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# The value of market access and national treatment commitments in services trade agreements

Philipp Lamprecht

Sébastien Miroudot

## OECD TRADE AND AGRICULTURE DIRECTORATE

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# THE VALUE OF MARKET ACCESS AND NATIONAL TREATMENT COMMITMENTS IN SERVICES TRADE AGREEMENTS

Philipp Lamprecht and Sébastien Miroudot

This paper looks at market access and national treatment commitments for services in the General Agreement on Trade in Services (GATS) and in 95 regional trade agreements (RTAs) involving the countries that are covered in the OECD Services Trade Restrictiveness Index (STRI). The objective is to quantify the impact of legal bindings on trade in services that result from a reduction in the uncertainty faced by exporters. Bilateral bindings indices are created for five broad service sectors (professional services, computer services, telecoms, financial services and transport services). They indicate how close the sector is from a fully bound regime with no possibility to introduce any new trade barrier, by comparing commitments with the actual trade regime. These bilateral indices are then tested over the period 2000-2014 in a structural gravity model. Despite differences across sectors, the results confirm that the legal bindings typically found in services trade agreements tend to have a positive impact on exports even if no actual liberalisation takes place.

**Key words:** Trade in services; regional trade agreements; services trade liberalisation; market access; national treatment; legal bindings.

**JEL Codes:** F13, F15

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## Executive Summary

This paper looks at market access and national treatment commitments for services in the General Agreement on Trade in Services (GATS) and in 95 regional trade agreements (RTAs) involving the countries that are covered in the OECD Services Trade Restrictiveness Index (STRI). The objective is to quantify the impact of legal bindings on trade in services that result from a reduction in the uncertainty faced by exporters.

Two studies (Ciuriak and Lysenko, 2016; Albert and Tucci, 2016) have already found a positive and significant impact on trade when services commitments in GATS are closer to the applied trade regime. These two studies rely on previous OECD work assessing the ‘water’ in the GATS, *i.e.* the discrepancy between the level of restrictiveness permitted by legal bindings in the GATS and the actual trade restrictiveness measured by the STRI.

The data used in this paper go further by adding a bilateral dimension to services commitments (through an analysis of commitments found in RTAs), by adding a time dimension to the analysis (the information from the STRI being checked for earlier years when RTAs entered into force) and by focusing on the commitments and whether they bind the existing regime or not.

Bilateral bindings indices are created with a value between 1 and 100 for five broad service sectors (professional services, computer services, telecoms, financial services and transport services). The indices aggregate market access and national treatment commitments in different sub-sectors and for different modes of supply as defined in the GATS. The scoring of each individual commitment introduces a distinction between an unbound trade regime (no commitments), a trade regime with water (commitments more restrictive than actual regulations), a bound regime (commitments similar or less restrictive than existing regulations), a bound regime with in addition a ratchet provision and a bound regime with no limitation to market access or national treatment (the highest level of commitments). Based on this hierarchy, the index then indicates how close the sector is from a fully bound regime with no possibility to introduce any new trade barrier, using a weighting scheme giving more emphasis to market access commitments (as they have an impact on national treatment as well) and more importance to modes of supply for which there are higher trade flows.

These bilateral indices are then tested over the period 2000-2014 in a structural gravity model with time-varying country-sector fixed effects that account for output, expenses, multilateral resistance as well as past values for the STRI (variables that are unobservable or unavailable for the services sectors we have). The fact that indices are in the bilateral dimension allows a very robust estimation of the model.

Despite differences in the results across sectors, the use of a bilateral index of commitments in the gravity model confirms that the legal bindings typically found in services trade agreements tend to have a positive impact on exports. For professional services, telecoms and financial services, a positive and significant impact is found on bilateral trade when there are higher levels of commitments. However, for computer services and transport services, the indices are positive but not econometrically significant. In the case of transport services, one issue is that commitments are heterogeneous across sub-sectors. When using disaggregated trade data (for fewer countries), a positive and significant coefficient is found for land transport. In addition, when using an alternative

trade dataset based on the Trade in Value-Added (TiVA) database, significant and positive coefficients are found both for computer services and the transport sector.

For sectors with a positive and significant coefficient, the implied elasticity of trade to the reduction of uncertainty in the trade regime through legal bindings is quite high. For example, going from the average level of commitments in the GATS to the average level of commitments in RTAs for telecoms services could increase bilateral trade by as much as 12%. For financial services, where there are less differences between GATS and RTA commitments, a similar calculation suggests that trade can still increase by 10% when moving to an index equal to the RTA average. The same exercise for professional services indicates an increase of 8%.

Some regressions on trade in mode 3, relying on estimates from the OECD analytical AMNE database, confirm that there is also a trade-enhancing effect for the sales of foreign affiliates when countries bind the existing regime in trade agreements. This time a positive and significant impact is also found for transport services. Not only mode 3 commitments have a positive impact but also the legal bindings index calculated on the basis of the respective weights of all modes, suggesting a complementary relationship between trade and FDI.

The results appear to be robust and can be replicated with different data and different weights for the construction of the bindings indices. Some tests on a potential endogeneity bias also suggest that the results are not explained by a causal relationship going from the importance of bilateral trade to the decision of having ambitious legal bindings. The commitments themselves appear to be producing an effect on trade even if the data do not allow a full causality test.

While other studies have highlighted that removing the water in services commitments has a positive impact on trade, the novelty in this paper is that commitments in RTAs have been accounted for and even consolidated with GATS commitments. Therefore, the paper reinforces previous policy implications with respect to the role of services commitments in the context of the negotiation of bilateral and regional deals. As no progress has been made in the context of GATS at the WTO, most of the additional market access and national treatment commitments in recent years are found in RTAs. The results of this paper indicate that, while limited to a few partners, these RTAs have a positive impact on bilateral trade in services (at least in the sectors for which we have identified positive and significant coefficients).

## Introduction

Since the negotiation of the General Agreement on Trade in Services (GATS) and its entry into force in 1995, most agreements dealing with the liberalisation of trade in services include market access and national treatment commitments. As these commitments are not always leading to actual trade liberalisation, the literature suggests that one of the main benefits of services trade agreements is to bind the existing regime and to ensure that any unilateral liberalisation is “locked-in”.

Following the analysis developed in the context of trade in goods, the benefit associated with legal bindings would be to enhance the stability and the predictability of the trade regime. Services suppliers have some guarantee that the regulations they face will not change or at least that the trade regime will not become more restrictive than it currently is. Such guarantees may play a positive role in the decision to enter foreign markets, especially when market entry is associated with high fixed costs or sunk costs. Therefore, one expects services commitments to increase the volume of trade even if the trade regime remains unchanged.

While several studies deal with the impact of the GATS and regional trade agreements (RTAs) on services trade, the question of the value of commitments cannot be fully analysed without some information on the applied regime. If a country has fully opened its market in a given service sector, but has commitments permitting a more restrictive regime in the future (for example through limitations not effectively in place but listed in the GATS and the RTAs it has signed), the uncertainty for foreign suppliers is still there. Such discrepancy between the commitments and the applied regime is described as “water”. Water in commitments is expected to mitigate the positive impact related to the predictability of trade policy and should be distinguished from the situation where the trade agreement binds the existing regime.

Therefore, an analysis of the value of services commitments should compare the legal bindings found in the GATS and in RTAs with the applied regime. The Services Trade Restrictiveness Index (STRI) allows such comparison and since the release of the OECD report on the Water in the GATS (Miroudot and Pertel, 2015), two papers have looked at the effect of binding commitments.

In a first paper, Ciuriak and Lysenko (2016) quantify the uncertainty-reducing effect of services trade agreements by introducing in a gravity model the OECD STRI and the measure of the water in GATS commitments also provided by the OECD. Both the STRI and the water measure are negatively correlated with trade but the magnitude of the coefficient is not the same. The effect of removing actual barriers to services (a reduction in the STRI) is estimated to be twice the effect of reducing uncertainty through legal bindings (a reduction in the water).

In a second paper, Albert and Tucci (2016) create a “policy space” variable, which is the difference between the STRI and the level of restrictiveness permitted by the GATS. The variable quantifies the policy uncertainty related to the existence of the water in the GATS and is also found to negatively affect trade. The coefficients for the STRI and the water are however closer than in the previous paper, suggesting an almost equal impact in reducing actual barriers and reducing the uncertainty. In addition, the paper distinguishes barriers to cross-border trade (Mode 1, 2 and 4 in GATS) from barriers to FDI (Mode 3) and finds that the policy space related to barriers to FDI has a positive impact on trade in services, pointing to a substitutive relationship between trade and FDI.

The results of these two studies suggest that reducing the uncertainty in the trade regime has a significant impact on trade. However, they do not account for commitments in regional trade agreements. The GATS entered into force in 1995 and in the past two decades, more than 140 RTAs have been signed with bilateral market access and national treatment commitments for services. Studies on services RTAs conclude that these agreements are significantly GATS-plus, indicating that countries have made many additional commitments as compared to the GATS (Marchetti and Roy, 2008; Roy, 2011; Miroudot et al., 2011).

For this project, the previous work on the water in the GATS has been augmented with a detailed analysis of all services RTAs in force in 2014 where one party at least is a country included in the STRI database. Instead of using country-sector STRIs, the analysis relies on bilateral indices that account for market access and national treatment commitments. Not only does this bilateral approach fully consider commitments in RTAs, it also allows a more robust estimation of the gravity equation with time-varying country-sector fixed effects (Yotov et al., 2016) that also solves the issue of not having STRIs for earlier years.<sup>1</sup> The technical details are available in the Annex.

Another novelty in this paper is that in addition to barriers by mode of supply, the indices are also tested with trade data for mode 3. These data come from the analytical AMNE database that has estimates of the output of foreign affiliates for a large number of countries.

The paper is structured as follows. Section 1 describes the methodology used to assess the level of commitments in RTAs and in the GATS, comparing them with actual policies as reflected in the STRI database. Section 2 introduces the main econometric results with respect to the impact of market access and national treatment commitments on the volume of bilateral trade, i.e. the value of binding the existing regime. Section 3 concludes. A technical annex provides additional econometric results and robustness checks, as well as more information on the model and on data sources.

## 1. Methodology used to assess commitments in regional trade agreements and in the GATS

The starting point of the empirical analysis is the information provided by services trade agreements on the sectors in which market access and national treatment commitments are made, as well as the list of limitations or non-conforming measures to these commitments. The analysis follows the structure of GATS schedules of commitments and their counterpart in regional and bilateral trade agreements. As such, it is different from the STRI database and earlier work on the water in the GATS relying on indices similar to the STRI for each sector and country.

For this project, we have created bilateral indices that summarise the level of commitments for imports from country  $j$  in country  $i$  and sector  $k$ . The indices have values between 0 and 100. They are continuous and aggregate commitments by sub-sector (as defined in the W/120 classification of services used in the GATS), by type of disciplines (market access or national treatment) and by mode of supply (mode 1, 2, 3 or 4). There is a weighting scheme based on the relative importance of the different modes of supply for each sector and giving more weight to market access commitments. However, results are also presented with equal weights to show that this weighting scheme is not the main driver of the econometric results.<sup>2</sup>

### *i. Analysis of commitments*

Five sectors are covered in the analysis based on the availability of trade data: computer services, financial services, telecoms, professional services, and transport services (see the Annex for their definition). The templates that are filled for each services trade agreement (a RTA or the GATS) are structured as shown in Table 1.

- 
1. The time-series for the OECD STRI starts in 2014 which is the last year in our dataset.
  2. One important rule when countries fill their schedule of commitments in GATS or in GATS-inspired RTAs is that a barrier affecting both market access and national treatment should be reported in the market access column of the schedule. Therefore, it makes sense to give more weight to market access as it reflects the national treatment barriers as well. For RTAs not following the GATS model, we apply similar rules and use the market access column to report barriers covering both market access and national treatment. The two types of agreements are thus analysed in a comparable way and we can apply the same weighting scheme.



The analysis follows the structure of commitments based on the GATS Services Sectoral Classification List (MTN.GNS/W/120)W/120) which is used by most countries in their GATS schedules and in GATS-inspired services chapters in RTAs. If the commitments are presented in a different way, using a different classification or the negative lists of NAFTA-inspired RTAs, we simply read the commitments or reservations in their original form and fill the same template as in Table 1. It involves finding a correspondence between the classification of the agreement and W/120 sub-sectors, as well as between the disciplines of the agreement and market access and national treatment as defined in GATS.

**Table 1. Template for the analysis of commitments**

Sector	W/120	GATS sector	Mode	STRI sector	Market access	National treatment
0. Horizontal	0	Horizontal commitments	M1	<i>Horizontal measures in STRI</i>		
	0		M2			
	0		M3			
	0		M4			
1. Professional services	1.A.a	Legal Services	M1	<i>Legal</i>		
	1.A.a		M2			
	1.A.a		M3			
	1.A.a		M4			
	1.A.b	Accounting, auditing and bookkeeping services	M1	<i>Accounting</i>		
	1.A.b		M2			
	1.A.b		M3			
	1.A.b		M4			
	1.A.d	Architectural services	M1	<i>Architecture</i>		
	1.A.d		M2			
	1.A.d		M3			
	1.A.d		M4			
	1.A.e	Engineering services	M1	<i>Engineering</i>		
	1.A.e		M2			
	1.A.e		M3			
	1.A.e		M4			
2. Computer services	1.B	Computer and Related Services	M1	<i>Computer</i>		
	1.B		M2			
	1.B		M3			
	1.B		M4			
3. Telecoms services	2.C.i	Telecommunication services: Fixed a, b, c, g and i	M1	<i>Telecommunications (fixed)</i>		
	2.C.i		M2			
	2.C.i		M3			
	2.C.i		M4			
	2.C.ii	Telecommunication services: Mobile a, b, c, g, i (and o if mobile listed)	M1	<i>Telecommunications (mobile)</i>		
	2.C.ii		M2			
	2.C.ii		M3			
	2.C.ii		M4			
	2.C.iii	Telecommunication services: Internet b, h, j, k	M1	<i>Telecommunications (Internet)</i>		
	2.C.iii		M2			
	2.C.iii		M3			
	2.C.iii		M4			
4. Financial services	7.A	All insurance and insurance-related services Excl. health insurance and pensions	M1	<i>Insurance</i>		
	7.A		M2			
	7.A		M3			
	7.A		M4			
	7.B	Banking and other financial services (excl. Insurance) - a to e	M1	<i>Commercial banking</i>		
	7.B		M2			
	7.B		M3			
	7.B		M4			

Sector	W/120	GATS sector	Mode	STRI sector	Market access	National treatment
5. Transport services	11.A	Maritime Transport Services	M1	Maritime transport		
	11.A		M2			
	11.A		M3			
	11.A		M4			
	11.C	Air Transport Services	M1	Air transport		
	11.C		M2			
	11.C		M3			
	11.C		M4			
	11.E	Rail Transport Services (freight)	M1	Rail freight transport		
	11.E		M2			
	11.E		M3			
	11.E		M4			
	11.F	Road Transport Services (freight)	M1	Road freight transport		
	11.F		M2			
	11.F		M3			
	11.F		M4			
	11.H.a	Cargo-handling services	M1	Logistics		
	11.H.a		M2			
	11.H.a		M3			
	11.H.a		M4			
	11.H.b	Storage and warehouse services	M1	Logistics		
	11.H.b		M2			
	11.H.b		M3			
	11.H.b		M4			
	11.H.cd	Freight transport agency services and Other	M1	Logistics		
	11.H.cd		M2			
	11.H.cd		M3			
	11.H.cd		M4			

There are two columns for market access and national treatment commitments in Table 1 (which correspond to many sub-columns in the actual templates). For each, sub-sector and mode of supply, the information reported there includes: the commitments in the agreement (full, partial or unbound), the comparison with GATS (for RTAs, GATS-plus or GATS-equal/GATS-minus) and the comparison with the STRI (preference, bound or water).

‘Preference’ means that the trade regime resulting from commitments in the agreement is more favourable than what is described in the STRI database. For example, there is a screening procedure for investment but the RTA partner benefits from higher thresholds for this screening to take place. It is not very common to find such preferences in services trade agreements but there are a few cases. The STRI database does not include any information on such preferences as it records services trade barriers on a most-favoured-nation (MFN) basis. We can infer that there is a preference when comparing the RTA commitments and the STRI information. For GATS schedules of commitments, there is, by definition, no preferential treatment.

The second entry in the template when comparing commitments with the STRI is “bound”. It means that the barriers described (the ‘limitations’, ‘reservations’ or ‘non-conforming measures’ to market access and national treatment) are the same as the ones found in the STRI database. In this case, the agreement is not offering a more favourable trade regime to its partners but there is a guarantee that the trade regime will not change in the future and become more restrictive (standstill). This is precisely the type of legal bindings we are looking for in the analysis to check whether binding the existing regime has a positive impact on trade.

However, some agreements go further than this “standstill” and introduce in addition a “ratchet mechanism”. The ratchet effect comes from a provision saying that if the trade regime becomes more favourable in the future, *i.e.* if some of the barriers listed in the agreement are removed, it will no longer be possible to re-introduce such barriers. The ratchet provision implies that any improvement in the trade regime becomes a commitment in the agreement. We record such cases as “bound+ratchet”

and take into account the additional legal certainty in the construction of the bilateral indices. For sub-sectors where there is no limitation to start with, the ratchet provision does not matter since the standstill is applied to the most favourable regime. It is also taken into account in the analysis.

Lastly, the comparison between the commitments of the agreement and the STRI information can indicate that there is “water” in the commitments. It means that the level of restrictiveness committed to in the agreement is above the actual trade regime, as described in the STRI. This situation creates some legal uncertainty as nothing in the agreement prevents the country from becoming as restrictive as permitted by its schedule of commitments, and concretely to re-introduce trade barriers that are consistent with its commitments.

There is *de facto* water when a country decides to not take any market access or national treatment commitment in a given sector. In this case, the entry is “unbound” and the legal uncertainty is at its maximum, thus corresponding to the lowest value in the index of bindings.

While there are differences in the positive list agreements inspired by GATS and in the negative list agreements that follow the NAFTA model, the analysis is neutral in terms of the structure of the agreements. NAFTA-inspired RTAs have ‘unbound’ sectors when they exclude from the coverage of cross-border trade in services or investment chapters some sectors or when they list them in the annex for future non-conforming measures. Whether the actual trade regime is bound or not can be analysed in a similar way in the negative list agreements.

## ii. Scoring of individual commitments

Based on the above hierarchy, the scoring of market access and national treatment commitments is detailed in Table 2. There is an individual score for each market access and national treatment commitment for all the rows of Table 1 (i.e. for each sub-sector and for each mode of supply). The assumption is that the strongest level of commitment (maximum score = 100) is when there is a standstill and no limitation to market access or national treatment. In this case, the uncertainty on the re-introduction of trade barriers has been fully removed. The lowest level of commitment is when there is no commitment at all (i.e. unbound). The score is then 1 (smallest score). In between, the scores are just spread evenly between the three categories of intermediate commitments, the case of water in commitments (25), standstill without ratchet (50) and standstill with a ratchet provision (75). In this latter case, the trade regime cannot become more restrictive but also any unilateral liberalisation receives the same guarantee; it decreases the level of uncertainty as compared to the standstill without ratchet.

Since we are interested in the level of commitment, the score is not higher when there is a preference in the agreement. The index does not measure the extent to which the agreement opens trade. It measures the degree of legal certainty in the trade regime. Also, it should be noted that the ratchet mechanism is taken into account only when commitments in the agreement match the actual trade regime. It is technically possible to have both water in the commitments and a ratchet provision. For example, a country can reserve the right to adopt any measure with respect to a specific service activity within a sector (while not having any such measure in place according to the STRI) and apply the ratchet provision to the other activities. In this case, there is still some uncertainty for service providers with respect to this specific activity and the overall assessment is that there is water for this sub-sector.

**Table 2. Scoring of individual commitments**

	Score for commitment
Full commitment (no limitations)	100
Standstill on limitations + ratchet mechanism	75
Standstill on limitations	50
Water	25
Unbound	1

Lastly, Table 1 highlights that there are horizontal commitments in services trade agreements that apply to all sectors. We take them into account in all sub-sectors. For example, all commitments related to mode 4 are generally in the horizontal section for GATS and the majority of RTAs following the model of GATS. Other types of RTAs also have “horizontal commitments”. In NAFTA-inspired agreements, there are for example non-conforming measures that apply to all sectors. There are also exceptions to market access and national treatment directly described in the main provisions of the services chapter. The general rule for the analysis is that any type of limitation to market access and national treatment is taken into account, wherever it is in the agreement. We also look for example at the exclusion of measures at a certain level of government (e.g. local government). GATS definitions are used to make the analysis comparable across countries and agreements.

The assessment, however, is only based on the measures that we can find in the STRI. We assume that the existing trade regime is bound when there are market access and national treatment commitments and when all the reservations or non-conforming measures listed have their equivalent in the STRI database. If some of the reservations listed have clearly no equivalent, we indicate that there is water. This exercise is not always straightforward, as the STRI and the schedule of commitments are not always based on the same concepts, the same language, or the same degree of specificity in their description of trade restrictive measures. If there is a doubt, the presumption is that the objective of trade negotiators was to bind the existing regime and not to introduce slight differences with this regime.

As highlighted in previous OECD analysis on the water in the GATS (Miroudot and Pertel, 2015), most of the water in commitments comes either from partial commitments with respect to the coverage of the sector (e.g. commitments for international law or home country law in legal services and not for domestic law) or from unilateral liberalisation after the entry into force of the agreement. This is why there is a time dimension in the analysis done for this paper.

The year used for STRI information (the applied regime) is 2014. If the commitments in the agreement match the current STRI, it is assumed that it has been the case for all years since the entry into force of the agreement. If there is some water in commitments and the sector is not unbound, the STRI information is checked for previous years to see when the water appeared. The index is adjusted if this water is the consequence of further liberalisation after the entry into force of the agreement. In the case of phasing-out commitments, the index is also changed at the date where the restrictions are removed (if the new regime is similar to the applied one).

### *iii. Aggregation over commitments and modes of supply*

Individual commitments are then aggregated with the weighting scheme described in Table 3. These weights reflect the importance of the different modes of supply for each sector and the fact that some measures having an impact on both market access and national treatment are only listed in market access columns in the agreements. There is of course no scientific method to translate these two guiding principles into accurate values. The weights from Table 3 are therefore still to some extent arbitrary but we show in the Annex that this weighting scheme has a limited impact on the econometric results. Also, we provide results for indices by mode of supply.

For the relative importance of trade by mode of supply, we rely on recent work released by the European Commission (Rueda-Cantuche et al., 2016) as well as internal OECD work. All these estimates show that trade in services is predominantly through mode 3 (commercial presence). But as we use cross-border trade data in the empirical analysis, mode 3 commitments should not take the leading role, especially if there is some substitutive relationship between cross-border trade (modes 1, 2 and 4) and mode 3, as suggested by Albert and Tucci (2016). The reason to include mode 3 commitments in bilateral indices for cross-border trade is the opposite. There might also be some complementary effects. Therefore, we have divided by two the weight of mode 3 as compared to trade estimates.

**Table 3. Weighting scheme for commitments and modes of supply**

	Market access (60%)				National treatment (40%)			
	Mode 1	Mode 2	Mode 3	Mode 4	Mode 1	Mode 2	Mode 3	Mode 4
Professional services	0.30	0.03	0.18	0.09	0.20	0.02	0.12	0.06
Computer services	0.24	0.03	0.21	0.12	0.16	0.02	0.14	0.08
Telecoms services	0.24	0.03	0.21	0.12	0.16	0.02	0.14	0.08
Financial services	0.27	0.03	0.27	0.03	0.18	0.02	0.18	0.02
Transport services	0.30	0.12	0.15	0.03	0.20	0.08	0.10	0.02

**iv. Bilateral indices for country pairs consolidating GATS and RTA commitments**

To create bilateral indices, we finally have to consolidate the information over different types of agreements. If both countries are WTO Members, there is a score coming from GATS commitments. If in addition, the two countries are part of a RTA, there is a specific score associated with this RTA. The two countries can also be part of different RTAs in force (for example some ASEAN agreements overlap with bilateral agreements between the same parties). In theory, RTA commitments should go further than GATS commitments and more recent RTAs have more ambitious commitments than previous RTAs involving the same parties. But in practice it is not always the case. For example, some RTAs exclude financial services while the parties benefit from GATS commitments in financial services. Therefore, the consolidation of the different commitments is based on the most advantageous ones for exporters from the point of view of legal certainty (the highest score in our index). It means that a bilateral index in the empirical analysis can be calculated with commitments from different trade agreements.

The higher the bilateral index, the more certainty there is for exporters that the trade regime will not become more restrictive than what it is. These bilateral indices are different from the STRI and from the indices calculated in the context of the project on the water in the GATS. They are different from the STRI because they do not measure the extent to which the trade regime is restrictive. With these indices, a high value can be associated with a fairly open trade regime or with a restrictive one. As long as there is a standstill on existing barriers, the value is the same for the open and the restrictive regime.<sup>3</sup>

The bilateral indices are also different from the water indices calculated in Miroudot and Pertel (2015) as they do not measure to what extent there is a discrepancy between the commitments and the actual trade regime. The case where there is water in the commitments has a fixed value and does not take into account the size of this water (except when the sub-sector is fully unbound). While the level of water can also be an indication of the uncertainty in the trade regime, the choice in this paper is to look more directly at whether the existing regime is bound. This approach can be seen as complementary to provide additional evidence on the positive impact of services trade agreements.

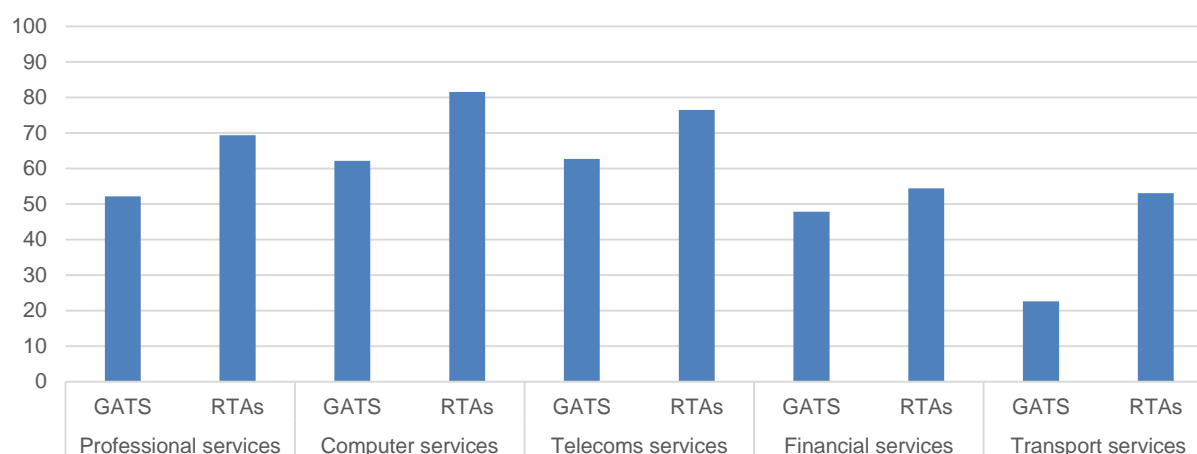
Finally, it should be stressed that only market access and national treatment commitments are taken into account in the bilateral indices. With respect to domestic regulations, RTAs often have additional commitments or sector-specific chapters with provisions that can also reduce the uncertainty for service providers. It is beyond the scope of this project to analyse such provisions but it should be highlighted that they can also have a positive impact on trade.

3. However, as indicated in Table 2, full commitments still get a higher value in the index because the regime without limitations to market access or national treatment can only be associated with a lower level of uncertainty for service providers as compared to a restrictive regime bound by commitments. The commitment to maintain barriers does not send the same signal as the commitment to not have them.

## 2. Empirical analysis on the value of market access and national treatment commitments

The average value of the indices calculated for the GATS and for the 95 RTAs covered in the analysis can be seen on Figure 1. For the GATS, it is the average of the score of the 44 STRI countries (among which 23 are EU Member states sharing the same GATS schedule but with different scores). For RTAs, the average is calculated over all schedules in all agreements.

**Figure 1. Average bindings indices by sector and type of agreement: GATS and RTAs (2014)**



In all sectors, there are higher values for the average over RTAs as compared to the GATS. It reflects the fact that RTAs go further than the GATS in terms of commitments (they are GATS-plus). Moreover, for most countries GATS entered into force in 1995 and domestic reforms have created some water in GATS commitments since then.

Across sectors, there are noticeable differences in the level of bindings. Computer services and telecoms services are the sectors where the strongest commitments are made, both for the GATS and RTAs, while there are weaker commitments for transport services, particularly in the case of GATS. Financial services is the sector where the difference between GATS and RTA commitments is the lowest. It is explained by the exclusion of financial services in a non-negligible number of RTAs (scored as unbound). The difference between GATS and RTA commitments is the highest for transport services, in particular because RTAs introduce bindings in additional transport sub-sectors as compared to the GATS.

The next step in the analysis is to check whether the indices calculated on Figure 1 are meaningful to explain bilateral volumes of trade, using gravity regressions over the period 2000-2014 (see the Annex for an explanation of the empirical model and data sources). As previously explained, a single bilateral bindings index is calculated for each country pair, consolidating the information from the GATS and from RTAs.

### *i. Pooled regression and regression results by sector*

Since we focus on five sectors, most of the regressions are run separately for each sector. But Table 4 starts with a pooled regression where all sectors are brought together and where fixed effects are in the country-sector-year dimension. It provides an estimate for the average effect of binding the existing services trade regime through market access and national treatment commitments.

Table 4. Pooled regression

Dependent variable: Bilateral exports by sector	Pooled regression
Log of distance (km)	-0.651*** (0.013)
1 for common official of primary language	0.079*** (0.028)
1 for pairs in colonial relationship post 1945	-0.129** (0.060)
1 if countries were or are the same country	0.263*** (0.051)
1 for common legal origin	0.195*** (0.020)
Bindings level Index	0.058*** (0.020)
Number of observations	67,208
R-squared	0.921

Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

There is a high R-squared due to the structure of the fixed effects (time-varying exporter-sector and importer-sector fixed effects). The traditional gravity variables have the expected sign and magnitude. Distance is negatively correlated with trade and the coefficients are in line with gravity estimates for services. Geographical, historical and political dummy variables are significant. There is a negative sign for the past colonial relationship but it is in line with other papers looking at services at the sector level (Nordås and Rouzet, 2015; Benz, 2017).

The variable indicating the level of bilateral bindings is econometrically very significant. However, its coefficient is rather small. As the index is a continuous variable in its log form, the coefficient can be interpreted as an elasticity. Therefore, a 10% increase in the level of the index is associated with a 0.6% increase in trade. But this first regression has pooled all sectors and this average effect is the result of contrasted elasticities across sectors, as can be seen in Table 5.

There are three sectors out of five with positive and significant coefficients for the bindings level index. These coefficients point to higher elasticities than in the case of the pooled regression in the case of professional services, telecoms services and financial services. If we compare these elasticities with those from other STRI quantitative studies, they are generally lower. One should be cautious in such a comparison as commitments indices are not constructed the same way as the STRI. But for example, if we compare the above elasticities with the ones estimated in the paper on the trade effect of regulatory differences (Nordås, 2016), they are two to three times smaller (in absolute terms since for commitments the higher the index the higher the volume of trade). A comparison with the results from Benz (2017) -although these results highlight non-linear effects and are expressed as tariff equivalents- suggests elasticities also two to three times lower than those estimated for the STRI. It is consistent with the results from Ciuriak and Lysenko (2016) that point to elasticities for the STRI two times higher as compared to the water measure in GATS.<sup>4</sup>

4. In the above regressions, we cannot add the STRI as it is in the same dimension as the fixed effects. Moreover, there are no STRIs for years before 2014. But we still control for existing barriers to trade in services both in the importing and exporting economy through the fixed effects.

**Table 5. Regression results by sector**

Dependent variable: bilateral exports by sector	Professional services	Computer services	Telecoms services	Financial services	Transport services
	(1)	(2)	(3)	(4)	(5)
Log of distance (km)	-0.720*** (0.032)	-0.675*** (0.041)	-2.139*** (0.177)	-0.520*** (0.038)	-0.648*** (0.015)
1 for common official of primary language	-0.154** (0.061)	-0.141 (0.125)	-1.769*** (0.303)	0.013 (0.084)	0.157*** (0.033)
1 for pairs in colonial relationship post 1945	0.313*** (0.121)	-0.309 (0.200)	4.102*** (0.620)	0.319*** (0.124)	-0.150** (0.065)
1 if countries were or are the same country	0.738*** (0.167)	2.237*** (0.233)	-0.993** (0.388)	0.569*** (0.147)	0.198*** (0.054)
1 for common legal origin	0.513*** (0.037)	0.430*** (0.068)	0.744*** (0.201)	0.113* (0.063)	0.139*** (0.025)
Bindings level index	0.278*** (0.076)	0.035 (0.076)	0.589*** (0.226)	0.775*** (0.078)	0.028 (0.021)
Number of observations	11 368	11 571	9 033	14 907	20 329
R-squared	0.971	0.876	0.989	0.976	0.866

Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

Another way of interpreting the coefficients from Table 5 is to look at the bindings level index in Figure 1 for GATS and RTAs. The index for RTAs is 33% higher than for GATS commitments in the case of professional services. With the elasticity estimated in Table 5, it implies an increase in trade of 8% when going from the average commitments in GATS (52) to the commitments in RTAs (69). Moving to a RTA fully binding the existing regime with a ratchet provision (index=75) implies an 11% increase while full commitments with no restrictions (index=100) bring the increase to 20%. It gives an idea of the “value” of commitments. The same exercise for telecoms services indicates an increase of 12% and for financial services 10% when going from the average in GATS to the average commitments observed in the RTA database.

While the results are positive and significant for professional services, telecoms services and financial services, there are two sectors where it is not the case. For computer services and for transport services, the commitments variable is not significant. Computer services is the sector with the highest level of commitments both in RTAs and in the GATS. One explanation could be that foreign suppliers are more likely to benefit from commitments when these commitments introduce some legal certainty in sectors that are generally characterised by a low level of legal certainty or trade openness. If a sector is most of the time with full commitments in trade agreements, and particularly in the GATS at the multilateral level, we should not measure a strong effect. However, the telecommunications sector is also with high levels of commitments and the bindings variable is very significant.

In the case of transport services, there is some heterogeneity across the different sub-sectors included in terms of commitments. For example, air transport is a sector almost fully carved out from the GATS and also excluded from most RTAs. The logistics sectors also create issues as the STRI is very detailed for them and they represent many different sub-sectors in the W/120 classification while maybe not having the same importance in trade flows (particularly cross-border trade flows).



Regressions with more disaggregated industries (Table A7 in the Annex) suggest that land transport is the sector for which there is a positive and significant coefficient on the bindings index. The coefficients remain insignificant for other transport sectors. Moreover, a regression with alternative trade data (based on the TiVA database – Table A6 in the Annex) has positive and significant coefficients both for computer services and the transport sector, suggesting that the sample of countries and missing data also play a role in the robustness of results for these two industries.

## *ii. Regression results for commitments in different modes of supply*

To further investigate differences across sectors, Table 6 introduces in the cross-border trade regressions separate indices for the commitments related to different modes of supply<sup>5</sup>. Albert and Tucci (2016) have highlighted that the water in mode 3 commitments tends to encourage rather than discourage cross-border trade, trade and FDI being in a substitutive relationship. It could also play a role in the two sectors for which the bindings index was not significant (computer services and telecoms services).

Since there is a high correlation between the bindings indices (see Table A3 in the Annex), they have been introduced separately and Table 6 shows the results of different regressions for each row and column. While in Table 5, there was no significant coefficient for computer services and telecoms services, we can see in Table 6 that it is no longer the case when distinguishing commitments in different modes of supply. Differences are also observed for professional services and for transport services. Only in the case of financial services are the results the same across modes of supply (a positive and significant coefficient).

The results are consistent with what we know from the different sectors in terms of the importance of the different modes of supply and where trade barriers are concentrated. In the case of professional services, the provision through mode 3 or mode 4 is generally regulated and these modes of supply are the ones where commitments matter. In the case of computer services, only the index for mode 4 has a positive and significant coefficient and it is also one of the main modes of supply for this type of service, as well as the one where restrictions are generally in place. A negative (and significant) coefficient is found for commitments in mode 1 and mode 2. It explains why there was no significant result in Table 5 when combining all modes of supply. It is difficult to interpret why commitments would discourage cross-border trade in this case but the result could come from high trade flows with countries with no such commitments. As previously explained, most countries have commitments in computer services, giving more importance in the econometric results to the few countries that do not have them.

At the opposite, for telecoms services, commitments for the cross-border provision (modes 1 and 2) are associated with higher trade flows, while a negative and significant relationship is found for commitments in mode 3 (commercial presence). This result is easier to explain in the context of trade and investment being substitutes. More commitments in mode 3 should encourage the provision through commercial presence rather than through cross-border trade, which is the dependent variable in the above regressions.

But in the case of financial services, trade and investment seem to be rather in a complementary relationship (as also observed for professional services) with positive and significant coefficients for mode 3 commitments in addition to mode 1, 2 and 4 commitments. Mode 3 is the main mode of supply for financial services (Rueda-Cantuche et al., 2016). For transport services, commitments in mode 1 are significant and mode 1 accounts for a large share of trade in this sector.

Finally, the results of Table 6 suggest that the way we weight the different modes of supply in the bindings index can influence the results when not distinguishing the mode of commitment, as in

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5. The mode of supply comes from the information in the trade agreement. Each index is the average by mode of the scores by sub-sector and by type of commitments (market access or national treatment).

Table 5. However, the results tend to remain robust when using equal weights for the bindings index (Table A8 in the Annex).

**Table 6. Regression results by mode of commitment**

Dependent variable: bilateral exports by sector	Professional services	Computer services	Telecoms services	Financial services	Transport services
	(1)	(2)	(3)	(4)	(5)
Bindings Index M1	0.112 (0.070)	-0.127** (0.054)	0.467** (0.215)	0.693*** (0.064)	0.040** (0.018)
Bindings Index M2	0.028 (0.073)	-0.129** (0.055)	1.360*** (0.240)	0.497*** (0.073)	0.023 (0.020)
Bindings Index M3	0.263*** (0.075)	-0.033 (0.069)	-0.801** (0.324)	0.577*** (0.069)	0.014 (0.020)
Bindings Index M4	0.443*** (0.056)	0.559*** (0.063)	-0.429 (0.310)	0.184*** (0.068)	0.003 (0.019)

*Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .*

### **iii. Regression results for sales of foreign affiliates (mode 3 trade flows)**

To complement the analysis, Table 7 provides regressions on trade in mode 3 (the sales of foreign affiliates) with the same bindings level index used in the cross-border trade analysis but also with the specific index for mode 3 commitments. As explained in the technical Annex, the regressions are based on a different dataset coming from the work done with TiVA data in the analytical AMNE database. A smaller number of countries are covered but data include many estimates (hence a higher number of observations). The results should be interpreted with more caution than previous regressions. Mode 3 is measured through the sales of foreign affiliates in the host economy ('importer') from parent companies in the origin country ('exporter').

The results are similar with cross-border trade for telecoms and financial services with positive and significant coefficients for the bindings index. Professional services have no longer a significant coefficient but the data used for this sector are more aggregated, covering a broader set of business services and creating a mismatch with the STRI data that are limited to legal, accounting, architecture and engineering services. Commitments in transport services have this time a positive and significant impact on trade.

In sectors where the coefficient is significant, both the bindings index and its version with only commitments for mode 3 are positively correlated with sales of foreign affiliates. The coefficients for the index reflecting commitments for all modes are even higher than for mode 3 bindings in the case of telecoms and financial services (although for financial services the standard errors do not leave out the possibility that the coefficients are the same). These results point to a complementary relationship between modes of supply where the movement of people and cross-border transactions may be facilitated by a commercial presence. And vice-versa, setting up and operating affiliates may require the movement of people (such as intra-corporate transferees) and cross-border trade (to import inputs from the parent company for example).

While the fact that many observations are estimated makes the results less robust, a difference with the cross-border trade dataset is that all countries are adequately represented in these regressions. Not all countries have detailed trade statistics at the bilateral by industry level in balance of payments statistics, and are therefore missing from the cross-border trade regressions. It can introduce a bias which is no longer there in the results from Table 7.

**Table 7. Regressions on trade in mode 3 (sales of foreign affiliates)**

Dependent variable: Bilateral sales of foreign affiliates	Professional services		Computer services		Telecom services		Financial services		Transport services	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log of distance (km)	-0.329*** (0.037)	-0.327*** (0.037)	-0.104** (0.048)	-0.095** (0.047)	-0.207*** (0.072)	-0.259*** (0.071)	-0.370*** (0.050)	-0.400*** (0.049)	-0.542*** (0.028)	-0.528*** (0.028)
1 for common official of primary language	0.069 (0.068)	0.071 (0.068)	-0.044 (0.088)	-0.038 (0.088)	0.384*** (0.141)	0.358** (0.142)	0.394*** (0.104)	0.366*** (0.103)	-0.316*** (0.077)	-0.319*** (0.077)
1 for pairs in colonial relationship post 1945	0.137 (0.163)	0.144 (0.161)	0.332** (0.133)	0.342** (0.133)	0.314 (0.233)	0.246 (0.237)	-0.672*** (0.219)	-0.751*** (0.220)	0.277** (0.124)	0.299** (0.122)
1 if countries were or are the same country	0.700*** (0.218)	0.706*** (0.218)	3.531*** (0.176)	3.551*** (0.176)	2.663*** (0.276)	2.534*** (0.276)	4.419*** (0.237)	4.349*** (0.235)	-0.198 (0.126)	-0.194 (0.128)
1 for common legal origin	0.415*** (0.055)	0.412*** (0.054)	0.419*** (0.066)	0.411*** (0.066)	0.481*** (0.103)	0.498*** (0.104)	0.066 (0.081)	0.100 (0.079)	0.576*** (0.057)	0.569*** (0.057)
Bindings Index	-0.025 (0.095)		-0.338 (0.219)		1.090*** (0.302)		0.496*** (0.138)		0.226*** (0.046)	
Bindings Index M3		0.008 (0.093)		-0.142 (0.152)		0.325* (0.171)		0.288** (0.128)		0.268*** (0.049)
Number of observations	13 561	13 561	13 008	13 008	13 454	13 454	13 516	13 516	13 531	13 531
R-squared	0.844	0.843	0.929	0.928	0.628	0.625	0.859	0.858	0.710	0.714

Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

### 3. Concluding remarks

Despite differences in the results across sectors and modes of supply, the use of a bilateral index of market access and national treatment commitments in the gravity model confirms that the legal bindings typically found in services trade agreements tend to have a positive impact on exports. The results on the value of commitments are consistent with the analysis done by Ciuriak and Lysenko (2016) and Albert and Tucci (2016) based on the OECD measure of the water in the GATS.

Binding the existing regime is better than having water in commitments and water is still a better outcome than an unbound regime. The results confirm this hierarchy suggested in the literature, to which some empirical support is provided in this paper. In addition, the results suggest that the ratchet provision is meaningful in providing an additional layer of certainty for exporters and more guarantees about the stability of the trade regime with no policy reversal in the case of partial commitments. Binding full commitments offers the highest level of certainty as it prevents the introduction of new trade barriers in an environment which is already the most favourable for foreign suppliers.

The results appear to be robust and can be replicated with different data and different weights for the construction of the bindings indices (see the Annex). Some tests on a potential endogeneity bias also suggest that the results are not explained by a causal relationship going from the importance of bilateral trade to the decision of having ambitious legal bindings. From the results presented, the commitments themselves appear to be producing an effect on trade even if assessing causality is a difficult exercise in econometric work and we have no such proof in the data.

While we have mentioned other studies highlighting that removing the water in services commitments has a positive impact on trade, the novelty in this paper is that commitments in RTAs have been accounted for and even consolidated with GATS commitments (while RTA empirical studies are generally not taking into account the multilateral commitments). Therefore, the paper reinforces previous policy implications with respect to the role of services commitments in the context of the negotiation of bilateral and regional deals.

As no progress has been made in the context of GATS at WTO, most of the additional market access and national treatment commitments in recent years are found in RTAs. The results of this paper indicate that while limited to a few partners, these RTAs have a positive impact on bilateral trade in services (at least in the sectors for which we have identified positive and significant coefficients). Going from the level of commitments observed on average in GATS to the average level in RTAs is associated with a significant positive impact on trade in the range of 8% to 12% depending on the sector.

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## Technical Annex

### Gravity model

The estimates presented in this paper rely on the structural gravity equation, as described by Anderson et al. (2014) in a paper analysing bilateral trade flows in services. It is a theoretically-funded and robust version of the gravity model based on output and expenses (the variables matching gross trade flows) and fully taking into account multilateral resistance terms (correctly accounted for in the empirical analysis through time-varying exporter and importer fixed effects).

The structural gravity model explains bilateral trade at user prices as a function of the expenditures in the importing country and sales in the exporting economy expressed as a share of world output (the frictionless value of trade) and a variable bilateral trade cost affected by trade costs with other partners (the distortion in trade induced by trade frictions costs).

Assuming identical preferences or technologies across countries (i.e. a globally common constant elasticity of substitution  $\sigma^k$  across varieties of services  $k$ ), the structural gravity equation is:

$$X_{ij}^k = \frac{Y_i^k \cdot Y_j^k}{Y^k} \left( \frac{t_{ij}^k}{p_j^k \cdot \Pi_i^k} \right)^{1-\sigma^k} \quad (1)$$

where  $X_{ij}^k$  is the value of exports of service  $k$  from country  $i$  to country  $j$  at destination prices,  $Y_i^k$  the sales of service  $k$  (to all destinations, at destination prices) in country  $i$ ,  $Y_j^k$  the expenditures on service  $k$  in country  $j$  (from all origins), and  $Y^k$  world output of service  $k$  (the sum of all sales/expenditures in all countries).  $t_{ij}^k \geq 1$  is a variable bilateral trade cost between country  $i$  and country  $j$  for service  $k$  but bilateral trade is also affected by trade costs with other partners, summarised in two multilateral resistance terms:

$$(\Pi_i^k)^{1-\sigma^k} = \sum_j \left( \frac{t_{ij}^k}{p_j^k} \right)^{1-\sigma^k} \frac{Y_j^k}{Y^k} \quad (2)$$

$$(p_j^k)^{1-\sigma^k} = \sum_i \left( \frac{t_{ij}^k}{\Pi_i^k} \right)^{1-\sigma^k} \frac{Y_i^k}{Y^k} \quad (3)$$

$\Pi_i^k$  is the outward multilateral resistance and aggregates the incidence of all bilateral trade costs borne by the producers of service  $k$  in country  $i$ .  $p_j^k$  is the inward multilateral resistance and accounts for the incidence of all bilateral trade costs on buyers of service  $k$  in country  $j$ . These two multilateral resistance terms account for the fact that it is relative prices, and thus relative trade costs, that matter for the determination of the global pattern of trade and production.

We cannot observe multilateral resistance but in a panel estimation (adding the time dimension  $t$ ), the two above terms can be absorbed by directional (i.e. exporter and importer) time-varying sectoral fixed effects. These fixed effects are in the same dimension as output and expenditures (two variables difficult to collect for all the countries we have for services sectors) and conveniently absorb the STRI as well (as we do not have values for the STRI before 2014).

The empirical model is the following:

$$X_{ijkt} = e^{[\pi_{ikt} + \chi_{jkt} + \beta_1 \text{BilateralTradeCosts}_{ij} + \beta_2 \text{Commitments}_{ijkt}]} \cdot \varepsilon_{ijkt} \quad (4)$$

where  $X_{ijkt}$  are exports of service  $k$  from country  $i$  to country  $j$  each year  $t$ .  $\pi_{ikt}$  are the time-varying exporter fixed effects accounting for outward multilateral resistance, output in sector  $k$  and any unobservable exporter-specific variable that has an influence on bilateral trade.  $\chi_{jkt}$  are the time-varying importer fixed effects controlling for inward multilateral resistance as well as expenses in sector  $k$  and other unobservable importer-specific variables. As it is common in the gravity literature, the bilateral trade costs (*BilateralTradeCosts<sub>ij</sub>*) are proxied by distance and a set of geographical, historical and political dummy variables (common language, colonial relationship, same country in the past and common legal system). The variable of interest for the analysis is then the bilateral index based on commitments in the GATS and in RTAs. The last term in the equation is the error term,  $\varepsilon_{ijkt}$ , for any measurement error in the dimension of interest of the estimation.

An even stricter version of equation (4) would introduce pair time-invariant fixed effects. Some results are preserved when doing so but it should be pointed out that the index used for commitments is often not varying over time. For countries that have not signed a bilateral agreement, the index takes the value of GATS commitments and since GATS entered into force for most countries in 1995 before the start of the period covered by the data, there is no variation for too many pairs in the panel, thus introducing some collinearity between the pair fixed effects and the commitments indices. The same happens for agreements that have entered into force before 2000 and for which there is no change in the index over time.

Equation (4) is the multiplicative form of the gravity equation used for an estimation with the Poisson Pseudo-Maximum Likelihood (PPML) estimator. Trade flows are not logged and zeroes in the dataset are preserved. The PPML estimator also controls for heteroskedasticity in the gravity data (Santos Silva and Teneyro, 2006). Robust standard errors are used since no pair fixed effects are included.

### Data sources

The cross-border trade flows for 2000-2014 are sourced from OECD and UN Comtrade and are balance of payments data. Table A1 provides the list of aggregate sectors used in the analysis and their correspondence with the STRI on the one hand and with Ebops categories in the balance of payment. Exports are combined with mirror imports to increase the coverage of the dataset. The data are cleaned the same way they are in the context of the Trade in Value-Added (TiVA) project but do not include any estimate. Table A1 also provides information on more disaggregated sectors that are used in regressions for robustness checks (Table A7).

The bilateral distance variable is the inter-city and population-weighted distance from CEPII. Variables for common language, colonial relationship, being or having been the same country and sharing the same legal system are also sourced from CEPII (Mayer and Zignago, 2011).

As the empirical strategy relies on fixed effects for output and expenses in each service sector, no additional data are required for the estimation.

For the estimation based on alternative cross-border trade data (Table A6), a different source is used for bilateral trade flows. The data come from TiVA. With respect to mode 3, the data are the ones constructed in the context of the OECD analytical AMNE database, based on the full matrix of sales of foreign affiliates sales created for the project. It should be noted that these data include many estimates and that the level of aggregation is higher, with less of a match for some sectors, such as professional services which are proxied with data on all ‘other business services’.

Table A1. List of sectors covered

Sector	STRI	W/120	Trade data	FATS data
1. Professional services	Legal, accounting, architecture and engineering services	Legal services (1.A.a), Accounting, auditing and bookkeeping services (1.A.b), Architectural services (1.A.d), Engineering services (1.A.e)	Ebops 2002: 274, 280 Ebops 2010: SJ21, SJ31	C73T74
2. Computer services	Computer services	Computer and related services (1.B)	Ebops 2002: 263 Ebops 2010: SI2	C72
3. Telecoms services	Telecommunication services	Telecommunication services (2.C)	Ebops 2002: 247 Ebops 2010: SI1	C64
4. Financial services	Commercial banking, insurance	All insurance and insurance-related services (7.A), Banking and other financial services (7.B.a to 7.B.e)	Ebops 2002: 253, 260 Ebops 2010: SF, SG	C65T67
5. Transport services	Air transport, maritime transport, rail freight, road freight, logistics	Maritime transport services (11.A), Air transport services (11.C), Rail transport services (11.E), Road transport services (11.F), Services auxiliary to all modes of transport (11.H)	Ebops 2002: 205 Ebops 2010: SC	C60T63
More disaggregated sectors				
1.a Legal & accounting	Legal, accounting	Legal services (1.A.a), Accounting, auditing and Bookkeeping services (1.A.b).	Ebops 2002: 274 Ebops 2010: SJ21	
1.b Architecture & engineering	Architecture, engineering services	Architectural services (1.A.d), Engineering services (1.A.e).	Ebops 2002: 280 Ebops 2010: SJ31	
4.a Insurance services	Insurance	All insurance and insurance-related services (7.A).	Ebops 2002: 253 Ebops 2010: SF	
4.b Financial services (excl. insurance)	Commercial banking	Banking and other financial services (7.B.a to 7.B.e).	Ebops 2002: 260 Ebops 2010: SG	
5.a Land transport	Rail freight, road freight	Rail transport services (11.E), Road transport services (11.F).	Ebops 2002: 219, 223 Ebops 2010: SC3B, SC3C	
5.b Sea transport	Maritime transport	Maritime transport services (11.A).	Ebops 2002: 206, 227 Ebops 2010: SC1, SC3D	
5.c Air transport	Air transport	Air transport services (11.C).	Ebops 2002: 210, 218 Ebops 2010: SC2, SC3A	
5.d Auxiliary transport services	Logistics	Services auxiliary to all modes of transport (11.H).	Ebops 2002: 232 Ebops 2010: SC3G	

Finally, the indices on bilateral commitments are the ones described in Section 1. They are constructed by the OECD Secretariat through a comparison of the STRI information with provisions and schedules of commitments in trade agreements (RTAs and the GATS). Individual commitments by mode of supply and type of discipline (market access or national treatment) are first scored according to the categories described in Table 2 and aggregated across sub-sectors with a simple mean. Then the weighting scheme from Table 3 is applied to market access, national treatment and the different modes of supply. Separate agreements, such as GATS and potentially several RTAs applying to the same partners, have a different score for market access and national treatment in the four modes of supply. The highest value is kept before the aggregation into a single index for each country pair. This is how the consolidation is obtained, assuming that exporters will benefit from the highest level of bindings found in GATS or RTAs.

Table A2 provides summary statistics for all the variables in the gravity model and Table A3 a correlation matrix for the indices of commitments.



**Table A2. Summary statistics for the variables in gravity regressions**

	Number of observations	Mean	Standard deviation	Minimum	Maximum
Exports (USD million)	68 576	118.652	610.545	0	32 356
Foreign affiliate sales (USD million)	68 040	417.968	2944.182	0	133 973
Bilateral weighted distance (km)	99 042	7505.519	4390.263	114.6	19 539.5
1 for common official of primary language	99 042	0.071	0.257	0	1
1 for pairs in colonial relationship post 1945	99 042	0.016	0.127	0	1
1 if countries were or are the same country	99 042	0.005	0.073	0	1
1 for common legal origin	99 042	0.203	0.402	0	1
Bindings level index	99 042	47.200	28.717	1	100
Bindings level index M1	99 042	53.433	36.441	1	100
Bindings level index M2	99 042	60.661	36.862	1	100
Bindings level index M2	99 042	46.358	29.738	1	100
Bindings level index M4	99 042	26.384	22.069	1	100

**Table A3. Correlation matrix for the bilateral commitments indices**

	Bindings	Bindings M1	Bindings M2	Bindings M3	Bindings M4
Bindings	1.00				
Bindings M1	0.95	1.00			
Bindings M2	0.92	0.93	1.00		
Bindings M3	0.93	0.81	0.79	1.00	
Bindings M4	0.71	0.56	0.53	0.67	1.00

***Countries and trade agreements covered in the analysis***

In terms of countries, the analysis of commitments is limited to the 44 countries for which there is a STRI (Table A4). But exports from all origin are included in the dataset, thus covering a higher number of bilateral pairs. When there is a RTA between two countries, the index tested in the empirical analysis reflects the commitments of the importing economy. If the two countries are not part of a RTA, the index has the value of GATS commitments or a value of one (the smallest value) if the partner is not a WTO Member.

All intra-EU trade flows are excluded from the analysis as for services the Single Market introduces a highly preferential regime among EU countries and not just legal bindings. In addition, these intra-EU trade flows would represent more than half of the observations in the dataset and bias the results. Since only 23 EU economies are included in the STRI, extra-regional imports from other EU economies are also dropped from the dataset. All commitments for the European Union are analysed at the level of Member states, each of them having a separate STRI.

**Table A4. Countries included in the OECD STRI**

Australia	Greece	New Zealand
Austria	Hungary	Norway
Belgium	Iceland	Poland
Brazil	India	Portugal
Canada	Indonesia	Russian Federation
Chile	Ireland	Slovak Republic
China	Israel	Slovenia
Colombia	Italy	South Africa
Costa Rica	Japan	Spain
Czech Republic	Korea	Sweden
Denmark	Latvia	Switzerland
Estonia	Lithuania	Turkey
Finland	Luxembourg	United Kingdom
France	Mexico	United States
Germany	Netherlands	

The RTA database covers all agreements in force in 2014 notified to the WTO where there is at least one party with a STRI. Table A5 provides the list of the 95 RTAs concerned. For the entry into force, the date corresponds to the entry into force of the services provisions (which is in some cases different from the provisions on trade in goods). For the year 2014, the agreements have to be in force before the 1 July. The information comes from the WTO RTA database (RTA-IS).

For Mexico and its Central American partners (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua), we take into account the bilateral agreements that are now inactive with the entry into force of the Mexico-Central America FTA in 2012. Although not listed in Table A5, we have included in the analysis: Mexico-Costa Rica (1995), Mexico-Nicaragua (1998) and Mexico-Northern Triangle with El Salvador, Guatemala and Honduras (2001). For EU Members before their accession, we follow the rule of the exclusion of intra-EU trade flows to have a consistent panel over years. Therefore, we have not analysed the agreements between the European Union and Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia, that are also listed as ‘inactive’ in the WTO database. But we kept Croatia and took into account the EU-Croatia Stabilisation and Association Agreement as the accession of Croatia was in 2013 and the country was outside the European Union for all years but one in the period covered.

**Table A5. RTAs included in the analysis**

Agreement	Date of entry into force (services)	Agreement	Date of entry into force (services)
ASEAN - Australia - New Zealand	01-01-2010	European Free Trade Association (EFTA)	01-06-2002
ASEAN - China	01-07-2007	Hong Kong, China - New Zealand	01-01-2011
ASEAN - Korea, Republic of	01-05-2009	India - Japan	01-08-2011
Australia - Chile	06-03-2009	India - Malaysia	01-07-2011
Australia - New Zealand (ANZCERTA)	01-01-1989	India - Singapore	01-08-2005

Agreement	Date of entry into force (services)	Agreement	Date of entry into force (services)
Brunei Darussalam - Japan	31-07-2008	Japan - Indonesia	01-07-2008
Canada - Chile	05-07-1997	Japan - Malaysia	13-07-2006
Canada - Colombia	15-08-2011	Japan - Mexico	01-04-2005
Canada - Panama	01-04-2013	Japan - Peru	01-03-2012
Canada - Peru	01-08-2009	Japan - Philippines	11-12-2008
Chile - China	01-08-2010	Japan - Singapore	30-11-2002
Chile - Colombia	08-05-2009	Japan - Switzerland	01-09-2009
Chile - Costa Rica (Chile - Central America)	15-02-2002	Japan - Thailand	01-11-2007
Chile - El Salvador (Chile - Central America)	01-06-2002	Japan - Viet Nam	01-10-2009
Chile - Guatemala (Chile - Central America)	23-03-2010	Korea, Republic of - Chile	01-04-2004
Chile - Honduras (Chile - Central America)	19-07-2008	Korea, Republic of - India	01-01-2010
Chile - Japan	03-09-2007	Korea, Republic of - Singapore	02-03-2006
Chile - Mexico	01-08-1999	Korea, Republic of - US	15-03-2012
Chile - Nicaragua (Chile - Central America)	19-10-2012	Malaysia - Australia	01-01-2013
China - Costa Rica	01-08-2011	Mexico - Central America	01-09-2012
China - Hong Kong, China	29-06-2003	Mexico - Uruguay	15-07-2004
China - Macao, China	17-10-2003	New Zealand - Chinese Taipei	01-12-2013
China - New Zealand	01-10-2008	New Zealand - Malaysia	01-08-2010
China - Singapore	01-01-2009	New Zealand - Singapore	01-01-2001
Colombia - Mexico	01-01-1995	North American Free Trade Agreement (NAFTA)	01-01-1994
Colombia - Northern Triangle (El Salvador, Guatemala, Honduras)	12-11-2009	Pakistan - China	10-10-2009
Costa Rica - Peru	05-06-2013	Panama - Chile	07-03-2008
Costa Rica - Singapore	16-09-2013	Panama - Costa Rica (Panama - Central America)	23-11-2008
Dominican Republic - Central America	04-10-2001	Peru - Chile	01-03-2009
CAFTA-DR	01-03-2006	Peru - China	01-03-2010
EFTA - Chile	01-12-2004	Peru - Korea, Republic of	01-08-2011
EFTA - Colombia	01-07-2011	Peru - Mexico	01-02-2012
EFTA - Hong Kong, China	01-10-2012	Singapore - Australia	28-07-2003
EFTA - Korea, Republic of	01-09-2006	Southern Common Market (MERCOSUR)	07-12-2005
EFTA - Mexico	01-07-2001	Thailand - Australia	01-01-2005
EFTA - Singapore	01-01-2003	Thailand - New Zealand	01-07-2005
EFTA - Ukraine	01-06-2012	Trans-Pacific Strategic Economic Partnership	28-05-2006
EU - Albania	01-04-2009	US - Australia	01-01-2005
EU - CARIFORUM States EPA	01-11-2008	US - Bahrain	01-08-2006
EU - Central America	01-08-2013	US - Chile	01-01-2004
EU - Chile	01-03-2005	US - Colombia	15-05-2012
EU - Colombia and Peru	01-03-2013	US - Jordan	17-12-2001
EU - Former Yugoslav Republic of Macedonia	01-04-2004	US - Morocco	01-01-2006
EU - Korea, Republic of	01-07-2011	US - Oman	01-01-2009
EU - Mexico	01-10-2000	US - Panama	31-10-2012
EU - Montenegro	01-05-2010	US - Peru	01-02-2009
EU - Serbia	01-09-2013	US - Singapore	01-01-2004
European Economic Area (EEA)	01-01-1994		

**Alternative cross-border trade dataset: TiVA data**

As part of TiVA we have a full matrix of bilateral trade in services for 63 economies and 34 industries. The advantage of this dataset is that there is no missing flow. But it comes with a price, which is that many data are estimated, partly with the gravity model. However, the resulting trade flows are more influenced by the way the Inter-Country Input-Output (ICIO) table is created and the balancing methodology. Working with a different dataset is interesting to check the robustness of previous results. But one should keep in mind that the TiVA data rely on estimates and we should trust relatively less the results.

Table A6 confirms the results of the main regressions for commitments in professional services, with a coefficient of similar size. For computer services, a positive and significant coefficient is found. It suggests that the countries in the sample or the quality of the trade data influence the results for this sector. But it is useful to have regressions with these alternative data to highlight that for computer services as well, binding commitments might have some value.

For telecoms services, the TiVA dataset does not offer data disaggregated enough. Telecoms services are merged with postal services. As a consequence, the negative and significant sign found in the regression in Table A6 cannot really be interpreted as contradicting previous results since postal services (or courier services) have very different regulations and commitments in trade agreements as compared to telecoms services. For financial services, the coefficient is no longer significant. There are important conceptual differences between trade in financial services measured in balance of payments data and in TiVA (using national accounts), related in particular to Financial Intermediation Services Indirectly Measured (FISIM). It could explain the different outcome in the regression.

Finally, transport services now have a significant coefficient. Its size is close to the one in Table 5 which was not significant and rather small. Therefore, we can confirm that for transport services the impact of market access and national treatment commitments is weaker, at least at the aggregate level.

**Table A6. Regressions with TiVA cross-border trade data**

Dependent variable: bilateral exports by sector	Professional services (1)	Computer services (2)	Post and telecoms (3)	Financial services (4)	Transport services (5)
Log of distance (km)	-0.736*** (0.029)	-1.046*** (0.031)	-1.218*** (0.028)	-0.559*** (0.026)	-0.871*** (0.012)
1 for common official of primary language	0.017 (0.054)	0.085 (0.080)	0.158*** (0.052)	0.630*** (0.060)	0.151*** (0.031)
1 for pairs in colonial relationship post 1945	0.273*** (0.088)	-1.308*** (0.115)	0.132 (0.138)	0.073 (0.111)	-0.403*** (0.052)
1 if countries were or are the same country	-0.604*** (0.100)	0.460** (0.215)	-0.373*** (0.134)	0.202* (0.106)	0.002 (0.081)
1 for common legal origin	0.217*** (0.038)	0.027 (0.058)	0.370*** (0.041)	-0.223*** (0.045)	0.153*** (0.021)
Bindings level index	0.167*** (0.057)	0.137** (0.065)	-0.293*** (0.089)	0.002 (0.082)	0.055*** (0.013)
Number of observations	30,358	30,358	30,358	30,358	30,358
R-squared	0.834	0.774	0.721	0.913	0.842

Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\* p<0.01; \*\* p<0.05; \* p<0.1.

**Alternative cross-border trade dataset: More disaggregated sectors with BOP data**

For some of the aggregate sectors presented in Table A1, we have more disaggregated data in balance of payment statistics. We are not using them because their quality is generally lower. Either there are fewer observations or these observations do not sum to the total figure for the more aggregated sector. Table A7 shows the regression results with the most disaggregated trade data we have that match the STRI sectors.

In Table A7, we can see that for professional services only the ‘legal and accounting services’ have a positive and significant coefficient for the index of bindings. In the case of financial services, both insurance and commercial banking have a positive and significant coefficient. When it comes to transport services, land transport has a positive and significant coefficient, but for other disaggregated sectors (sea, air and auxiliary transport services) it is not the case. The heterogeneity across transport sectors can explain why the aggregate transport services sector had low coefficients or non-significant coefficients for the bindings index in previous regressions.

**Table A7. Regressions with more disaggregated sectors (BOP data)**

Dependent variable: bilateral exports by sector	Professional services		Financials services		Transport services			
	Legal & accounting	Architecture & engineering	Insurance	Commercial banking	Land transport	Sea transport	Air transport	Auxiliary transport services
	(1)	(2)	(5)	(6)	(7)	(8)	(9)	(10)
Log of distance (km)	-0.609*** (0.030)	-1.008*** (0.038)	-0.471*** (0.052)	-0.783*** (0.030)	-1.128*** (0.083)	0.109 (0.090)	- 1.348*** (0.173)	-1.227*** (0.112)
1 for common official of primary language	-0.075 (0.065)	-0.020 (0.079)	0.177 (0.119)	0.577*** (0.062)	-0.242** (0.103)	0.199** (0.087)	- 0.175*** (0.068)	-1.720*** (0.140)
1 for pairs in colonial relationship post 1945	0.417*** (0.080)	0.695*** (0.155)	-0.262 (0.184)	0.208 (0.129)	1.273*** (0.113)	0.030 (0.115)	0.161* (0.090)	1.243*** (0.228)
1 if countries were or are the same country	1.645*** (0.131)	1.068*** (0.162)	1.795*** (0.188)	-0.553*** (0.199)	-0.130 (0.234)	2.299*** (0.325)	-0.381 (0.274)	0.256 (0.297)
1 for common legal origin	0.536*** (0.039)	0.262*** (0.046)	0.032 (0.095)	-0.318*** (0.056)	0.617*** (0.059)	0.133*** (0.046)	0.519*** (0.037)	0.707*** (0.069)
Bindings level index	0.220*** (0.072)	-0.166 (0.111)	0.605*** (0.107)	0.608*** (0.082)	0.138** (0.057)	0.155 (0.154)	0.015 (0.084)	-0.060 (0.061)
Number of observations	12 645	12 973	16 396	16 476	11 058	10 042	9 197	9 799
R-squared	0.977	0.888	0.983	0.957	0.747	0.828	0.916	0.818

Note: Robust standard errors are in parenthesis. The stars denote the statistical significance percentage level: \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ .

**Robustness check: Equal weights for the index of bindings**

In Section 1, it has been emphasised that the weighting scheme for market access versus national treatment commitments and for the different modes of supply, is not so important to explain the results. As an additional robustness check, we run regressions with an index calculated with equal weights for market access, national treatment and for the four modes of supply. Table A8 confirms

that the results are very similar when using this other index and that the weighting scheme is not decisive in the conclusions of the paper.

**Table A8. Regressions with equal weights for the bindings index**

Dependent variable: Bilateral exports by sector	Professional services (1)	Computer services (2)	Telecoms services (3)	Financial services (4)	Transport services (5)
Log of distance (km)	-0.708*** (0.033)	-0.665*** (0.041)	-1.893*** (0.169)	-0.545*** (0.038)	-0.649*** (0.015)
1 for common official of primary language	-0.145** (0.061)	-0.135 (0.125)	-1.639*** (0.310)	-0.006 (0.085)	0.157*** (0.033)
1 for pairs in colonial relationship post 1945	0.309** (0.122)	-0.315 (0.200)	3.916*** (0.657)	0.316** (0.129)	-0.153** (0.065)
1 if countries were or are the same country	0.759*** (0.167)	2.249*** (0.232)	-0.781** (0.388)	0.591*** (0.148)	0.197*** (0.054)
1 for common legal origin	0.508*** (0.037)	0.427*** (0.068)	0.808*** (0.208)	0.123* (0.063)	0.140*** (0.025)
Bindings level index	0.321*** (0.076)	0.106 (0.077)	1.236*** (0.237)	0.711*** (0.088)	0.021 (0.020)
Number of observations	11 368	11 571	9 033	14 907	20 329
R-squared	0.971	0.876	0.989	0.975	0.866

### ***Robustness check: Endogeneity***

A well-known issue when doing gravity regressions with RTA variables is the endogeneity between trade flows and the decision of countries to form a RTA. Countries that have higher services trade flows and a closer economic relationship are more likely to sign a RTA.

First, it should be emphasised that our dataset is different as it does not include *per se* a RTA variable and has consolidated the commitments in GATS and in RTAs. We do not have a variable taking a value of zero in the years preceding the entry into force of the RTA and then a positive value after. If we leave aside the case of the few countries that are not WTO Members (and for which we generally do not have the trade data), most countries in the dataset are moving from a GATS regime for trade in services to a RTA regime with additional commitments.

But still, there could be some endogeneity – although less pronounced than in datasets only focusing on the RTA effect-. This is why in Table A9 we run a regression with only the bilateral pairs in a RTA for the whole period or in GATS for the whole period (a smaller number of country pairs by definition). This regression can show that the coefficients we obtain are not the result of a change in the trade regime from GATS to a preferential trade agreement that would have been negotiated because of the higher trade flows. The results in Table A9 are similar to the main regressions in Table 5 and even more significant in the case of computer services and transport services.

Table A9. Test for the endogeneity of results

Dependent variable: Bilateral exports by sector	Professional services	Computer services	Telecoms services	Financial services	Transport services
	(1)	(2)	(3)	(4)	(5)
Log of distance (km)	-0.699*** (0.032)	-0.637*** (0.049)	-1.828*** (0.299)	-0.356*** (0.044)	-0.614*** (0.015)
1 for common official of primary language	-0.165*** (0.062)	-0.214 (0.136)	-1.893*** (0.346)	0.030 (0.092)	0.223*** (0.038)
1 for pairs in colonial relationship post 1945	0.026 (0.094)	-0.428** (0.188)	6.613*** (0.535)	0.510*** (0.118)	-0.248*** (0.067)
1 if countries were or are the same country	3.838*** (0.219)	3.683*** (0.504)	-2.472*** (0.757)	4.976*** (0.415)	3.267*** (0.299)
1 for common legal origin	0.503*** (0.039)	0.484*** (0.078)	0.886*** (0.285)	0.304*** (0.075)	0.094*** (0.028)
Bindings level index	0.355*** (0.107)	0.343* (0.179)	4.471*** (1.435)	1.071*** (0.098)	0.045* (0.026)
Number of observations	7 964	6 837	3 796	9 207	14 616
R-squared	0.978	0.890	0.993	0.985	0.895