WTO-X provisions) on member and non-member countries. They find that deep trade agreements increase trade between members and reduce trade costs for non-member countries.

As defined by the OECD, trade in services is the value of services[4] exchanged between residents and non-residents of a country, including services provided through foreign affiliates established abroad. Moreover, trade liberalization in this sector is more complex because most trade barriers are non-tariff barriers such as discriminatory regulations, licensing and quotas affecting market access and national treatment for the foreign providers. According to Mattoo *et al.* [2008], "The recent proliferation of trade agreements covering services is evidence of heightened policy interest in the contribution of efficient service sectors to economic development" due to the elimination of all discrimination. For Roberts [2000], liberalization of service sectors can produce important welfare gains due to higher trade barriers relative to goods. Miroudot and Shepherd [2014] find that regional integration concerning services leads to slightly decrease trading costs rela-tive to RTAs in goods.

Furthermore, a recent interest for the effectiveness of RTAs on trade in services is present in the literature. Ceglowski [2006] finds positive and significant effect for four RTAs on services trade with a trade creation effect for European trade agreements. Guillin [2012] examines the effects of Euro-

3. This database includes agreements where tariffs should be reduced to zero and six provisions beyond tariff reductions (services trade, investments, standards, public procurement, competition and intellectual property rights).

4. Based on the GATS (Article I), the WTO underlines that there are four main modes of services: cross-border, consumption abroad, commercial presence, presence of natural persons.

pean RTAs covering services. She finds a positive influence of these RTAs on trade in services for the European Union (EU) and the European Economic Area (EEA) without take into account the sector level. Guillin [2013] investigates the effects of depth trade agreements in services. She shows that more sectors are incorporated in RTAs, higher the impact on trade in ser-vices will be. van der Marel and Shepherd [2013] underline the importance of the heterogeneity of services by employing sector-specific analysis. They find that RTAs have the greatest positive impact on finance and business services whereas Lee and Cho [2017] find significant results for transport service trade.

This paper is one of the first to investigate the heterogeneous effect of services trade agreements across regions, sectors and the depth of agreements. We test whether these three dimensions matter for services trade on intra and extra-bloc trade. We employ a theory-based and robust gravity model (Baldwin and Taglioni [2006]; Baier and Bergstrand [2007]; Head and Mayer [2014]) for the period 1985-2016 with Poisson Pseudo-Maximum Likelihood (PPML) three-way fixed effects for its robustness (Santos Silva and Tenreyro [2006, 2011]; Fally [2015]; Baier *et al.* [2019]; Esteve-Pérez *et al.* [2019]; Larch *et al.* [2019]). Because sector-specific analyses using gravity are uncommon in the services literature, we will estimate not only using aggregated services trade data but also disaggregated data for nine services sectors[5]: transport, travel, communication, computer and information, construction, finance, insurance, personal, cultural and recreational services, other business services. To assess the impact of depth services trade agreements, we use the number of WTO-X core provisions based on Hofmann *et al.* [2017] database. We find evidence of a differing impact on developed and developing countries, particularly due to their differences in terms of economic and institutional capacities influencing the scope and the design of preferential commitments on services. The largest gains would occur with a better regulatory cooperation between them allowing to reduce high restrictions to services trade. For instance, it would be more benefit if domestic regulation regarding competition and transparency is improved.

The paper is structured as follows. Section 2 presents a literature review and a descriptive analysis. Section 3 describes the empirical approach used. Section 4 analyzes the results and Section 5 concludes.

5. We do not include intellectual property services and governments goods and services due to the poor data availability for developing countries which would reduce the number of trade agreements studied.

2. Trade agreements and trade in services

2.1. Literature review

Following the increase in trade in services around the world and the growing role of RTAs covering services, the economic literature paied more and more attention to the effects of these types of trade agreements on services trade. We focus here on three main areas of this literature: the comparison of trade agreements between goods and services trade, the study of trade agreements covering services for total services and at the sectoral level.

The evidence indicates that bilateral trade services depends on the determinants of trade in goods with higher magnitude for some service sectors than goods due to the presence of trade barriers. Kimura and Lee [2006] investigate the impact of various determinants (GDP, population, distance, adjacency, language, trade agreement) on bilateral services trade relative to goods. They find that RTAs have a positive and significant effect on trade in services and goods where the magnitude is higher for the latter on the exporter side. Blyde and Sinyavskaya [2007] show that trade liberalization has greater influence on trade in services than goods due to higher barriers on trade in services, notably for the transportation and communication services. About the factors influencing the belonging to services trade agreements, Cole and Guillin [2015] find that geographic factors are less important to conclude RTAs on services, differences in skilled-unskilled labor ratio and GDP per capita have positive influence for these RTAs compared to goods.

Our paper contributes on the specialized literature about the heterogeneity effects of trade agreements across countries and at the sectoral-level where we focus particularly on trade in services. The existing literature mainly studied services trade agreements between developed countries without pay attention to the other agreements (North-South, South-South) even if North-North flows concentrate trade in services. For instance, Ceglowski [2006] compares the impact of four RTAs on services (EEA/EFTA, NAFTA, CEFTA, EU) where a trade creation effect appears for European trade agreements. Park and Park [2011] examine the impact of some RTAs under GATS provision without decompose RTAs variables individually to take into account the possible heterogeneity. They find that these RTAs promote services trade among member countries (not diversion effect) with the greatest effect in business services and the lowest in transportation services. At the aggregated level, Guillin [2012] examines the trade creation (EU, EEA) and trade diversion effects for three European trade agreements on services where a dissimilar effect is present with an insignificant effect for EFTA.

Trade agreements became deeper over time including more areas and service sectors in commitments. The degree of trade liberalisation can differ

significantly across the type of services but also the nature of commitments leading to have a heterogeneity amongst services trade agreements. Guillin [2013] focuses on the specific provisions in RTAs on services in order to study the impact of "depth" (low, medium, high levels by scoring) trade agreements on trade in services. She shows that more sectors are included in these agreements, higher the effect on services trade will be. These results underline that depth and sectoral coverage of services RTAs are important in the development of bilateral trade. This approach allows to underline the fact that services trade agreements have heterogeneous effects across commitments and at service sectoral-level. van der Marel and Shepherd [2013] use a new database about trade in services by sectors and they introduce Services Trade Restrictiveness developed by the World Bank in their estimates. They find that services RTAs enhance trade between member countries for business and finance services whereas for the other sectors the results are not significant (insurance, wholesale, transport). Lee and Cho [2017] explore the influence of services RTAs on transport service trade for OECD countries. They find that these RTAs increase trade in trans-port services where deeper provisions lead to improve bilateral trade. Once again, the heterogeneity across countries has not been taken into account.

2.2. Descriptive analysis: some facts

Over the last decades, trade in services[6] growing more quickly than trade in goods with an increasing role of developing countries representing more than 33% of exports of world services between 1995-2014. Services play a significant role in developed and developing countries allowing to enhance trade and economic growth by improving performance of industries and providing intermediate inputs. Moreover, a large number of trade agreements cover areas that fall under the current mandate of the WTO and go beyond tariff reductions (Hofmann *et al.* [2017]). This section takes a first look at the heterogeneity of trade in services through the three following dimensions.

2.2.1. Across regions

The rise in services trade concerns also services exports from developing countries that have grown twice as fast relative to developed countries since 1990. From a regional perspective (Figure 1), European countries are the leaders in services export (47.7% of world service exports in 2010 and 46% in 2017) following by North-American countries (16.3% of world service exports in 2010 and 2017). East Asia and Pacific region with Japan (3.4% of world service exports in 2010 and 2017) and China (4.5% of world service

6. The share of services export has increased from around 9% in 1970 to 20% in 2014 (Loungani *et al.* [2017]).

exports in 2010 and 4.2% in 2017) have been driving the dynamism of trade in services for developing countries. The concentration of world trade in services in Europe is justified by the fact that services sector represent more than 66% of its total GDP and 80% of growth in the last years.

2.2.2. Across sectors

At the sectoral level, since the early 1990s, three main services concentrated services exports in the world: travel, transport and other business services (Table 3). They represented around 1000 billions of US dollars during this period in average each year. Since the 2000s, with the development and the diffusion of new technologies, modern services have appeared. Finance, insurance, telecommunications, computer and information services have faster growth driven by high income countries[7]. For instance, high income countries concentrated all financial services exports in 1990 against 94% in 2014. Concerning computer and information services, more than 90% in 1990 and around 70% in 2014 for high income countries. For our study (Table 1), we observe the same trend with a trade services concentration in these three sectors representing more than 50% of their total exports services. A growth in modern services such as finance, computer and information services also appears for North and South countries.

2.2.3. Across depth

A large number of trade agreements (goods and services) are signed in the same region (Figure 2). We observe that the highest number of intra-regional trade agreements is present in Asian (18), European (17) and American (15) countries. In the same time, there is a dynamism in inter-regional trade agreements, particularly between Asian countries with European (20) and American countries (11). Among these trade agreements, European countries have the deepest agreements (9 WTO+ and 7 WTO-X provisions) compared with the other countries due to the EU enlargement with deeper commitments in economic integration. At the inter-regional level, we show that America-Oceania, Asia-Oceania and Africa-America trade agreements are deeper with more than 16 provisions on average. Furthermore, sign trade agreements could be different between countries due to the level of liberalization already achieved. Indeed, trade agreements between developed countries seek to go beyond tariff reduction whereas agreements with developing countries try to focus on tariff liberalization. For instance, North-North trade agreements are the deepest even if North-South trade agreements include the same number of WTO-X provisions as the formers but without legal enforceability (Hofmann *et al.* [2017]).

7. Following the World Bank's country income classification.

3. Empirical strategy: a structural gravity model

3.1. Empirical specifications

We will follow the usual practice by estimating expected bilateral trade flows using specifications based on the gravity model. When it comes to gravity models for trade in services, all papers rely on the same explanatory variables as for trade in goods. For instance, bilateral trade flows are proportional to the GDP of trading partners and inversely proportional to distance. So, the use of gravity equation is consistent to explain trade in services (François [1993]; Ceglowski [2006]; Kimura and Lee [2006]; Park and Park [2011]; Guillin [2013]). According to Anderson *et al.* [2018], "gravity works well with sectoral services data: most estimates are significant with expected signs and reasonable magnitudes". We perform then a theory-consistent structural gravity model by taking into account multilateral resistance terms (Anderson and van Wincoop [2003]; Head and Mayer [2014]). Equations 1-2 are based on Anderson and van Wincoop [2003] who refined the work of Anderson [1979] by delivering the following structural gravity system of trade:

$$X_{ijt} = \frac{Y_{it}}{\Omega_{it}} \frac{X_{jt}}{\Phi_{jt}} \phi_{ijt}, \qquad [1]$$

where $Y_i = \sum_j X_{ij}$ is the value of total production, $X_j = \sum_i X_{ij}$ is the value of expenditure, and Ω_{it} and Φ_{jt} the multilateral resistance terms defined as

$$\Phi_{jt} = \sum_l \frac{\phi_{jlt} Y_l}{\Omega_{lt}} \quad \text{and} \quad \Omega_{it} = \sum_l \frac{\phi_{lit} X_l}{\Phi_{lt}}. \qquad [2]$$

Here, bilateral trade X_{ijt} is a function of supply, demand, and bilateral frictions. The supplier term in the structural gravity equation $S_{it} = \frac{Y_{it}}{\Omega_{it}}$ weights total production Y_{it} by the exporter's multilateral resistance Ω_{it}, and the demand term $M_{jt} = \frac{X_{jt}}{\Phi_{jt}}$ weights total expenditure X_j by the importer's multilateral resistance Φ_{jt}. More precisely, Ω_{it} and Φ_{jt} are structural terms developed by Anderson and van Wincoop [2003] as the inward and the outward multilateral resistances, respectively. One of the important application of the gravity model is to estimate the effect of bilateral trade determinants. Most trade models express bilateral accessibility through $0 < \phi_{ij} = \tau_{ij}^{\theta} < 1$, in which θ is the elasticity of trade flows to trade costs, and trade costs τ_{ij} contain the

bilateral elements[8] defining the level of frictions to trade between the two partners.

Applied to the current analysis of trade in services, the empirical gravity equation is given by PPML with fixed effects developed by Santos Silva and Tenreyro [2006] and Fally [2015]:

$$X_{ijt} = exp\ (\ \beta_1 NN\_1_{ijt} + \beta_2 NN\_2_{ijt} + \beta_3 NS\_1_{ijt} + \beta_4 NS\_2_{ijt} + F_{it} + F_{jt} + F_{ij}\ )\eta_{ijt} \quad [3]$$

where X_{ijt} is the total value of trade in services between country i and country j (one-way) at year t in the log-linear form. Following Baldwin and Taglioni [2006], Baier and Bergstrand [2007], Head and Mayer [2014], we include three sets of fixed effects commonly practiced in the economic lit-erature to have robust results and standard deviation[9]. Unilateral time-variant (GDP, population, GDP per capita) and bilateral time-invariant (dis-tance, common language, contiguity) determinants of trade are absorbed in specifications using these fixed effects due to the collinearity issue between them. Indeed, exporter-year and importer-year fixed effects (respectively F_{it} and F_{jt}) take into account changes in multilateral resistance over time (Equa-tion [3]). This approach captures other trade costs across other export and import markets through relative price effects. The exclusion of these terms leads to an omission bias with more unobserved trade barriers. Country-pair fixed effects (F_{ij}) partially correct the omitted variable bias[10] because the unobserved variables could be correlated with the bilateral characteristics of the dyadic variables. Moreover, country-pair fixed effects eliminates or accounts for, respectively, the unobservable linkages between the endog-enous trade policy covariate and the error term in gravity regressions.

The log-linear form is unable to handle zero trade flows because the logarithm of zero is undefined. In this respect, PPML is the empirical method most often employed because of its robustness[11] compared with the other estimators which have larger biases (Santos Silva and Tenreyro [2011]). Indeed, according to their Monte Carlo simulation, they show that the PPML-estimator is well-behaved and performs well when the data can exhibit over-dispersion and also have excess zeros. Furthermore, in our case adding many fixed effects with PPML three-way fixed effects does not bias esti-mates. Indeed, Baier *et al.* [2019], Esteve-Pérez *et al.* [2019], Larch *et al.*[2019] address computational issues with the three-way fixed effects cur-rently recommended in the gravity literature with an iterative PPML estima-tion procedure facilitating their inclusion with unbiased regressions.

NN_1_{ijt}, NN_2_{ijt}, NS_1_{ijt}, NS_2_{ijt} are binary variables measuring the trade effects of North-North and North-South trade agreements covering services,

8. Among which geographical distance, common language, shared border, currency, and common history.

9. We also use a Huber-White estimator to avoid any heteroscedasticity issue and thus to have robust standard errors clustered by country-pair.

10. Egger and Nigai [2015] found that the dyadic-fixed effects are a better measure of bilateral trade costs than the standard set of gravity variables.

11. "... when there is evidence of heteroskedasticity, the Poisson pseudo-maximum-likelihood estimator should be used as a substitute for the standard log linear model (Santos Silva and Tenreyro [2006]).

respectively. NN_1_{ijt} and NS_1_{ijt} equal 1 if both countries (i and j) belong to the same trade agreement since the entry into force at year t, and 0 other-wise. These first variables of interest represents trade creation effects lead-ing to enhance intra-regional trade between member countries by means of trade liberalization. The expected sign is positive due to better market access and national treatment commitments[12].

More generally, trade diversion effect indicates a decrease in trade from member countries to non-member countries[13]. As suggested by Dai *et al.* [2014], NN_2_{ijt} and NS_2_{ijt} take value 1 if exporter (i) has signed a trade agreement with any trade partner other than j, and 0 otherwise[14]. This approach tries to better justify the origin of a possible trade diversion effect due to the participation in several RTAs with different preferential commitments. Moreover, this method[15] allows to avoid collinearity between these variables of interest and the exporter-time fixed effects. Face to non-tariff measures in the case of trade services, the trade diversion seems to be more ambiguous due to the discriminatory nature of preferences. Mattoo *et al.* [2017] underline that the expected sign can be positive (with MFN[16] provisions also applied to non-member countries) or negative (with discriminat-ing and preferential provisions). To better grasp heterogeneous effects of trade agreements, we decompose our variables of interest (NN_1_{ijt}, NN_2_{ijt}, NS_1_{ijt}, NS_2_{ijt}) across regions: between European countries, between Asian countries and between not regional countries (Table 3).

Then, as recommended by Hofmann *et al.* [2017], the obvious measure of depth of trade agreements is the total number of core provisions. More precisely, core provisions are the ones that are identified by the literature as the most meaningful from an economic point of view including all WTO+ provisions[17] and four WTO-X areas. We decide to focus on the total number in log of WTO-X provisions[18] (*North-NorthDeepEU1, North-NorthDeepEU2*, and so on) for the trade agreements studied. For instance, competition policy (measures to proscribe anticompetitive business conduct, harmonisa-tion of competition laws, establishment or maintenance of an independent competition authority), investment measures (information exchange, development of legal frameworks, harmonisation and simplification of procedures, national treatment, establishment of mechanism for the settlement of

12. Based on the Article XVII of the GATS, national treatment is to accord to the services and service suppliers of any other countries treatment no less favourable than is accorded to domestic services and service suppliers.

13. Theoretically, when imports from a low-cost non-member country are replaced by imports from a higher-cost member country due to preferential access to the market.

14. Here, we exclusively focus on the exporter-side and we do not assess the impact of trade diversion on internal trade because we have not internal trade observations for services.

15. Indeed, if trade diversion is defined as 1 for all exports from a trade agreement member country to a non-member, the sum of trade creation and trade diversion effects is always equal to 1 for any exporter that belongs to an agreement at year t.

16. Countries cannot discriminate between their trading partners with the grant of preferential commitments to someone and not to other trading partners.

17. Tariffs industrial goods, tariffs agricultural goods, customs administration, export taxes, SPS measures, state trading enterprises, TBT measures, countervailling measures, anti-dumping, state aid, public procurement, TRIMS measures, GATS, TRIPS.

18. Areas beyond the WTO.

disputes), movement of capital (liberalization of capital movement, prohibition of new restrictions) and Intellectual Property Rights (accession to international treaties not referenced in the TRIPs Agreement). The regulation of service markets is strongly linked to these specific areas allowing to enhance market access.

3.2. Data

The dependent variable comes from Francois and Pindyuk [2013] and completed with the WTO-UNCTAD-ITC trade in services dataset[19] at the aggregated and disaggregated level. According to the OECD, "trade in services records the value of services exchanged between residents and non-residents of an economy, including services provided through foreign affiliates established abroad. Trade in services drives the exchange of ideas, know-how and technology, although it is often restricted by barriers such as domestic regulations". These two merged datasets (1985-2010 and 2010-2016) cover bilateral services flows at the worldwide[20] level coming from the OECD, Eurostat, UN and IMF using mirroring techniques to have the most complete data for the period 1985-2016 (Table 2). We use the total value of services trade in million dollars but also for nine specific-sectors: transport, travel, communication, computer and information, construction, finance, insurance, personal, cultural and recreational services, other business services (Table 3). The model includes data from the WTO[21] about RTAs where we focus on twenty-three trade agreements covering services[22] (Table 4) and representing more than 55% of the world total exports services in 2016[23].

4. Results

4.1. Trade agreements and trade in services

We present the findings obtained by applying PPML with three-way fixed effects (Table 5). We observe for total services (Column 1) that services trade

19. For more details: https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm and http://stat.wto.org/StatisticalProgram/WSDBStatProgramTechNotes.aspx?Language=E#Def_Meth_Services_BPM6

20. See list of countries in Appendice 1.

21. http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx

22. In our paper, we exclude South-South trade agreements because most of these agreements only entered into force in the last years of our sample or are concluded with countries that have poor data availability. This fact also limits the choice of North-South trade agreements.

23. http://stat.wto.org/CountryProfile/WSDBCountryPFHome.aspx?Language=E

agreements improve trade. More precisely, we find that North-North trade agreements lead to net trade creation (+ 156%)[24] denoting that trade cre-ation is accompanied by an increase in exports from intra-bloc countries to extra-bloc countries between developed countries. A major advantage of services trade agreements is that member countries increase market access to foreign providers with national treatment measures (without discrimina-tion). More precisely, these agreements tend to reduce trade costs for both members and non-members due to the narrow "margin of preference" in the case of services trade. Moreover, the presence of a trade-promoting for extra-bloc exports can be justified by the preponderance of large non-EU services traders such as the US, Japan and Korea. For North-South services trade agreements, there is a decrease in intra-bloc exports annulled by an increase of extra-bloc exports between developed and developing countries but the net trade effect is not significant (Table 6)). As suggested by Mattoo *et al.* [2017], non-discriminatory conditions of market access for services through "most-favored-nation" (MFN) clause expanding spillover effects of preferential commitments to other countries. For instance, the nature of regulatory barriers to services trade, which are often applied universally. This approach in the negotiations of trade agreements allows to avoid trade diversion.

A sectoral analysis confirms that North-North trade agreements increase exports between member countries in the main sectors characterising the world exports services such as transport (+ 58.4%), travel (+ 111.7%), finance (+ 285.7%) and other business services (+ 27.1%)[25]. These results sustain the facts previously described where these four sectors are the main services exported by developed countries in the world, particularly thanks to the dismantling of impediments to trade in services. The highest magnitudes for some coefficients are due to higher trade costs in services than goods leading to have greater effects on trade with the trade liberalisation (Miroudot and Shepherd [2014]). Concerning North-South trade agreements, the results are more mitigated with an increase of extra-bloc exports between developed and developing countries in construction services (+ 85.9%) jus-tified by the possible MFN clause effect. For the other sectors, a decrease in intra-bloc exports between these countries appears for travel (– 25.2%), com-munication (– 39.9%), computer and information (– 60.5%), finance (– 51.3%), personal, cultural and recreational services (– 48.3%). Three rea-sons could explain these findings. First, most of North-South trade agree-ments are very recent (early the 2000s) which does not allow to apply expected preferential commitments. In other words, Miroudot and Shepherd [2014] find that reductions in trade costs for services tend to lag rather than lead entry into force. They also show that trade costs appear to increase following the sign of a trade agreement deteriorating trade in services between member countries. Second, developing countries have more diffi-culties to implement trade liberalization (customs procedure, regulatory

24. Only the coefficients of the variables of interest statistically significant are used to calculate the net trade effect. $\beta_1 + \beta_2 = 0.54 + 0.40 = 0.94$ leading to $(exp(0.94) - 1) \times 100$. See Table 6 for more details.

25. All these results are net trade effect (Table 6). The high amplitude of the coefficient for finance services is due to the presence of an increase in intra-bloc and extra-bloc exports.

measures, political stability) compared with developed countries where some non-tariff measures remain in place despite the presence of trade agreements. Third, the Parties can list all exceptions or conditions to these preferential commitments by limiting market access and national treatment for some sectors (list of reservations).

4.2. Results across regions

To better grasp the heterogeneity of trade effects of trade services agreements, we decompose our variables of interest across regions (Table 7). According to the results for total services in Column (1), North-North trade agreements for European countries, North-North and North-South trade agreements for not regional countries are positively related to exports with a net trade creation effect between member countries (Table 8). The highest effect appears for European countries where services trade agreements clearly improve trade in this developed region. For instance, deeper economic integration through the common market in the EU is a favorable environment to improve exchanges and free movements of capital and persons. *A contrario*, there is a decrease, on average, of extra-bloc exports for Asian North-North trade agreements (– 14.7%) in the cases of Japan-Singapore and Korea-Singapore whereas there is a reverse effect for Asian North-South trade agreements (+ 60%). Moreover, European North-South trade agreements seem reduce intra-bloc exports between member countries (– 30.2%). In our case, the only European North-South agreement in the sample is the EU-Albania agreement in 2009 where we suppose that its recent entry into force could justify this result with the likely persistence of non-tariff measures. Moreover, this surprising result can be explained by the poor data quality for trade in services between EU and Albania, as well as the relatively small number of observations.

Focusing on sector services, we once again find a positive effect of European North-North trade agreements in the majority of services (except for construction) with the greatest impact for financial and insurance services (Table 8). For instance, trade in financial and insurance services has been multiplied by two since the entry into force of these trade agreements between European countries. Since 1999, the establishment of the Economic and Monetary Union (EMU) has lead to a deepened financial integration further where financial services are the second highest trade balance of all EU services (based on Eurostat data). Nevertheless, the same trend does not appear for European North-South trade agreements with a decrease of intra-bloc exports in all services, except other business services. With the recent trade agreement with Albania[26], we suppose that trade costs appear to increase following the sign of this trade agreements "because an RTA is not actually to reduce trade costs going forward, but to commit to trade cost

26. We also estimated with lagged terms (5 years after the entry into force of trade agreements) to take into account the phase-in effects of trade agreements (Baier and Bergstrand [2007]) and the results confirm these findings. The results are available upon request.

reductions that have already been made" (Miroudot and Shepherd [2014]). Concerning Asian countries, North-North trade agreements increase extra-bloc exports for construction, finance (with the highest coefficient), personal, cultural and recreational services. Only a net trade creation effect appears for Asian North-South trade agreements for transport services (+ 37.7%) whereas there is a trade deviation effect for communication, finance, per-sonal, cultural and recreational services. These dissimilar effects come from limited services trade liberalization in some Asian trade agreements (Findlay *et al.* [2009]) with impediments to trade in services (regulatory restrictions on foreign services and service providers)[27]. For not regional countries, the positive sign of the coefficient of North-North trade agreements reveals a net trade creation effects for financial services (+ 63.2%) and a positive effect for trade with non-member countries for travel services. For North-South trade agreements in the case of not regional countries, we show a positive net trade effect for transport and OBS. There is a negative sign of the coefficient of North-South trade agreements on extra-bloc exports for travel and finan-cial services with a decrease of intra-bloc exports for personal, cultural and recreational services. These differences across sectors could be explained by the possible presence of list of reservations in trade agreements and restrictive rules of origin for services providers.

4.3. Results across depth

Through the total number of WTO-X core provisions (in log) in services trade agreements, we study here the trade effects of deep agreements for services (Table 9). The data strongly suggest that deeper trade agreement in services have been effective in some sectors, but not in others. To start (Column 1), an increase in WTO-X provisions in European North-North trade agreements has a positive effect on services exports between member countries. When the number of WTO-X provisions increases, we find a negative effect on intra-bloc exports for European North-South trade agreements due to the spe-cific case of Albania in your study for the reasons described previously. Fur-thermore, there is a trade-promoting effect on extra-bloc exports for not re-gional countries belonging North-North and North-South trade agreements. We know that deep agreements can reduce trading costs among member countries (MFN clause effect) by reducing other frictions such as differences in national regulations that create costs for foreign providers.

With sectoral data, the results sustain the leadership of European coun-tries in trade in services. Indeed, an increase in WTO-X provisions in these North-North trade agreements improves a net trade creation effect for trans-port, travel, finance (with the highest coefficient), insurance and other busi-ness services. Dissimilar effects appear across sectors for European North-South trade agreements. For instance, an increase in WTO-X provisions lead to decrease in intra-bloc exports (for transport, travel, finance and other

27. Such as ownership rules, technical regulations, licensing and qualification requirements.

business services) but increase in intra-bloc exports for computer and information, construction services. For Asian countries, few coefficients are statistically significant. When the number of WTO-X provisions increases, there is a negative effect on extra-bloc exports (in transport, computer and information, insurance and other business services) for these North-North trade agreements. Deep provisions on competition, investment and mobility could influence the capacity of countries to better integrate in trade markets according to the nature of these measures (discriminatory or not). Moreover, an increase in WTO-X provisions in North-South trade agreements between Asian countries lead to a negative effect on intra-bloc exports for computer and information services but also for financial services (possible effect of restrictive rules of origin or list of reservations). About not regional coun-tries, only deeper North-South trade agreements are significant. The increase in WTO-X provisions improves the net trade creation effect for transport, travel, construction and other business services (with the highest coefficient) but a negative effect on intra-bloc exports for communication services. With the presence of deeper commitments, the findings show an increase of extra-bloc exports for computer and information services, finance, insurance, personal, cultural and recreational services. As argued by Mattoo *et al.* [2017], "if frictional barriers are eliminated in a non-discriminatory way, third countries also benefit from the reduction in asso-ciated costs" (positive externalities effect).

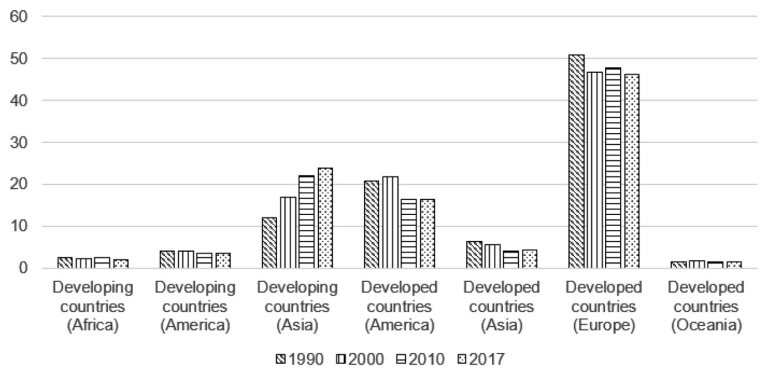
5. Conclusion

In this paper, we identify impacts of trade agreements covering services on trade in services at the aggregated and disaggregated level (for nine sectors) with a worldwide sample over the period 1985-2016. We compare twenty-three trade agreements according to their level of development, North-North and North-South trade agreements. Based on the robust esti-mates with PPML-fixed effects, we find three sets of findings. First, the results confirm the existence of heterogeneous effects of services trade agreements across regions. On total services, the highest net trade creation effect appears for European North-North trade agreements due to the lead-ership of European countries in the world service exports and deeper eco-nomic integration in the EU. North-North and North-South trade agreements between not regional countries yield an overall positive trade effect by pro-moting not only intra-bloc exports but also extra-bloc exports (MFN clause effect). In other words, non-members also benefit from trade cost reduc-tions. For some Asian countries, the results are more mitigated (limited services liberalization) with a trade diversion effect for North-South trade agreements and a positive effect on extra-bloc exports for North-North trade agreements. Second, a sectoral analysis shows that services trade agree-ments promote essentially four sectors representing the main services exchanged in the world: transport, travel, finance and other business ser-

vices[28] even if there are differences between the studied regions. These differences across sectors could be explained by the possible presence of list of reservations in trade agreements with regulatory measures and restrictive rules of origin for services providers. We know that services are heterogeneous in nature and sector-specific regulations are important. Third, we find evidence that deeper services trade agreements (with total number of WTO-X core provisions) have been effective in some sectors, but not in others, according to the studied regions.

Based on our findings, North-North trade services agreements have the greatest economic and trade potential, in particular European economies compared with the other regions, *i.e.* an asymmetric liberalization in services. In other words, some trade agreements in services between devel-oped and developing countries do not seem have a symmetric impact. We also observe that a limited number of sectors is concerned by the spillover effects of services trade agreements. Therefore, services trade liberalization through some trade agreements often do not provide substantial preferen-tial treatment to partner countries. However, there is substantial scope for reducing trade costs in major services sectors with non-discriminating measures for foreign providers. Moreover, some services trade agreements go sometimes further than GATS with WTO-X provisions allowing to extend the preferential treatment to more countries. Meanwhile, trade facilitation and global value chain participation should get more attention in order to help developing countries. These new areas of cooperation would allow to implement commitments and opening up services markets allowing trade gains and new job creation with additional reforms.

Figure 1. Trade in services across regions (% of world total exports services)



Source: UNCTAD.

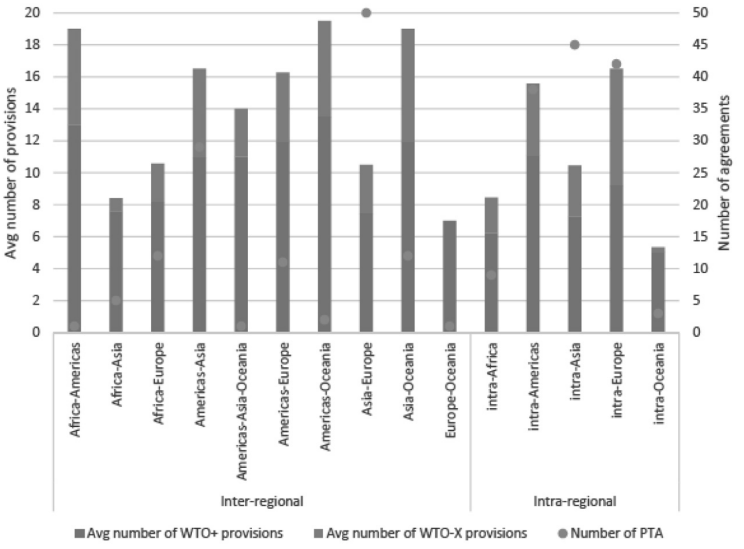
28. Including operational leasing (rentals), and miscellaneous business, professional and technical services.

Table 1. Export services in the main sectors (in % of total export services)

	2000 (Transport)	2000 (Travel)	2000 (OBS)
Developed countries (North-America)	16,65	30,60	17,70
Developed countries (Asia)	41,57	14,60	22,50
Developed countries (Oceania)	23,40	50,90	8,40
Developed countries (Europe)	24,94	23,78	27,91
Developing countries (South-America)	30,85	40,75	9,25
Developing countries (China)	4,66	20,60	9,70
	2014 (Transport)	**2014 (Travel)**	**2014 (OBS)**
Developed countries (North-America)	13,80	22,50	25,10
Developed countries (Asia)	30,10	13,67	21,63
Developed countries (Oceania)	12,90	59,20	12,50
Developed countries (Europe)	21,51	20,91	25,46
Developing countries (South-America)	24,00	48,65	11,50
Developing countries (China)	16,40	24,50	29,70

Source: IMF. Note: We focus on the main countries participating in the services trade agreements of our study (Table 4). OBS means "Other business services".

Figure 2. Number of trade agreements and average depth across regions



Source: Hofmann et *al.* (2017).

Table 2. Summary statistics

	Observation	Mean	Std. Dev.	Min	Max
Total services exports	164305	288.27	1860.96	0	83278.81
*NN*1	164305	0.007	0.26	0	1
*NN*2	164305	0.08	0.27	0	1
*NS*1	164305	0.008	0.09	0	1
*NS*2	164305	0.058	0.23	0	1
Transport services exports	93867	90.41	435.73	0	9844
*NN*1	93867	0.13	0.33	0	1
*NN*2	93867	0.14	0.35	0	1
*NS*1	93867	0.01	0.11	0	1
*NS*2	93867	0.10	0.30	0	1
Travel services exports	90972	104.25	648.44	0	30756.83
*NN*1	90972	0.13	0.34	0	1
*NN*2	90972	0.14	0.35	0	1
*NS*1	90972	0.01	0.11	0	1
*NS*2	90972	0.10	0.30	0	1
Communication services exports	86062	7.44	57.57	0	3900
*NN*1	86062	0.12	0.33	0	1
*NN*2	86062	0.13	0.34	0	1
*NS*1	86062	0.01	0.11	0	1
*NS*2	86062	0.09	0.29	0	1
Computer and information services exports	85660	15.82	145.69	0	7689.16
*NN*1	85660	0.12	0.33	0	1
*NN*2	85660	0.14	0.34	0	1
*NS*1	85660	0.01	0.11	0	1
*NS*2	85660	0.09	0.29	0	1
Construction services exports	87244	7.62	47.55	0	2370.008
*NN*1	87244	0.13	0.33	0	1
*NN*2	87244	0.14	0.35	0	1
*NS*1	87244	0.01	0.11	0	1
*NS*2	87244	0.10	0.30	0	1
Financial services exports	88118	25.28	253.81	0	14695
*NN*1	88118	0.13	0.34	0	1
*NN*2	88118	0.14	0.35	0	1
*NS*1	88118	0.01	0.11	0	1
*NS*2	88118	0.10	0.30	0	1
Insurance services exports	87399	11.96	179.54	0	14331
*NN*1	87399	0.13	0.34	0	1
*NN*2	87399	0.14	0.35	0	1
*NS*1	87399	0.01	0.11	0	1
*NS*2	87399	0.10	0.30	0	1
Personal, cultural and recreational services exports	87336	6.24	58.47	0	3592.636
*NN*1	87336	0.13	0.33	0	1
*NN*2	87336	0.14	0.35	0	1
*NS*1	87336	0.01	0.11	0	1
*NS*2	87336	0.09	0.29	0	1
Other business services exports	95281	94.87	569.72	0	18656.46
*NN*1	95281	0.12	0.33	0	1
*NN*2	95281	0.13	0.34	0	1
*NS*1	95281	0.01	0.11	0	1
*NS*2	95281	0.09	0.29	0	1

Sources: Francois and Pindyuk [2013] and completed with the WTO-UNCTAD-ITC trade in services dataset. These differences of observations across sectors are explained by less developing countries present in the samples due to the poor data availability.

Table 3. Description of service sectors

Transport	Process of carriage of people and objects from one location to another as well as related supporting and auxiliary services
Travel	Goods and services acquired by personal travellers, for health, education or other purposes, and by business travellers
Communication	Telecommunication, postal and courier services
Computer and information	Computer services, news agency services and other information provision services
Construction	Construction projects and installation by employees of an enterprise in locations outside the territory of the enterprise
Finance	Financial intermediation and auxiliary services provided by banks, stock exchanges factoring enterprises, credit card enterprises, and other enterprises
Insurance	Various types of insurance to non residents by resident insurance enterprises, and vice versa (freight insurance, direct insurance, reinsurance)
Personal, cultural and recreational services	Audiovisual services and other cultural and recreational services
Other business services	Operational leasing (rentals), and miscellaneous business, professional and technical services

Source: IMF.

Table 4. List of trade agreements covering services studied

	North-North
Between European countries	EEA (1994) EU (1995) EFTA (2002)
Between Asian countries	Japan-Singapore (2002) Korea-Singapore (2006)
Between not regional countries	New Zealand-Singapore (2001) EFTA-Singapore (2003) Singapore-Australia (2003) US-Singapore (2004) US-Australia (2005) EFTA-Korea (2006) Japan-Switzerland (2009)
	North-South
Between European countries	EU-Albania (2009)
Between Asian countries	Japan-Malaysia (2006) Japan-Thailand (2007) Japan-Indonesia (2008) Japan-Philippines (2008) China-Singapore (2009)
Between not regional countries	EU-Mexico (2000) EU-Chile (2005) Panama-Singapore (2006) China-New Zealand (2008) Australia-Chile (2009)

Source: WTO.

Table 5. PPML-fixed effects results

	Total services (1)	Transport (2)	Travel (3)	Communication (4)	Computer (5)
North-North1	0.54[a]	0.46[a]	0.75[a]	– 0.03	– 0.04
	(0.09)	(0.11)	(0.14)	(0.20)	(0.22)
North-North2	0.40[a]	0.50	0.17	0.13	– 0.07
	(0.09)	(0.10)	(0.11)	(0.19)	(0.20)
North-South1	– 0.24[a]	– 0.28[a]	– 0.81[a]	– 0.51[b]	– 1.71[a]
	(0.07)	(0.09)	(0.14)	(0.21)	(0.25)
North-South2	0.34[a]	0.32[a]	0.50[a]	0.07	0.77[a]
	(0.03)	(0.03)	(0.04)	(0.09)	(0.11)
Observations	112994	57163	56106	38309	38097
R^2	0.95	0.93	0.96	0.91	0.93
	Construction (6)	Finance (7)	Insurance (8)	PCR (9)	OBS (10)
North-North1	– 0.93[a]	0.81[b]	– 0.32	– 0.10	0.24[b]
	(0.20)	(0.31)	(0.25)	(0.26)	(0.12)
North-North2	0.10	0.53[b]	1.16[a]	0.33	0.05
	(0.18)	(0.27)	(0.24)	(0.26)	(0.12)
North-South1	– 0.14	– 1.39[a]	– 1.46[a]	– 0.66[b]	– 0.30[b]
	(0.19)	(0.36)	(0.26)	(0.28)	(0.13)
North-South2	0.62[a]	0.66[a]	1.22[a]	0.07	0.38[a]
	(0.10)	(0.08)	(0.10)	(0.10)	(0.05)
Observations	39463	40487	36204	42507	57773
R^2	0.88	0.97	0.97	0.92	0.92

Note: All specifications include bilateral fixed effects, exporter-year and importer-year fixed effects. Robust standard errors clustered by country-pair are in parentheses with [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels. North-North1 and North-North2 respectively mean trade between members and trade with non-members, and so on. PCR means Personal, cultural and recreational services.

Table 6. Summary of net trade effects

North-North trade agreements in services	Net effect
Total services	0.94[a]
Transport	0.46[a]
Travel	0.75[a]
Communication	Not significant
Computer	Not significant
Construction	– 0.93[a]
Finance	1.35[a]
Insurance	1.16[a]
PCR	Not significant
OBS	0.24[b]
North-South trade agreements in services	**Net effect**
Total services	Not significant
Transport	Not significant
Travel	– 0.29[b]
Communication	– 0.51[b]
Computer	– 0.93[a]
Construction	0.62[a]
Finance	– 0.72[b]
Insurance	Not significant
PCR	– 0.66[b]
OBS	Not significant

Note: Calculations made using the results in the Table 5. Only the coefficients that are statistically significant have been used to calculate the net effect with "nlcom". [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels.

Table 7. PPML-fixed effects results across regions

	Total services (1)	Transport (2)	Travel (3)	Communication (4)	Computer (5)
North-NorthEU1	1.63[a]	1.22[a]	1.58[a]	− 0.27	− 0.45
	(0.18)	(0.24)	(0.29)	(0.36)	(0.31)
North-NorthEU2	− 0.17	0.36[c]	− 0.32	0.57[c]	0.53[c]
	(0.08)	(0.21)	(0.27)	(0.34)	(0.30)
North-NorthASIA1	0.009	0.06	0.20	0.32	− 0.39
	(0.11)	(0.17)	(0.22)	(0.22)	(0.31)
North-NorthASIA2	− 0.16[c]	0.008	− 0.19	0.30	− 0.58[c]
	(0.09)	(0.14)	(0.12)	(0.22)	(0.32)
North-NorthNOTREG1	0.16[c]	0.02	0.10	− 0.18	0.16
	(0.09)	(0.12)	(0.14)	(0.22)	(0.24)
North-NorthNOTREG2	0.13[c]	0.03	0.26[a]	− 0.12	− 0.29
	(0.07)	(0.10)	(0.09)	(0.16)	(0.20)
North-SouthEU1	− 0.70[a]	− 1.08[a]	− 1.18[a]	− 1.98[a]	− 4.07[a]
	(0.19)	(0.23)	(0.26)	(0.62)	(0.41)
North-SouthEU2	0.33[a]	0.44[a]	0.83[a]	0.11	0.82[a]
	(0.03)	(0.04)	(0.05)	(0.09)	(0.12)
North-SouthASIA1	0.17[b]	0.32[b]	− 0.004	− 0.14	− 0.78[a]
	(0.08)	(0.12)	(0.13)	(0.21)	(0.25)
North-SouthASIA2	0.30[b]	− 0.09	− 0.001	− 0.46[a]	0.49[b]
	(0.12)	(0.09)	(0.12)	(0.16)	(0.23)
North-SouthNOTREG1	1.06[a]	0.36[a]	0.45		
	(0.24)	(0.38)	(0.34)		
North-SouthNOTREG2	− 0.14	0.17	− 0.52[a]	− 0.23	0.54[c]
	(0.16)	(0.11)	(0.08)	(0.24)	(0.33)
Observations	112994	57163	56106	38309	38097
R^2	0.96	0.93	0.96	0.91	0.93

	Construction (6)	Finance (7)	Insurance (8)	PCR (9)	OBS (10)
North-NorthEU1	− 0.81[b]	2.74[a]	2.03[a]	− 0.44	1.23[a]
	(0.35)	(0.59)	(0.58)	(0.51)	(0.35)

North-NorthEU2	– 0.50	0.47	– 0.06	1.38[a]	– 0.86[a]
	(0.31)	(0.54)	(0.54)	(0.47)	(0.32)
North-NorthASIA1	0.002	0.76[b]	– 0.35	0.54	0.10
	(0.24)	(0.30)	(0.24)	(0.49)	(0.19)
North-NorthASIA2	0.77[a]	1.02[a]	– 0.20	0.58[c]	– 0.14
	(0.24)	(0.32)	(0.27)	(0.30)	(0.15)
North-NorthNOTREG1	0.09	0.49[b]	– 0.02	– 0.18	0.19
	(0.35)	(0.24)	(0.23)	(0.30)	(0.12)
North-NorthNOTREG2	0.02	– 0.28	0.19	– 0.44	0.09
	(0.23)	(0.22)	(0.22)	(0.30)	(0.10)
North-SouthEU1	– 0.97[a]	– 2.73[a]	– 2.14[a]	– 1.40[a]	– 0.50
	(0.29)	(1.01)	(0.38)	(0.51)	(0.31)
North-SouthEU2	0.77[a]	1.04[a]	1.56[a]	0.47[a]	0.51[a]
	(0.14)	(0.10)	(0.12)	(0.14)	(0.07)
North-SouthASIA1	0.03	0.07	0.21	– 0.12	– 0.01
	(0.21)	(0.27)	(0.21)	(0.33)	(0.13)
North-SouthASIA2	– 0.03	– 0.40[a]	– 0.17	– 0.38[c]	– 0.09
	(0.17)	(0.15)	(0.18)	(0.21)	(0.09)
North-SouthNOTREG1	1.006	– 0.22	– 0.74[c]	1.03[a]	
	(0.72)	(0.78)	(0.44)	(0.29)	
North-SouthNOTREG2	– 0.06	– 0.72[a]	– 0.06	– 0.50[b]	0.43[a]
	(0.26)	(0.16)	(0.21)	(0.20)	(0.11)
Observations	39463	40487	36204	42507	57773
R^2	0.88	0.97	0.97	0.92	0.92

Note: All specifications include bilateral fixed effects, exporter-year and importer-year fixed effects. Robust standard errors clustered by country-pair are in parentheses with [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels. North-NorthEU1 and North-NorthEU2 respectively mean trade between members and trade with non-members for European countries, and so on. PCR means Personal, cultural and recreational services, NOTREG means trade agreements between not regional countries. Some results not appear due to the lack of data for these countries.

Table 8. Summary of net trade effects across regions

North-North EU trade agreements in services	Net effect
Total services	1.63[a]
Transport	1.58[a]
Travel	1.58[a]
Communication	0.57[c]
Computer	0.53[c]
Construction	– 0.81[b]
Finance	2.74[a]
Insurance	2.03[a]
PCR	1.38[a]
OBS	0.36[b]
North-North ASIA trade agreements in services	**Net effect**
Total services	-0.16[c]
Transport	Not significant
Travel	Not significant
Communication	Not significant
Computer	Not significant
Construction	0.77[b]
Finance	1.78[a]
Insurance	Not significant
PCR	0.58[c]
OBS	Not significant
North-North NOT REG trade agreements in services	**Net effect**
Total services	0.30[a]
Transport	Not significant
Travel	0.26[a]
Communication	Not significant
Computer	Not significant
Construction	Not significant
Finance	0.49[b]
Insurance	Not significant
PCR	Not significant
OBS	Not significant

Note: Calculations made using the results in the Table 7. Only the coefficients that are statistically significant have been used to calculate the net effect with "nlcom". [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels. NOT REG means with not regional countries.

North-South EU trade agreements in services	Net effect
Total services	– 0.36[c]
Transport	– 0.64[a]
Travel	Not significant
Communication	– 1.98[a]
Computer	– 3.24[a]
Construction	Not significant
Finance	– 1.68[c]
Insurance	Not significant
PCR	– 0.92[c]
OBS	0.51[a]
North-South ASIA trade agreements in services	**Net effect**
Total services	0.47[a]
Transport	0.32[b]
Travel	Not significant
Communication	– 0.46[a]
Computer	Not significant
Construction	Not significant
Finance	– 0.40[a]
Insurance	Not significant
PCR	– 0.38[c]
OBS	Not significant
North-South NOT REG trade agreements in services	**Net effect**
Total services	1.06[a]
Transport	0.36[a]
Travel	– 0.52[a]
Communication	Not significant
Computer	0.54[c]
Construction	Not significant
Finance	– 0.72[a]
Insurance	Not significant
PCR	– 1.24[b]
OBS	1.47[a]

Note: Calculations made using the results in the Table 7. Only the coefficients that are statistically significant have been used to calculate the net effect with "nlcom". [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels. NOT REG means with not regional countries.

Table 9. PPML-fixed effects results across depth

Number of WTO-X provisions in log	Total services (1)	Transport (2)	Travel (3)	Communication (4)	Computer (5)
North-NorthDeepEU1	0.88[a]	0.61[b]	1.46[a]	− 0.89[b]	− 0.93[a]
	(0.26)	(0.30)	(0.39)	(0.36)	(0.35)
North-NorthDeepEU2	0.01	0.22[b]	− 0.18	0.07	− 0.02
	(0.08)	(0.09)	(0.12)	(0.14)	(0.13)
North-NorthDeepASIA1	− 0.10	− 0.12	0.07	− 0.13	− 0.23
	(0.12)	(0.18)	(0.18)	(0.20)	(0.26)
North-NorthDeepASIA2	− 0.02	− 0.34[a]	− 0.30[a]	− 0.41[b]	− 0.65[a]
	(0.07)	(0.12)	(0.11)	(0.16)	(0.18)
North-NorthDeepNOTREG1	− 0.005	− 0.12	0.02	− 0.36	0.20
	(0.08)	(0.10)	(0.16)	(0.23)	(0.20)
North-NorthDeepNOTREG2	0.12[a]	0.007	− 0.003	0.04	− 0.12
	(0.04)	(0.05)	(0.06)	(0.12)	(0.10)
North-SouthDeepEU1	− 2.55[a]	− 3.31[a]	− 2.58[a]	1.93[a]	
	(0.38)	(0.41)	(0.43)	(0.65)	
North-SouthDeepEU2	0.06[a]	0.12[a]	0.23[a]	− 0.01	0.28[a]
	(0.01)	(0.02)	(0.02)	(0.06)	(0.07)
North-SouthDeepASIA1	− 0.07	0.27	0.23[c]	− 0.04	− 0.87[a]
	(0.10)	(0.14)	(0.12)	(0.17)	(0.33)
North-SouthDeepASIA2					
North-SouthDeepNOTREG1	0.99[a]	1.55[a]	1.12[a]	− 2.04[a]	− 5.74[a]
	(0.29)	(0.33)	(0.30)	(0.57)	(0.70)
North-SouthDeepNOTREG2	1.02[a]	0.90[a]	0.92[a]	0.98[a]	1.04[a]
	(0.07)	(0.07)	(0.08)	(0.15)	(0.16)
Observations	112994	57163	56106	38309	38097
R^2	0.96	0.93	0.96	0.91	0.93
Number of WTO-Xprovisions in log	Construction (6)	Finance (7)	Insurance (8)	PCR (9)	OBS (10)
North-NorthDeepEU1	− 0.62	2.87[a]	1.39[a]	− 0.81	0.85[b]
	(0.43)	(0.85)	(0.77)	(0.52)	(0.39)
North-NorthDeepEU2	− 0.58[a]	0.20	− 0.09	0.60[a]	− 0.47[a]

	(0.15)	(0.25)	(0.23)	(0.19)	(0.13)
North-NorthDeepASIA1	– 0.29	0.33	– 0.37	0.17	– 0.003
	(0.24)	(0.32)	(0.24)	(0.50)	(0.20)
North-NorthDeepASIA2	0.30[b]	– 0.29	– 0.79[a]	0.22	– 0.37[a]
	(0.14)	(0.22)	(0.20)	(0.23)	(0.11)
North-NorthDeepNOTREG1	– 0.10	0.04	– 0.23	– 0.32	0.12
	(0.33)	(0.24)	(0.20)	(0.26)	(0.11)
North-NorthDeepNOTREG2	0.17	0.01	0.19[c]	– 0.25	0.05
	(0.16)	(0.11)	(0.11)	(0.15)	(0.06)
North-SouthDeepEU1	2.68[b]	– 3.97[a]	– 0.67	– 2.73[a]	
	(1.08)	(1.33)	(0.89)	(0.46)	
North-SouthDeepEU2	0.23[a]	0.23[a]	0.58[a]	0.13[b]	0.13[a]
	(0.08)	(0.04)	(0.07)	(0.06)	(0.04)
North-SouthDeepASIA1	0.07	– 0.58[b]	– 0.33	– 0.50	0.08
	(0.18)	(0.24)	(0.20)	(0.30)	(0.12)
North-SouthDeepASIA2					
North-SouthDeepNOTREG1	1.61[c]	0.68	– 0.31	– 0.98	1.73[a]
	(0.95)	(0.93)	(0.41)	(0.71)	(0.29)
North-SouthDeepNOTREG2	0.87[a]	1.16[a]	1.61[a]	0.38[b]	1.03[a]
	(0.15)	(0.16)	(0.18)	(0.15)	(0.09)
Observations	39463	40487	36204	42507	57773
R^2	0.88	0.97	0.97	0.92	0.92

Note: All specifications include bilateral fixed effects, exporter-year and importer-year fixed effects. Robust standard errors clustered by country-pair are in parentheses with [a], [b] and [c] respectively significance at the 1%, 5% and 10% levels. North-NorthDeepEU1 and North-NorthDeepEU2 respectively represent the total number in log of WTO-X provisions in services trade agreements for trade between member countries in Europe and for trade with non-member countries in Europe, and so on. PCR means Personal, cultural and recreational services, NOTREG means trade agreements between not regional countries. Some results not appear due to the lack of data for these countries.

Appendice 1. List of countries in the database

Afghanistan, Albania, Algeria, Angola, Anguilla, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Cayman Islands, Central African Republic, Chad, Chile, China, Chinese Taipei, Colombia, Comoros, Congo, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Ivory Coast, Democratic Republic of the Congo, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Faeroe Islands, Fiji, Finland, France, Gabon, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Republic of Korea, Kuwait, Lao, Latvia, Lebanese Republic, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macao, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Tanzania, Thailand, Gambia, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay, Uzbekistan, Vanuatu, Venezuela, Viet Nam, Yemen, Zambia, Zimbabwe.

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