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Erik van der Marel, London School of Economics.

Ben Shepherd, Principal.

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developing trade consultants
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349 5th Avenue
New York, NY 10016
Ben@Developing-Trade.com

Services Trade, Regulation, and Regional Integration: Evidence from Sectoral Data

Erik van der Marel[1] and Ben Shepherd[2, 3]

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Abstract: We use new World Bank Services Trade Restrictiveness Indices (STRIs) to measure the impact of regulation on cross-border services trade at the sectoral level. We find that policy barriers as measured by the overall STRI for each sector have a negative and significant effect on total services trade, as well as trade in business and financial services. The effect in other sectors is not statistically significant. However, disaggregating the policy data by mode produces stronger results: policy restrictiveness negatively impacts trade in all sectors except wholesale and retail trade. There is thus considerable evidence of cross-sectoral heterogeneity in the impact of regulations. In addition, we find evidence of cross-modal substitution in total services trade, but complementarity in business, financial, and insurance services. Finally, we find that regional trade agreements tend to promote trade overall and in business and financial services; however, the effect seems to be primarily driven by the impact of the European Union.

JEL Codes: F13; F15.

Keywords: Trade in services; Non-tariff measures; Regional integration.

[1] Fellow at the London School of Economics; e.l.van-der-marel@lse.ac.uk, and Research Fellow, Groupe d'Économie Mondiale (GEM), Sciences-Po Paris.

[2] Principal, Developing Trade Consultants Ltd; Ben@Developing-Trade.com.

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1. Introduction

World trade in services has increased substantially during the last two decades. Especially since 2001-2002, world services trade has expanded with an annual average growth rate of 10.7% against a similar growth rate of 6.6% for the period 1990 to 1999. There is little doubt that declining entry barriers and regulation-related costs, as well as the increased use of information and communication technology, have helped to expand the scope of this trade. At the same time, starting from around 2001 the number of regional trade agreements (RTAs) with a services component has started to increase (Figure 1), with a consequent impact on the barriers faced by services firms looking to do business abroad.

Two types of regulations need to be addressed when liberalizing services trade or negotiating services agreements. First are economy-wide regulations that are important for the whole domestic economy, which also affect the total amount of services trade. However, services are heterogeneous in nature, and as a result sector-specific regulations are at least as important from a trade perspective. Both types of regulations are comprised of many sub-levels of regulation with each of them having different effects on services trade. In principle, all these types of regulation are being negotiated in RTAs to facilitate special access to services imports and exports. Yet, RTA negotiations need to be "deep" as well as sectorally broad in order to make meaningful trade contributions.

Against this background, this paper addresses the question of the extent to which regulation and regional integration in services constitute drivers of bilateral services trade. We assess this question by focusing on detailed regulations at the sector level that affect sector-specific services trade. We also include measures of trade promotion of RTAs. This allows us to evaluate what types of regulation for which services sectors drive trade expansion, and whether or not negotiated RTAs play a contributing role in that process.

Our paper makes three specific contributions relative to the existing literature. First, we map newly available policy data from the World Bank's Services Trade Restrictiveness Database (Borchert et al., 2012a; and Borchert et al., 2012b) to sector-specific services trade flows using six different services sectors for which sufficient data are available. Most work on services trade flows using gravity as an empirical framework does not use any sectoral disaggregation, or work with policy variables that are developed at the sectoral level. Indeed, this is the first paper to apply the new World Bank policy data in a gravity setting. Second, this paper uses new data on cross-border services trade developed by Francois et al. (2009), and which have been collected from many different data sources. Availability of services trade data remains a significant constraint for researchers, but this new database—which is relatively unexploited in the literature—significantly improves country and sector coverage.

The paper by Kox and Nordas (2007) is closest to our line of research, but those authors only analyze how domestic regulation affecting total costs has an impact on trade in business services and financial services. It is not clear to what extent more detailed regulatory factors affect trade flows by way of separating restrictions according to GATS mode of supply (cross-border trade versus sales of foreign affiliates), or the ways in which other sectors are affected, such as transport, insurance, or telecommunication services. The empirical services trade literature on RTAs using gravity is even scarcer, although Marchetti (2009) finds in a cross-section of countries that for total services, the trade effect of RTAs is not any different from deep integration initiatives such as the EU.

The paper proceeds as follows. The next section reviews the existing gravity literature on services trade, focusing on policy variables, sectoral disaggregation, and regional integration. Section 3 presents our empirical strategy and data, and provides some preliminary evidence on the links between regulation and trade. Section 4 discusses the results of our analysis and, finally, the last section concludes, discusses policy implications, and presents directions for future research.

2. Literature Review

There remains a split in the services literature between contributions dealing with regulatory policy indicators on the one hand, and those dealing with regional integration on the other. To date no work has tried to connect these two strands of the literature. Moreover, work that has estimated the impact of regulatory variables on services trade focuses only on aggregate flows, thus obscuring the possibility of significant cross-sectoral heterogeneity in the responsiveness of trade flows to policy.

Earlier work that has analyzed services trade flows using a gravity framework has shown that standard variables from the goods literature also generally apply to aggregate services trade, albeit with some differences in coefficients and variable significance.[4] However, empirical techniques vary considerably across papers; the earlier work, in particular, does not tend to incorporate theory-based gravity model specifications, such as the one developed by Anderson and Van Wincoop (2003).

Sector specific analyses using gravity are uncommon in the services literature, and tend only to cover a small number of sectors. Kox and Nordas (2009), for instance, look at transport and business services, and their interaction with an overall regulatory indicator. Other contributions, such as Kox and Nordas (2007), include financial services and other business services. A study by Francois et al. (2007) also only covers some sectors such as transport services, producer services, other business services, and other non-trade services. Fink (2009) has by far the most sectoral detail, but the model only includes data for European countries combined with basic gravity variables. Some studies (e.g. Kox et al., 2005; Schwellnus, 2007; Lennon, 2009; and Head et al., 2009) only choose as an alternative to total services trade the category of other commercial services: this classification

[4] Examples include: Francois (1993); Freund and Weinhold (2002); Grünfeld and Moxnes (2003); Kimura and Lee (2004); Lennon (2008); Kox and Nordas (2007); Schwellnus (2007); and Walsh (2004). Differences between services and goods are notably found in distance, language and contiguity.

excludes specific producer services such as transport, but is so broad that it still masks possible heterogeneity among, for example, finance, and wholesale/retail trade services.

Aggregation is also a notable feature of previous work when it comes to the use of policy variables. Even Kox et al. (2009) and Schwellnus (2007), who use some level of sectoral disaggregation, only use the OECD's Product Market Regulation (PMR) indicator as an economy-wide indicator of policy barriers. In fact, the PMR database encompasses many different sub-level indicators such as state control, barriers to enterprise, and barriers to trade and investment. Kox and Lejour (2006) use the more disaggregated sub-levels of this indicator in a cross-sectional setting for other commercial services, but with mixed results. Francois et al. (2007) use three higher level indicators for their different categories of services sectors, and find that barriers to entrepreneurship form the most important barrier to services imports, especially for producer and other business services. However, more sector-specific analysis remains unexplored in their study and the authors call for more in-depth analysis using regulatory policy indicators.

In a similar manner, Kox and Nordas (2007) estimate total costs of entering and servicing a market within the OECD area by collecting various economy-wide regulatory policy variables. Their analysis includes a detailed list of general policies. At the extensive margin, they find that for both total and other business services, trade regulation matters for both the importer and exporter sides. At the intensive margin, business services trade is more sensitive to economy-wide regulatory restrictions than total services trade.

Our work builds on and extends this area of research in several ways. First, we include detailed sector-level services trade data along with new data from the World Bank on regulatory policy. Second, we exploit the richness of the new World Bank policy data by examining the impact of policy restrictions affecting Mode 1 directly but also Mode 3. We are therefore able to analyze the

potential for cross-model substitution or complementarity in a way that has not been possible in the previous gravity model literature.

The second strand of research that we develop in the paper deals with the impact of regional integration on services trade flows. We include a variable that measures the extent of regional services integration in our country sample. Our motivation for doing so comes from Miroudot et al. (2010), who find that trade costs are usually higher in services than in goods, but that RTAs with a services component tend to result in lower trade costs for members and third parties alike. The reason may lie in the nature of regulatory barriers to services trade, which are often applied universally. Thus, even regional reforms tend to be applied in a way that is relatively non-discriminatory compared with the situation in goods markets.

Recent studies on services trade in the regional context (e.g. Marchetti, 2009; Shingal, 2010; and Guillin, 2010) tend to include an RTA dummy for total services trade flows, and find that it has a positive and statistically significant coefficient. Francois and Hoekman (2009) also examine the possibility of trade diversion, and conclude that at the sector level trade diversion takes place for business and ICT services within the EU bloc. However, Hornok (2012) has recently highlighted the identification difficulties inherent in including dummies for both intra- and extra-bloc trade in a cross-sectional model, and so we limit the analysis here to intra-bloc trade, but focus again on the sectoral level.

Studies that include an EU dummy as one example of an RTA are more common. Examples include Park (2002), Walsh (2006), Kox and Nordas (2007; 2009), Francois and Hoekman (2009), and van der Marel (2011). Results have been mixed, however. Fink (2009) goes furthest in detail, and finds that most services sectors exhibit a significant EU15 effect, except travel, transport, and financial and

insurance services.[5] However, the results of most regional integration dummies in services are largely dependent on what type of fixed effects, data, and estimation techniques are used. We re-address this question below in the context of a model that includes both an RTA dummy and an EU dummy, in order to see whether the EU has greater trade effects than other RTAs.

3. Methodology and Data

3.1 Gravity Model Specification

As in much of the empirical trade literature for both goods and services, our starting point for the analysis is the standard theory-based gravity model of Anderson and van Wincoop (2003; 2004). It takes the following form:

$$(1)\ \log\left(X_{ij}^{k}\right) = \log\left(E_j^k\right) + \log\left(Y_i^k\right) - \log\left(Y^k\right) + (1-s)\log\left(t_{ij}^k\right) - (1-s)\log\left(P_j^k\right) - (1-s)\log\left(\Pi_i^k\right) + e_{ij}^k$$

where X_{ij}^k is exports from economy *i* to economy *j* in sector *k*; E_j^k is sectoral expenditure; Y_i^k is sectoral production; $Y^k = \sum_i Y_i^k$ (world output); t_{ij}^k is bilateral trade costs; *s* is the intra-sectoral elasticity of substitution (between varieties within a sector); and e_{ij}^k is a random error term satisfying standard assumptions. The P_j^k and Π_i^k terms represent multilateral resistance, which means that trade patterns are determined by the level of bilateral trade costs relative to trade costs elsewhere in the world. Inward multilateral resistance $(P_j^k)^{(1-s)} = \sum_{i=1}^{N}\left(\Pi_i^k\right)^{(s-1)} w_i\left(t_{ij}^k\right)^{(1-s)}$ captures the dependence of economy *j*'s imports on trade costs across all suppliers. Outward multilateral resistance $(\Pi_i^k)^{(1-s)} = \sum_{i=1}^{N}\left(P_j^k\right)^{(s-1)} w_j\left(t_{ij}^k\right)^{(1-s)}$ captures the dependence of economy *i*'s

[5] There are also several in-depth studies that analyze the general effect of European market integration for specific services, such as Cummings and Rubio-Misas (2006) for the insurance sector, or Maijoor et al. (1998) for auditing. Lejour and de Paiva Verheyden (2004), as well as Kox and Lejour (2006), search for a general trade effect within the EU.

exports on trade costs across all destination markets. The *w* terms in both these equations are weights equivalent to each economy's share in global output or expenditure.

Empirical work based on equation (1) usually accounts for multilateral resistance as well as the expenditure and production terms using fixed effects by exporter and by importer (Anderson and Van Wincoop, 2003). That is the approach we adopt here, which gives:

$$(2)\ \log\left(X_{ij}^{k}\right) = \mathrm{c} + \sum_{\mathrm{i}} \mathrm{f}_{\mathrm{i}}^{\mathrm{k}} + \sum_{\mathrm{j}} \mathrm{f}_{\mathrm{j}}^{\mathrm{k}} + (1-s)\log\left(t_{ij}^{k}\right) + e_{ij}^{k}$$

with $c = -\log\left(Y_t^k\right)$ as the regression constant, and the f terms representing full sets of exporter and importer fixed effects.

The final part of the gravity model is the trade costs function t. Our specification of this cost function is presented in equation (3) and includes a new World Bank Services Trade Restrictiveness Index (STRI), transformed so as to vary dyadically:

$$(3)\ \log\left(t_{ij}^{k}\right) = b_1 \mathrm{STRI}_{\mathrm{ij}}^{k} + b_2 RTA_{ij} + b_3 \log\left(Dist_{ij}\right) + b_4 Contig_{ij} + b_5 Colony_{ij} + b_6 Language_{ij}$$

Using a dyadic version of the STRI is important, because it allows for the possibility that regulations in the exporter, as well as in the importer, affect trade flows. This possibility has been alluded to in the previous literature discussed above (e.g., Lennon et al., 2009). To account for regional trade integration forces in services we use a dummy variable equal to unity when both members of a country pair belong to the same RTA (RTA_{ij}). This is to capture the average effect of being in an RTA, which includes other discriminatory measures in addition to the STRI index. Finally, we include standard trade costs proxies from the gravity model literature, to take account of "natural" trade costs. We include international distance, as well as dummy variables for countries that share a common border, common colonial heritage, or common language.

To estimate the model we substitute equation (3) into equation (2) and enter the fixed effects as dummy variables. We then estimate the model by Poisson quasi-maximum likelihood to deal with the combined effects of heteroskedasticity and log-linearization (Santos Silva and Tenreyro, 2006).

As in any gravity model, observations with zero trade are an issue in this one. Using a GTAP sectoral aggregation scheme, 17,444 observations out of a total of 29,151 for exports are equal to zero. Standard practice in the goods literature is to substitute zeros for missing observations, and to include recorded and inferred zeros as part of the estimation sample. However, we adopt a different approach here. We limit the sample to observations with strictly positive trade flows for the reason that services trade data are notorious for the poor quality of reporting, particularly in developing countries. It is therefore highly likely that some of the zeros represent missing data for non-zero flows, rather than genuine zero observations. This point is particularly true in relation to bilaterally and sectorally disaggregated data: many countries produce data on total services trade with the rest of the world, but do not produce it at the sectoral level, or disaggregated by partner country. Apparent zeros might therefore be masking actual economic activity in this case, and it is more prudent to drop them from the sample.

3.2 Data Sources and Description

The dependant variable (cross-border services exports) comes from the Trade in Services Database (Francois et al., 2009).[6] This dataset combines primary data from various sources such as the OECD, Eurostat, and IMF Balance of Payments statistics, and uses mirroring techniques to produce the most complete dataset currently available on bilateral services trade. It uses a sectoral disaggregation that

[6] The Francois et al. (2009) dataset also includes FDI data in services sectors as a proxy for mode 3 trade. However, we do not exploit these data for two reasons. The first is that FDI data are often unreliable, particularly at a sectoral level. The second is that they are a poor proxy for mode 3 trade, which is based on the level of sales of foreign affiliates, not the level of FDI itself. Furthermore, data on FDI in Francois et a. (2009) are mostly reported for all trading partners together and hence not available on a bilateral basis. Borchert et al. (2012b) show that the STRI is correlated with FDI outcomes using a cross-border database of mergers and acquisitions.

follows the GTAP scheme commonly used in general equilibrium modeling. As such, there are nine different sectors, namely business services, construction, communication, finance, insurance, public services, recreation comprised of travel services and recreation services, trade services, and finally transport services. Table 1 provides summary statistics for all sector specifications for which we have sufficient data to conduct regressions with policy variables (six out of a total of nine). Given that our policy data are available for a single year only, we take 2005—the latest year for which we have broad data availability—as our baseline.

The model also includes data from the World Bank's STRB (Borchert et al., 2012a; and Borchert et al., 2012b). This dataset collects and makes publicly available comparable information on services policies in 103 countries, six sectors (telecommunications, finance, insurance, transport, retail, and professional services), and the key modes of supply. It is the best and most comprehensive dataset currently available on services policies, and is the only publicly available source that summarizes information on services policies from a trade perspective, compiling them into overall and modal STRIs ranging from 0 (unrestricted) to 100 (fully closed) using the methodology described in Borchert et al. (2012a), and Borchert et al. (2012b). Other indicators that have been used in previous work, such as the OECD's Product Market Regulation indicators, cover a narrower sample of countries and sectors, and are not produced with trade policy applications in mind. In particular, previous data have focused on general market regulations rather than discriminatory measures affecting foreign firms, which is the crucial perspective for trade policy applications. The World Bank database is based on data retrieved via a questionnaire for non-OECD countries, and from publicly available sources for OECD countries. In both cases, the data were verified by government officials from the countries concerned. We are therefore confident that they provide a highly accurate picture of the services trade environment in the countries and sectors covered. We match them to the GTAP aggregation scheme of the services trade data by using the closest available policy indicator where the correspondence is not exact. For example, we use data on restrictions to trade in professional

services as a proxy for regulation of business services, and data on retail trade policies as a proxy for trade services (wholesale/retail). Table 2 provides summary statistics for the policy indicators we use from the World Bank's database.

Data on regional trade integration in the form of membership of an RTA comes from De Sousa (Forthcoming). Standard gravity model controls measuring natural geographic trade barriers are taken from CEPII. Full details of our data and sources are provided in Table 3.

3.3 Preliminary Evidence

Before moving to a fully specified regression model with sectoral data in the next section, we first present some initial evidence on the links between services policies and trade using graphical methods. Figure 2 shows a scatterplot of total services exports and the World Bank's overall STRI. The graph uses a pure cross-section for the year 2005. It is immediately evident that the regression line is downwards sloping. This pattern suggests that as the policy environment becomes more restrictive, services trade tends to drop off. In terms of preliminary evidence, therefore, the data support the idea that services policies matter for trade, although the correlation is weak (-0.076). We investigate this issue further in the next section using a fully-specified econometric model that accounts for other intervening influences. We also examine the potential for cross-modal linkages, and cross-sectoral heterogeneity, which have been relatively little explored in the literature thus far.

4. Estimation Results

Table 4 presents baseline gravity model results for sector-specific services trade using overall STRIs—i.e., covering all modes—in each sector. Standard gravity model variables such as distance have the expected signs and magnitudes, and are statistically significant. R2s indicate that the gravity model has considerable explanatory power for services trade, accounting for over 80% of the observed variation in bilateral trade flows in each case.

In terms of the variables of main interest—the policy indicators—we find that services trade is clearly sensitive to the level of policy restrictiveness in an overall sense in the following sectors: total trade, business services, and financial services (columns 1-3). The largest effect is in business services, where the estimated elasticity is more than twice as large in absolute value as in finance. In all three cases, however, the impact of the STRI on trade flows is statistically significant at the 10% level orhigher. By contrast, insurance and wholesale/retail trade do not disclose any significant impact of the STRI on trade flows. In the case of transport, we find the paradoxical result that more restrictive regulation is associated with more trade, and that the effect is statistically significant at the 1% level. However, we show below that this anomalous result disappears when we disaggregate the policy data by mode of supply.

The other coefficient of interest is the regional integration dummy. In three of the six regressions—again total trade, business services, and financial services—we find that the RTA dummy has a positive and 1% statistically significant coefficient. Regional integration therefore appears to boost trade substantially in those sectors. However, the same is not true in the other three sectors for which data are available: regional integration efforts appear to have borne little fruit in insurance, wholesale/retail trade, and transport, as the estimated coefficient is not statistically significant.

To investigate the regional integration issue further, we rerun the regression from Table 4 column 1 (total trade) including in addition a dummy for EU membership (column 7).[7] Including both an RTA dummy and an EU dummy makes it possible to gauge the average effects of RTAs on services trade, and to see whether or not the most advanced regional integration project in services—namely the EU—has additional trade boosting effects. Interestingly, we find that the RTA dummy no longer has a statistically significant coefficient, and its magnitude is only about half as large as in the baseline model. However, the EU dummy has a positive and statistically significant coefficient that is close in

[7] Due to data limitations, it is not possible to rerun the sectoral regressions with an EU dummy.

magnitude to that of the RTA dummy in the baseline specification. We therefore conclude that the apparent effect of RTAs on services trade in Table 4 column 1 is largely an artifact of the EU's strongly trade promoting role—once it is accounted for, the positive effect of RTAs on services trade disappears. This result emphasizes that only a commitment to deep integration, including regulatory reform and behind-the-border barriers, can produce genuine liberalization in services trade.

4.1 Results using Detailed Policy Indicators

In the remainder of this section, we pursue the same general approach as for the models in Table 4, but use more detailed policy data than the general indices used previously. Specifically, we reproduce Table 4 using separate STRIs for modes 1 and 3, the two primary modes of supply for the services sectors we have data on. The advantage of this approach is that it allows us to identify with more precision the types of regulations that matter most for particular types of services trade, and at the same time to highlight once again the importance of cross-sectoral heterogeneity in accounting for the effects of policy on services trade. Although our data cover trade by mode 1 only, we include data on mode 3 restrictions because of the possibility of inter-model linkages through substitution or complementarity effects. Specifically, our approach makes it possible to gauge whether barriers to one type of services trade, such as mode 3, make another type of services trade, such as mode 1, more appealing for business. Since results for the RTA dummy are in accordance with those from the Table 4 regressions, the discussion here focuses only on the additional policy data.

Results appear in Table 5. The first finding to note is that results are stronger than for the overall STRI: there is at least one policy variable with a negative and statistically significant coefficient in all regressions except trade services (for which data are only available on mode 3 restrictions). Taking total trade first (column 1), we find that mode 1 restrictions are indeed associated with weaker trade flows. However, mode 3 restrictions are associated with stronger trade flows. One possible

explanation is that restrictions on mode 3 trade cause firms to substitute away to mode 1 trade, and that cross-border trade acts as a substitute for foreign affiliates sales on an aggregate basis. A similar coefficient pattern is discernible in the case of transport services, although the coefficient on mode 3 restrictions is not statistically significant.

In the cases of business and financial services (columns 2-3), a different dynamic is apparent. Surprisingly, the coefficient on mode 1 restrictions is not statistically significant in either case. However, mode 3 restrictions are both strongly negatively associated with mode 1 trade, and the effects are statistically significant at the 1% level. These results tend to suggest that in these two sectors, modes 1 and 3 are complements: restrictions on foreign establishment also tend to reduce cross-border trade.

In insurance (column 4), we find a surprising reversal of coefficient signs: mode 1 restrictions have a positive and statistically significant coefficient, while mode 3 restrictions have a negative and statistically significant coefficient. The mode 3 result can be explained on the basis of cross-modal complementarity, as discussed above. However, the mode 1 result is quite contrary to expectations, and is perhaps a result of poor data quality for cross-border trade in insurance services, as well as the relatively small number of observations (by gravity standards).

Finally, in transport (column 6), we find that mode 1 restrictions are indeed associated with smaller cross-border trade flows: the coefficient is negative and statistically significant at the 1% level. The coefficient on mode 3 restrictions is positively signed, which would be consistent with a substitution effect between modes. However, it is not statistically significant, and so we do not conclude that significant cross-modal substitution takes place in the case of transport services.

5 Conclusion

This paper has shown that services RTAs, and regulatory policies more broadly, can have very different effects on different sectors. In line with previous work, we find considerable evidence of a

link between regulatory restrictiveness and lower trade, but the strength of the link as well as its nature is highly sector specific. In particular, restrictions on mode 3 trade can produce complementary reductions in mode 1 trade, or substitution-related trade increases. Similarly, we find that some sectors respond strongly to regional integration efforts with a services component, but that others do not. Although sectoral disaggregation is difficult in services work due to the lack of widely available and reliable data, our results suggest that it will be a particularly important issue for researchers going forward.

From a policy point of view, our findings are important for two reasons. First, they highlight the importance of addressing sector-specific regulatory issues in addition to the general regulatory stance of a country with respect to the services sector as a whole. The breadth of the services sector, and the important role played by cross-sectoral heterogeneity, make the job of services negotiators a very difficult one, be it in multilateral or regional forums. There is a need in both cases for sectoral regulatory bodies to be involved in any broad-based efforts at services liberalization, which poses significant capacity issues for many developing countries.

The second policy issue of interest that arises from our results relates to the role of services RTAs. The data strongly suggest that regional integration efforts have been effective in some sectors, but not in others. Although outside the scope of the present paper, it will be important for future work to play closer attention to the different levels of commitments undertaken in different sectors in services RTAs. Casual empiricism suggests that countries often approach different sectors with different levels of ambition in terms of liberalization. It therefore remains to be seen whether our findings are driven by heterogeneity in the application of similar liberalization approaches across economically different sectors, or whether they simply reflect the very partial nature of many services RTAs in terms of sectoral scope and depth.

References

Anderson, J.E. and E. van Wincoop (2003) "Gravity with Gravitas: A Solution to the Border Puzzle", *American Economic Review*, Vol. 93, No. 1, pp. 170-92.

Anderson, J. and E. Van Wincoop, (2004) "Trade costs", *Journal of Economic Literature*, Vol. 42, No. 3, pp. 691-751.

Baldwin, R. and D. Taglioni (2006) "Gravity for Dummies and Dummies for Gravity Equations", *NBER Working Paper*, No. 12516, National Bureau of Economic Research, Cambridge, MA.

Borchert, I., B. Gootiiz and A. Mattoo (2012a) "Guide to the Services Trade Restrictions Database", *Policy Research Working Paper*, No. 6108, World Bank.

Borchert, I., B. Gootiiz and A. Mattoo (2012b) "Policy Barriers to International Trade in Services: Evidence from a New Database", *Policy Research Working Paper*, No. 6109, World Bank.

Cummings, J.D. and M. Rubio-Misas (2006) "Deregulation, Consolidation and Efficiency: Evidence from the Spanish Insurance Industry", *Journal of Money, Credit and Banking*, Vol. 38, No. 2, pp. 323-55.

De Sousa, J. (Forthcoming) "The Currency Union Effect on Trade is Decreasing over Time", *Economics Letters*.

Fillet-Castejón, C., J. Francois and J. Woerz (2008) "Trade through FDI: Investing in Services", *IIDE Discussion Paper 200805-02*, Institute for International & Development Economics, Rotterdam/ Linz.

Fink C. (2009) "Has the EU Single Market Program Led to Deeper Integration of EU Services Market?", *GEM Working Paper*, July, Group d'Économie Mondiale, Sciences Po, France: Paris.

Francois, J. and B. Hoekman (2009) "Services Trade and Policy", *Economics Working Paper* 2009-03, Department of Economics, Johannes Kepler University, Austria: Linz.

Francois, J., B. Hoekman and J. Woerz (2007), “Does Gravity Apply to Intangibles? Measuring Barriers to Trade in Services”, Paper presented at the CEPII-OECD Workshop ‘Recent Developments in International Trade in Services’, Paris, November.

Francois, J., O. Pinduyk and J. Woerz (2009) “Trends in International Trade and FDI in Services”, *IIDE Discussion Paper*, No. 200908-02, Institute for International and Development Economics.

Frankel, J. (1997) *Regional Trading Blocs in the World Economic System*, Washington DC: Institute for International Economics.

Freund, C. and D. Weinhold (2002) “The Internet and International Trade in Services”, *The American Economic Review*, Vol. 92, No. 2, pp. 236-40.

Guillin A. (2010) “Trade in Services and Regional Trade Agreements: Do Negotiations on Services Have to be Specific?”, University of Paris 1 / University of Dublin, paper presented at the ETSG 2010: http://www.etsg.org/ETSG2010/papers/Guillin.pdf

Head, K., T. Mayer and J. Ries (2009) “How Remote is the Offshoring Threat?”, *European Economic Review*, Vol. 53, No. 4, pp. 429-44.

Hornok, C. (2012) “Gravity or Dummies? The Limits of Identification in Gravity Estimations”, *Working Paper*, No. 2012_11, Central European University.

Kimura, F. and H.H. Lee (2004) “The Gravity Equation in International Trade in Services”, *Review of World Economies*, Vol. 142, No. 1, pp. 92-121.

Kox, H. and A. Lejour (2006) “The Effects of the Services Directive on Intra-EU Trade and FDI”, *Revue Economique*, Vol 57, No. 4, pp. 747-69.

Kox, H. and H.K. Nordas (2007) “Services Trade and Domestic Regulation”, *OECD Trade Policy Working Paper*, No. 49, OECD, France: Paris.

Kox, H. and H.K. Nordas (2009) “Regulatory Harmonization and Trade in Services: Volumes and Choice of Mode”, www.eiit.org/WorkingPapers/Papers/TradePolicyMultilateral/FREIT040.pdf

Kox. H., A. Lejour and R. Montizaan (2005) “The Free Movement of Services within the EU”, *CPB Discussion Paper*, No. 69, Central Plan Bureau, The Hague.

Lejour, A. and J.W. de Paiva Verheijden (2004) “Services Trade within Canada and the European Union: What Do They have in Common?”, *CPB Discussion Paper*, No 42, Central Plan Bureau, The Hague.

Lennon, C. (2009) “Trade in Services and Trade in Goods: Differences and Complementarities”, *WIIW Working Paper*, No. 53, The Vienna Institute for International Economic Studies, Austria: Vienna.

Lennon, C., D. Mirza and G. Nicoletti (2009) “Complementarity of Inputs across Countries in Services Trade”, *Annals of Economics and Statistics*, No. 93-94, pp. 1-23.

Maijoor, S., W. Buijink, R. Meeuwissen and A. van Witteloostuijn (1998) “Towards the Establishment of an Internal Market for Audit Services within the European Economy”, *European Accounting Review*, Vol. 7, No. 4, pp. 655-73.

Marchetti, J. (2009) “Do Economic Integration Agreements lead to Deeper Integration of Services Markets?”, http://www.wto.org/english/res_e/reser_e/gtdw_e/wkshop09_e/marchetti_e.pdf

Miroudot, S., J. Sauvage and B. Shepherd (2010) “Measuring the Costs of International Trade in Services”, *GEM Working Paper*, October, Groupe d’Économie Mondiale, Sciences-Po, France: Paris.

Park (2002) “How Far has Regional Integration Deepened? Evidence from Trade in Services”, *KIEP Working Paper No. 02-17*, Korean Institute for International Economic Policy, Korea: Seoul.

Santos Silva, J.M.C. and Tenreyro, S. (2006) “The Log of Gravity”, *The Review of Economics and Statistics*, Vol. 88, No. 4, pp. 641-58.

Schwellnus, C. (2007) “The Effects of Domestic Regulation on Services Trade Revisited”, CEPII *Working Paper*, No. 2007-08, CEPII Resarch Centre, France: Paris.

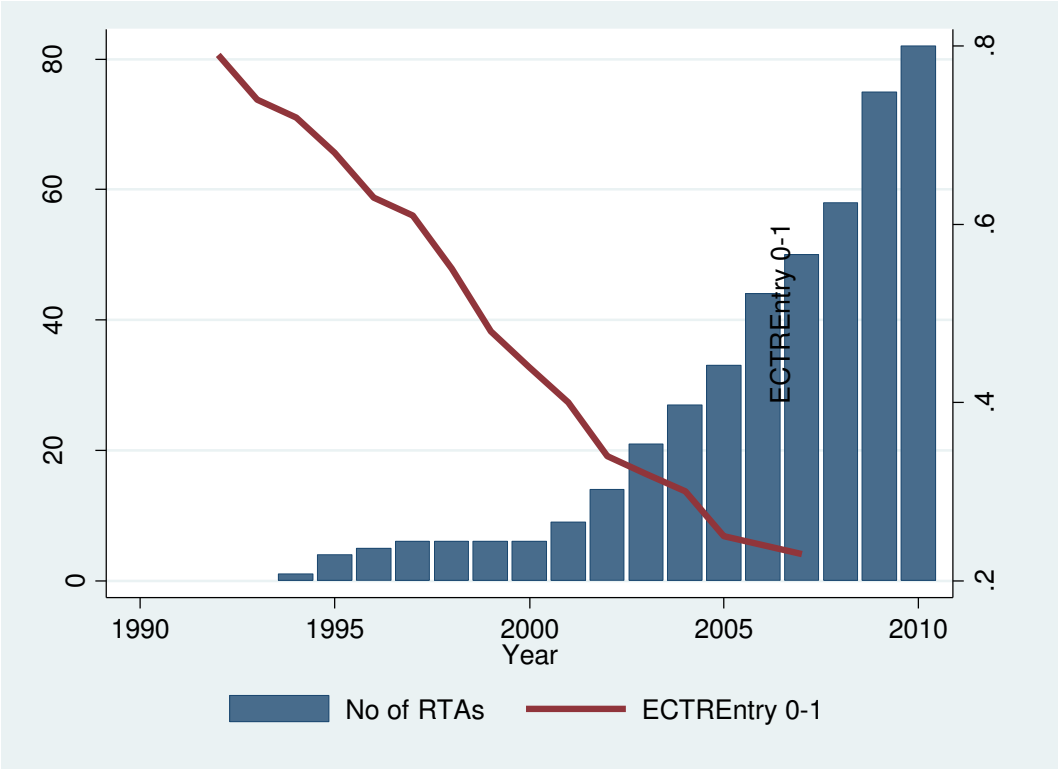
Shingal, A. (2010) “How Much Do Agreements Matter for Services Trade?”, World Trade Institute, paper presented at the ETSG 2010: http://www.etsg.org/ETSG2010/papers/Shingal.pdf

van der Marel, E. (2011) “Determinants of Comparative Advantage in Services”, *GEM Working Paper*, March, Groupe d’Économie Mondiale, Sciences-Po, France: Paris.

Walsh, K. (2006) “Trade in Services: Does Gravity Hold? A Gravity Model Approach to Estimating Barriers to Services Trade”, *IIIS Discussion Paper*, No 183, Institute for International Integration Studies.

Tables and Figures

Figure 1: Number of Services RTAs and Level of Entry Barriers



Source: Authors' calculations. Entry barriers (sourced from the OECD's ECTR database) cover all countries in our data sample and are rescaled from 0-1. The RTAs in services represent any type of RTA with a services component. Years are for the date of notification. Data are taken from the WTO's RTA database.

Figure 2: Total Imports of Business and Construction Services, and Level of Regulatory Restrictiveness, 2003.

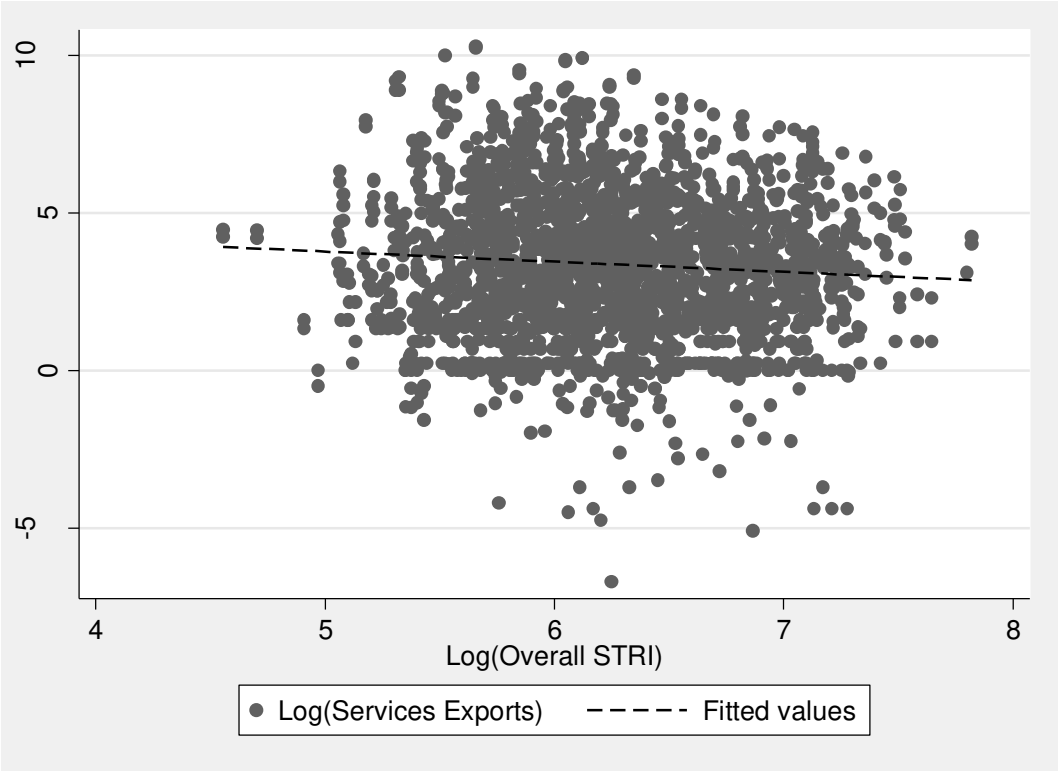


Table 1: Summary Statistics for Total and Sectoral Services Exports

Sector	Obs	Mean($m)	Std. Dev.	Min	Max
Business	2806	77.657	508.131	0	10740
Finance	2732	11.621	125.746	0	4298.074
Insurance	2701	10.435	139.916	0	5033
Trade	732	28.213	121.841	0	1872.855
Transport	2920	148.359	514.947	0	8145
Total	6398	167.292	1024.969	0	28830.910

Table 2: Summary Statistics for Regulatory Indicators

Regulation	Obs	Mean	Std. Dev.	Min	Max
Overall STRI	15575	23.425	19.312	0	96.3
Mode 1 STRI	12809	25.284	21.743	0	100
Mode 3 STRI	15575	22.373	20.362	0	100

Table 3: Data Sources

Variable	Variable description	Source	Period
X	Export value in US$	Trade in Services Database (Francois et al., 2009)	2005
Overall STRI	Overall Services Trade Restrictiveness Index (i.e., covering all modes of supply) , converted to logarithms as log((1+STRIi)*(1+STRIj))	World Bank Services Trade Restrictiveness Database	2007-2010 (varies)
Mode 1 STRI	Services Trade Restrictiveness Index covering mode 1 only, converted to logarithms as log((1+STRIi)*(1+STRIj))	World Bank Services Trade Restrictiveness Database	2007-2010 (varies)
Mode 3 STRI	Services Trade Restrictiveness Index covering mode 3 only, converted to logarithms as log((1+STRIi)*(1+STRIj))	World Bank Services Trade Restrictiveness Database	2007-2010 (varies)
Dist, Contig, Colony, Language	Distance (converted to logarithms), sharing a similar border, colonial links or language	CEPII	na
RTA	Dummy equal to unity for country pairs sharing a services RTA; or equal to unity when only one country is a member of a services RTA	De Sousa (Forthcoming)	2005

Table 4: Baseline Estimation Results

	(1) Total	(2) Business	(3) Finance	(4) Insurance	(5) Wholesale/Retail Trade	(6) Transport	(7) Total
ln(STRI)	-0.493***	-0.867***	-0.304*	0.004	0.151	0.676***	-0.494***
	(0.004)	(0.000)	(0.064)	(0.985)	(0.268)	(0.000)	(0.003)
ln(distance)	-0.410***	-0.551***	-0.275	-1.032***	-1.183**	-0.398***	-0.381***
	(0.000)	(0.000)	(0.151)	(0.000)	(0.043)	(0.000)	(0.000)
Contiguity	0.096	1.896***	0.923*	-1.931***	3.098***	0.402***	0.101
	(0.588)	(0.000)	(0.090)	(0.000)	(0.000)	(0.008)	(0.574)
Colony	0.491***	0.495**	0.533	0.364	2.033***	0.243*	0.528***
	(0.000)	(0.018)	(0.150)	(0.264)	(0.000)	(0.085)	(0.000)
Language	0.121	-0.358***	0.686***	-0.285	-1.321***	0.284*	0.128
	(0.362)	(0.005)	(0.010)	(0.451)	(0.000)	(0.060)	(0.348)
RTA	0.560***	0.991***	1.081***	-0.031	-0.718	0.273	0.294
	(0.001)	(0.000)	(0.005)	(0.923)	(0.115)	(0.213)	(0.175)
EU							0.502**
							(0.036)
Observations	2213	782	365	392	413	1154	2213
R-squared	0.903	0.959	0.965	0.965	0.938	0.840	0.904

Notes: The dependent variable in all cases is exports (X^{k}_{ijt}), and all models include fixed effects by exporter and by importer. Estimation is by Poisson. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively. P-values based on robust standard errors corrected for clustering by country-pair appear in parentheses beneath the parameter estimates.

Table 5: Modal Estimation Results

	(1) Total	(2) Business	(3) Finance	(4) Insurance	(5) Wholesale/Retail Trade	(6) Transport
ln(Mode 1 STRI)	-0.739***	0.002	-0.017	0.481**		-0.370***
	(0.004)	(0.983)	(0.907)	(0.026)		(0.000)
ln(Mode 3 STRI)	0.356**	-0.374***	-0.999***	-0.435***	0.151	0.192
	(0.011)	(0.001)	(0.000)	(0.006)	(0.268)	(0.164)
ln(distance)	-0.410***	-0.551***	-0.275	-1.032***	-1.183**	-0.398***
	(0.000)	(0.000)	(0.151)	(0.000)	(0.043)	(0.000)
Contiguity	0.096	1.896***	0.923*	-1.931***	3.098***	0.402***
	(0.588)	(0.000)	(0.090)	(0.000)	(0.000)	(0.008)
Colony	0.121	-0.358***	0.686***	-0.285	-1.321***	0.284*
	(0.362)	(0.005)	(0.010)	(0.451)	(0.000)	(0.060)
Language	0.491***	0.495**	0.533	0.364	2.033***	0.243*
	(0.000)	(0.018)	(0.150)	(0.264)	(0.000)	(0.085)
RTA	0.560***	0.991***	1.081***	-0.031	-0.718	0.273
	(0.001)	(0.000)	(0.005)	(0.923)	(0.115)	(0.213)
Observations	2213	782	365	392	413	1154
R-squared	0.903	0.959	0.965	0.965	0.938	0.840

Notes: The dependent variable in all cases is exports (X_{ijt}^{k}), and all models include fixed effects by exporter and by importer. Estimation is by Poisson. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels respectively. P-values based on robust standard errors corrected for clustering by country-pair appear in parentheses beneath the parameter estimates.