Going beyond the 0/1 dummy: Estimating the effect of heterogeneous provisions in services accords on services trade

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Abstract

The proliferation of preferential trade agreements in services (STAs) and improved availability of data on bilateral services trade flows has resulted in a growing literature on the theoretical and empirical assessment of services trade effects. However, this literature has not considered the different types of provisions found in STAs while estimating the trade effects. We address this issue taking into account the heterogeneity of provisions found in STAs using the Design of Trade Agreements (DESTA) database (Dür et.al, 2014). Our results suggest that not accounting for this heterogeneity lends an upward bias to the magnitudes of the estimated trade effects. This finding is robust to estimations involving only positive and those incorporating zero trade flows as well as to sample coverage (all, EU, non-EU, North-North, North-South).

JEL classification: F10, F14, F15

Key words: Services trade, PTAs, heterogeneity of provisions, structural gravity, endogeneity

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1 Introduction

One of the striking features of trade diplomacy since 1995 has been the pace of preferential goods trade liberalisation and rule-making. More recently, a similar trend is observed regarding services trade. Of the 81 preferential trade agreements (PTAs) notified to the World Trade Organization (WTO) and in force prior to the year 2000, 73 (90%) featured provisions dealing exclusively with trade in goods. Since then and up until August 2014, another 182 PTAs into force of which 114 (63%) also include provisions on services trade. This development indicates the rising importance of services trade in general, the growing need felt by countries to place such trade on a firmer institutional and rule-making footing, and the attractiveness of doing so on an expedited basis via preferential negotiating platforms (Sauvé and Shingal, 2011).

Concurrently, a cottage literature has evolved to study the trade effects of services trade agreements (STAs) using theoretical models and empirical analyses, aided greatly by the publication of databases on bilateral services trade led by the Organization for Economic Cooperation and Development (OECD)’s database on bilateral services trade\textsuperscript{1}. Since its publication, several authors (Grüinfeld and Moxnes, 2003; Mirza and Nicoletti, 2004; Ceglowski, 2006; Kimura and Lee, 2006; Kox and Lejour, 2006; Walsh, 2006; Lennon, 2008; Shingal, 2009; Marchetti, 2011; Egger et al 2012, and Shingal, 2014) have used this dataset to examine the trade effect of services accords on aggregate and disaggregated services trade flows. Publication of other databases – the UN Services Database (UNSD) and the Trade in Services Database (TSD, Francois and Pindyuk, 2013\textsuperscript{2}) – has further aided the estimation of services trade effects.

However, there is not much literature that looks at the differences in STA provisions while examining the trade effects of services accords. Marchetti (2011) classified STAs into “those providing for deeper integration (positive integration-type of agreements seeking harmonization of at least basic regulatory requirements)” exemplified by the EU and the EEA and “to those envisaging the liberalization of specific restrictions to trade in services without aiming at regulatory harmonization (negative integration-type of agreements)”, which characterizes all other STAs negotiated in the last decade.

Services trade effects of the EC agreements (15% more services trade) are found to be slightly higher than those of negative-integration services accords (13% more services trade) in the

\textsuperscript{1}In 2002, the OECD Secretariat presented data on total trade in services, broken down by partner country, for 26 OECD member countries over 1999–2002. This has now been extended to cover 35 reporting countries from the OECD, 238 OECD and non-OECD partner countries and 12 years (1999–2010).

\textsuperscript{2}The recently made public World Bank Trade in Services Database is based on the TSD.
results from his more complete specifications. Other literature (Berger et.al. 2011, 2013) has looked at the diversity of provisions including those on dispute-settlement in the RTA/BIT “blackbox” to assess their impact on FDI flows.

In this paper, we revisit the trade effects of services agreements taking into account the different types of provisions found in STAs, using the Design of Trade Agreements (DESTA) database (Dur et.al. 2014), which has coded information on the design features of 587 PTAs over 1947-2010 and goes beyond classifying STAs as positive- and negative-integration agreements a la Marchetti (2011). Besides using an updated dataset on bilateral services trade flows, we base our empirical analyses on recent developments in the estimation of structural gravity models (for instance see Head and Mayer, 2013). In addition to treating STA membership as endogenous, we also examine trade effects of STA membership allowing for zero trade flows. All these reasons explain the difference in our results compared to those of Marchetti (2011).

Our results suggest that accounting for the different types of provisions found in services accords considerably reduces the magnitudes of the estimated trade effects. This finding is robust to estimations at the intensive margin of trade and those incorporating zero trade flows as well as to the choice of different samples (all, EU, non-EU, North-North, North-South).

The rest of this chapter is structured as follows. In the next section, we present the theoretical framework underlying our empirical strategy in Section 3. Section 4 looks at the data while Section 5 discusses estimation issues. Section 6 discusses the results and Section 7 concludes.

2 Estimating the impact of services accords

Much like bilateral trade in goods, bilateral services exports ($X_{ijt}$, from country $i$ to country $j$ at time $t$) are governed by the same forces of “gravity” such as the GDP of the exporter and importer, prices and bilateral trade costs (for instance see Anderson et al 2011). The last are typically proxied by bilateral distance between capitals of the two countries, incidence of and heterogeneity between (restrictive) services regulation, and indicators for common international borders, language, colonial origins, legal systems and membership of PTAs (in the context of this paper, STAs or $STA_{ijt}$).

Empirically, we have the following model:

$$\ln X_{ijt} = \mu_{ij} + \alpha_{it} + \gamma_{jt} + \rho_t + \delta STA_{ijt} + \varepsilon_{ijt}$$ (1)
where all the bilateral trade costs are captured in the pair-wise fixed effects $\mu_{ij}$, the exporter-time ($\alpha_{it}$) and importer-time ($\gamma_{jt}$) fixed effects in (1) control for the effect of the respective GDPs and following recent literature (Baier and Bergstrand, 2007), also account for the time-varying terms in a panel data setting. $\varepsilon_{ijt}$ is the error term.

However, (1) does not account for a significant characteristic of most bilateral trade data – the existence of “export zeroes” (for instance see Helpman et al. 2008 and Baldwin and Harrigan, 2011). This is even more true of bilateral services trade data, which also tend to report a significant number of missing observations.

Finally, (1) assumes that STA membership is exogenous. However, in a significant departure from earlier work, researchers (Magee, 2004; Baier and Bergstrand, 2002, 2004, 2007; Egger et al 2008) have begun to treat PTA membership as endogenous based on the intuition that if there is a tendency for countries to “self-select” themselves into an accord, then treating PTA membership as exogenous would underestimate the magnitude of the trade effect. For example, the decision to negotiate NAFTA was not independent of the fact that the US, Canada and Mexico were already important trading partners for each other. However, treating this decision as independent would lessen the magnitude of the estimated trade effect of the NAFTA.

Recent literature (Egger et al 2011) has provided a reduced form estimation of a theory-consistent gravity model that endogenizes the impact of PTA membership and also accounts for trade at both margins. Significantly, the inclusion of pair-wise, importer-time and exporter-time fixed effects in (1) also enables an endogenous treatment of the STA variable (Baier and Bergstrand, 2007).

3 Data

Data on $X_{ijt}$ are taken from the OECD’s Bilateral Trade in Services database. These include 6095 trading partner pairs between 35 exporting and 238 importing countries over 1999–2010 (the list of countries is provided in Annex Table A1). Of these, 203 trading partners reported negative services exports and assuming reporting errors, these values were taken as zero. In addition, data on services exports were found unreported for 7,147 out of 44,322 observations, i.e. countries that enter into an agreement are those that already trade significantly with each other and vice versa.

4 For instance, Baier & Bergstrand (2007) find the trade effect from goods agreements to quintuple once PTA membership is endogenized econometrically.

5 In our sensitivity analyses, we also ran our regressions without these observations but found the results to be qualitatively similar.
which, following this literature, were also assumed to be zero.\textsuperscript{6} This brought the total number of export zeroes in the sample to 19,700 (44.4\% of the full sample).

Unfortunately, the OECD data used in this paper only cover only two ways in which services are supplied: cross-border (Mode 1) and consumption abroad (Mode 2). Trade via commercial presence (Mode 3), which accounts for more than a third of global services trade flows, is not covered in the OECD database. Given this limitation and the fact that much reciprocal services liberalization is aimed at facilitating commercial presence, it would also be useful to examine the results in this chapter by including bilateral data on FDI in services.

This said, the OECD database may have better coverage than the UNSD especially in terms of the number of importing countries; the latter also only begins in the year 2000. In contrast, the TSD that begins in 1981 and uses mirror flows may provide better coverage than even the OECD database, though the former is riddled with zero trade flows up until 1995.

Data on trade agreements are taken from the WTO’s Regional Trade Agreements Information System (RTA-IS) database, where $\text{STA}_{ijt} = 1$ for agreements notified under Article V of the GATS during 1958–2010 and 0 otherwise. Since our data cover the period 1999–2010, if a services agreement was reached before 1999, the STA variable takes a value 1 over 1999–2010. On the other hand, if the agreement came into effect after 1999, then the variable takes a value 1 in the year the STA entered into force and every year after that and the value 0 otherwise.

To account for the different types of provisions found in STAs, we use one variable from Dür et al. (2014): DESTA (an aggregated “depth” variable that takes the value 0, 1 or 2). We additionally create a new variable, DEPTH, that provides a measure of disaggregated “depth” by adding selective attributes on services provisions in STAs; the variable takes the value 0, 2, 4, 5, 6, 7 or 8. Details on the methodology used in constructing these variables are provided in the Appendix to this paper, but essentially the larger values of the indices point to more substantive provisions on services in the concerned PTA. Annex Table A2 shows the mean value for all variables, along with the minimum, maximum and the standard deviation.

Figure 1 shows trading partner dyads in our sample that had bilateral services exports exceeding USD10 billion (bn) over 1999–2010. Looking at these export averages over 1999–2010, we find that 29 trading pairs (0.5\% of the 6,095 dyads) had bilateral services exports in excess of USD10 bn and interestingly, more than half of these (18) had a services trade agreement in force in 2010.

\textit{<Insert Figure 1 here>}

\textsuperscript{6}Low thresholds for reporting and measurement errors can be responsible for both unreported flows and for export zeroes.
Table 1 shows the decile distribution of (positive) bilateral services exports averaged over 1999–2010 and the existence of STAs. The top decile (n = 385, accounting for 6.3% of all trading pairs in the sample) had an average services export value of USD3.7 bn; nearly half of these dyads had a services trade agreement in force in 2010. Table 1 also suggests that the distribution of bilateral services exports over 1999–2010 was highly skewed with the average for the top decile being more than 28,000 times greater than that of the last decile!

Significantly, as one goes down the deciles, the propensity to negotiate a services accord also declines, which highlights the endogenous relationship between these two variables. Bilateral services exports are also found to be 5.7 times greater amongst all dyads in our sample in the presence of a services accord than otherwise.

Finally, Figure 2 (bottom panel) shows the percentage density of STAs in our database according to the “depth” of a services agreement as measured by the DEPTH variable and the mean value of services exports ($ mn) again plotted against DEPTH (top panel). As is clear from the bottom panel, not having an STA (depth = 0) accounts for a majority of our database (density = 87.9%), followed by depth indices of 5 (6.9%) and 8 (3.5%), respectively. However, as the top panel shows, the largest services trade flows are associated with the depth index of 2 ($ 18.3 bn), followed by 5 ($ 1.9 bn) and 8 ($ 916 mn). Since depth index 2 has the lowest number of observations in our database (density = 0.02% in the bottom panel), it is likely that estimating services trade effects by the “depth” of an accord would reduce the magnitude of the estimated average treatment effect.

4 Estimation issues

Our equations can be estimated log-linearly using ordinary least squares (OLS). However, this excludes the treatment of export zeroes (as the log of zero is not defined) and the incidence of export zeroes was fairly high in our data (44.4%). Selection of the appropriate estimator in the presence of zeroes is contingent on the process generating the error term. Following recent literature (Head and Mayer, 2013), we found our data to be characterized by a constant variance to mean ratio which suggested the use of the Poisson pseudo–maximum
likelihood (PPML) for inference. Importantly, PPML\textsuperscript{7} estimates remain consistent in the presence of over-dispersion, which was also true of our data (for instance see Colin and Trivedi, 2005; Santos Silva and Tenreyro, 2006).

Unfortunately, PPML estimation with several high-dimensional fixed effects led to non-convergence. This did not change even with the application of different work-around strategies suggested in the recent literature (Santos Silva and Tenreyro, 2010).

Given the need for at least two-high dimensional fixed effects in estimating these equations, another possibility was to use the “2WFE” approach developed recently (Guimaraes and Portugal, 2010). This allows for estimating linear regressions model with two high-dimensional fixed effects with minimal memory requirements. Head and Mayer (2013) find the 2WFE estimator to provide identical estimates to the least squares dummy variable (Harrigan, 1996) without being subject to arbitrary limits. They also recommend the 2WFE over other estimation strategies such as double-demeaning, Bonus Vetus OLS (Baier and Bergstrand, 2009) and tetrads (Head et al, 2010).

Thus, we estimated our equations log-linearly using the 2WFE estimator.

However, this strategy would only work at the intensive margin. To include export zeroes in the 2WFE estimation, we followed the approach of Eaton and Kortum (2001) and assumed that there was a minimum level of services exports $\epsilon$ such that when gravity-predicted $X_{ijt} < \epsilon$, the observed value of services exports was zero. Although $\epsilon$ is unknown, it can be approximated by the minimum observed services exports for each destination market ($\text{min}X_j$).

Unlike the practice of adding an arbitrary constant to the export zeroes, this approach is more intuitive as the minimum trade flow for a specific importer would tend to reflect differences in market size, competition and trade barriers, as well as reporting and measurement issues. The approach is also consistent with theory and does not require exclusion restrictions.

Thus, the equations were also estimated log-linearly by replacing $X_{ijt}$ with $(X_{ijt} + \text{min}X_j)$ to incorporate the export zeroes in the analyses.

\textsuperscript{7}The PPML advocates the use of a simple Poisson pseudo-maximum likelihood because in the presence of heteroscedasticity in the data, the standard log-linearized gravity model yields inconsistent estimates (Santos Silva & Tenreyro, 2006). ‘An additional problem of log-linearization is that it is incompatible with the existence of zeroes in trade data, which led to several unsatisfactory solutions, including truncation of the sample and further non-linear transformations of the dependent variable’ (Santos Silva & Tenreyro, op.cit., pp. 653).
5 Results

The results for positive exports are reported in Table 2. In this table, rows report results for five different samples: all STAs, North-South STAs, North-North STAs, only-EU STAs (i.e. only agreements between any of the 27 EU member states) and only non-EU STAs (i.e. only agreements between none of the 27 EU member states). The columns report the estimated services trade effects for three different possible STA variables: STA (the basic 0/1 dummy), DESTA (an aggregated depth variable that takes the value 0, 1 or 2), and DEPTH (a disaggregated measure of depth that takes the value 0, 2, 4, 5, 6, 7 or 8) with the larger values being associated with more substantive provisions on services in the concerned PTA. All estimations include dyadic, importer-time and exporter-time fixed effects and standard errors are clustered by dyad and year.

Using the simple 0/1 STA dummy, the (services) trade effects range from 14.2\%\(^8\) for the full sample to 72.6\% amongst the EU Member States and 21.4\% for North-North STAs. However, North-South STAs seem to be associated with net trade diversion, as do STAs amongst the non-EU trading partners in our sample (as in Shingal 2009, 2014). This could reflect the fact that more meaningful services liberalization may have only been attained in North-North and only-EU STAs and that STAs amongst all other dyads exclude, by definition, the more important services trading partners for members of such STAs.

Interestingly, the magnitudes of the trade effects fall considerably for all samples (and especially for the only-EU sample) once we account for the different provisions found in STAs using the DEPTH variable; the estimates for North-South STAs even lose statistical significance. Moreover, we get lower estimated trade effects even with the aggregate “depth” variable DESTA.

Thus, not accounting for the heterogeneity of provisions found in services accords lends an upward bias to the magnitudes of the estimated trade effects. This may not be so surprising. The conventional 0/1 dummy variable masks significant differences in commitments made by trading partners that negotiate services accords by treating them alike, which biases the magnitude of the trade effects. However, our database reveals that the largest services trade flows are not associated with more provisions on services in PTAs, so “unbundling” the non-zero STA variables while estimating trade effects “reveals” this disconnect.

\(^{<}\)Insert Table 2\(^{>}\)

\(^{8}\)This is calculated as \(\{\exp(\delta)-1\}\) \(\times\) 100 where \(\delta\) is the coefficient on the STA variable.
This general finding is also confirmed in the results obtained after incorporating the export zeroes in the sample and reported in Table 3. One would expect these coefficients to have lower magnitudes compared to the baseline results as the regressions now incorporate zero export flows. However, the (services) trade effect for the full sample seems to be enhanced now, which seems to suggest that just being a part of an STA facilitates the probability of entering the export market for services. In contrast, the trade effects for North-North and the only-EU samples are reduced using DEPTH while those for North-South accords and non-EU partners are now statistically indifferent from zero, irrespective of the depth of the STA. This seems to suggest that greater provisions on services may not have much bearing on the propensity to become a services exporter per se.

<Insert Table 3>

6 Conclusion

This paper uses updated OECD data on bilateral services trade flows and a new data set on the different provisions found in services accords to account for the heterogeneity in such provisions in estimating the impact of services preferentialism. Countries are increasingly resorting to such preferentialism and going beyond the WTO in making commitments in their PTAs. However, as in the case of goods agreements, commitments made in STAs show varying levels of ambition in terms of actual provisions. It is thus important to examine if these agreements are actually resulting in greater services trade, once the varying extents of liberalization embodied in these provisions are taken into account.

Significantly, our results suggest that accounting for this heterogeneity in services provisions reduces the magnitudes of the estimated trade effects. This is not surprising. The conventional 0/1 dummy variable masks significant differences in commitments made by trading partners that negotiate services accords by treating them alike, which biases the magnitude of the trade effects. However, our database reveals that the largest services trade flows are not associated with more provisions on services in PTAs, so “unbundling” the non-zero STA variables while estimating trade effects “reveals” this disconnect.
References


Figure 1: Top services export flows (USD billion, average 1999–2010)

Source: OECD; own calculations

Note: Dyads shaded darker had a services trade agreement in force in 2013; those shaded lighter did not.
Figure 2: Differences in substantive provisions in services PTAs and mean services export flows (USD million, average 1999–2010)

Source: OECD and Dür et al. (2014); own calculations
Table 1: Decile distribution of bilateral services exports (avg. 1999-2010)

<table>
<thead>
<tr>
<th>Deciles (n = 3850)</th>
<th>Avg. $X_{ij}$ ($mn$)</th>
<th>STA</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>3776.8</td>
<td>0.49</td>
</tr>
<tr>
<td>D2</td>
<td>395.0</td>
<td>0.35</td>
</tr>
<tr>
<td>D3</td>
<td>133.1</td>
<td>0.32</td>
</tr>
<tr>
<td>D4</td>
<td>53.7</td>
<td>0.26</td>
</tr>
<tr>
<td>D5</td>
<td>24.8</td>
<td>0.27</td>
</tr>
<tr>
<td>D6</td>
<td>11.5</td>
<td>0.17</td>
</tr>
<tr>
<td>D7</td>
<td>5.3</td>
<td>0.20</td>
</tr>
<tr>
<td>D8</td>
<td>2.2</td>
<td>0.16</td>
</tr>
<tr>
<td>D9</td>
<td>0.7</td>
<td>0.15</td>
</tr>
<tr>
<td>D10</td>
<td>0.1</td>
<td>0.07</td>
</tr>
<tr>
<td>D1/D10</td>
<td>28072.4</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Source: OECD; own calculations

Table 2: Summary of trade effects from estimating equation (1) on positive exports

<table>
<thead>
<tr>
<th>$X_{ij} &gt; 0$</th>
<th>STA</th>
<th>DESTA</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>14.2%**</td>
<td>8.1%***</td>
<td>2.9%***</td>
</tr>
<tr>
<td>N-S</td>
<td>-19.0%*</td>
<td>-10.3%*</td>
<td>-0.2%</td>
</tr>
<tr>
<td>N-N</td>
<td>21.4%***</td>
<td>13.2%***</td>
<td>3.5%***</td>
</tr>
<tr>
<td>EU</td>
<td>72.6%***</td>
<td>31.4%***</td>
<td>5.7%***</td>
</tr>
<tr>
<td>Non-EU</td>
<td>-15.2%#</td>
<td>-8.0%#</td>
<td>-2.4%</td>
</tr>
</tbody>
</table>

Note: All estimations include dyadic, importer-time and exporter-time fixed effects; unreported standard errors clustered by dyad and year.

Legend: # p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 3: Summary of trade effects from estimating equation (1) on all exports

<table>
<thead>
<tr>
<th>$X_{ij} &gt;= 0$</th>
<th>STA</th>
<th>DESTA</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>14.4%**</td>
<td>9.7%***</td>
<td>2.6%***</td>
</tr>
<tr>
<td>N-S</td>
<td>18.2%</td>
<td>9.4%</td>
<td>2.3%</td>
</tr>
<tr>
<td>N-N</td>
<td>9.4%</td>
<td>10.1%***</td>
<td>2.5%***</td>
</tr>
<tr>
<td>EU</td>
<td>38.5%***</td>
<td>17.7%***</td>
<td>3.3%***</td>
</tr>
<tr>
<td>Non-EU</td>
<td>3.8%</td>
<td>2.0%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Note: All estimations include dyadic, importer-time and exporter-time fixed effects; unreported standard errors clustered by dyad and year.

Legend: # p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Table A1: Sample countries

**Exporters:** Australia, Austria, Belgium, Canada, Chile, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hong Kong, Hungary, Ireland, Iceland, Israel, Italy, Japan, South Korea, Luxembourg, Mexico, The Netherlands, Norway, New Zealand, Poland, Portugal, Russia, Slovakia, Slovenia, Sweden, Turkey, United States

**Importers:** Aruba, Afghanistan, Angola, Anguilla, Albania Andorra, Netherlands Antilles, United Arab Emirates, Argentina, Armenia, American Samoa, Antarctica, French Southern Territories, Antigua & Barbuda, Australia, Austria, Azerbaijan, Burundi, Belgium, Benin, Burkina Faso, Bangladesh, Bulgaria, Bahrain, Bahamas, Bosnia & Herzegovina, Belarus, Belize, Bermuda, Bolivia, Brazil, Barbados, Brunei Darussalam, Bhutan, Bouvet Island, Botswana, Central African Republic, Canada, Cocos (Keeling) Islands, Switzerland, Chile, China, Cote d’Ivoire, Cameroon, Democratic Republic of Congo, Congo, Cook Islands, Colombia, Comoros, Cape Verde, Costa Rica, Cuba, Christmas Island, Cayman Islands, Cyprus, Czech Republic, Germany, Djibouti, Dominica, Denmark, Dominican Republic, Algeria, Ecuador, Egypt, Eritrea, Spain, Estonia, Ethiopia, Finland, Fiji, Falkland Islands, France, Faroe Islands, Federated States of Micronesia, Gabon, United Kingdom, Georgia, Guernsey, Ghana, Gibraltar, Guinea, Gambia, Guinea-Bissau, Equatorial Guinea, Greece, Grenada, Greenland, Guatemala, French Guiana, Guam, Guyana, Hong Kong, Heard & McDonald Islands, Honduras, Croatia, Haiti, Hungary, Indonesia, Isle of Mann, India, British Indian Ocean Territory, Ireland, Iran, Iraq, Iceland, Israel, Italy, Jamaica, JER Jordan, Japan, Kazakhstan, Kenya, Kyrgyzstan, Cambodia, Kiribati, St. Kitts & Nevis, South Korea, Kuwait, Lao PDR, Lebanon, Liberia, Libya, St. Lucia, Liechtenstein, Sri Lanka, Lesotho, Lithuania, Luxembourg, Latvia, Macau, Morocco, Moldova, Madagascar, Maldives, Mexico, Marshall Islands, Macedonia, Mali, Malta, Myanmar, Montenegro, Mongolia, Northern Mariana Islands, Mozambique, Mauritania, Montserrat, Mauritius, Malawi, Malaysia, Mayotte, Namibia, New Caledonia, Niger, Norfolk Island, Nigeria, Nicaragua, Niue, The Netherlands, Norway, Nepal, Nauru, New Zealand, Oman, Pakistan, Panama, Pitcairn, Peru, Philippines, Palau, Papua New Guinea, Poland, Puerto Rico, North Korea, Portugal, Paraguay, Palestine, French Polynesia, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Serbia & Montenegro, Sudan, Senegal, Singapore, South Georgia & South S.S., St. Helena, Solomon Islands, Sierra Leone, El Salvador, San Marino, Somalia, Serbia, Sao Tome & Principe, Surinam, Slovakia, Slovenia, Sweden, Swaziland, Seychelles, Syria, Turks & Caicos Islands, Chad, Togo, Thailand, Tajikistan, Tokelau, Turkmenistan, Timor-Leste, Tonga, Trinidad & Tobago, Tunisia, Turkey, Tuvalu, Taiwan, Tanzania, Uganda, Ukraine, U.S. Minor Islands, Uruguay, United States, Uzbekistan, Holy See (Vatican), St. Vincent & The Grenadines, Venezuela, Virgin Islands (British), Virgin Islands (U.S.), Vietnam, Vanuatu, Wallis & Futuna Islands, Samoa, Yemen, Yugoslavia, South Africa, Zambia, Zimbabwe
The DESTA variable used in this chapter from Dür et.al. (2014) is simply the answer to the following question:

“Does the agreement include substantive provisions stipulating the liberalization of trade in services?”

where the responses are coded as follows:

0 no mention of services trade liberalization
1 services trade liberalization mentioned as general objective
2 substantive provisions liberalizing trade in services

To construct DEPTH, we combine coded responses to selective questions in Dür et.al.(2014) in an additive index. We regard these questions as more relevant in terms of the effect of their responses on services trade: Are services liberalized following a positive or a negative list approach? Does the services chapter contain an MFN clause? Does the services chapter contain a national treatment clause? Does the services chapter grant the right of non-establishment (i.e. does it allow the provision of services without local presence)? Does the services chapter allow for the movement of natural persons in the provision of services?

The responses to the questions used in constructing DEPTH have the following codes associated with them:

a) Are services liberalized following a positive or a negative list approach?

0 no substantive service provisions

1 positive list approach (list of sectors to be covered)
2 negative list approach (all sectors are covered except those listed)

b) Does the services chapter contain an MFN clause?

0 no service chapter
0 no MFN clause included in the service chapter
1 MFN clause included in the service chapter

c) Does the services chapter contain a national treatment clause?

0 no service chapter
0 no national treatment clause included in the service chapter
1 national treatment clause included in the service chapter that is limited in scope to specific sectors
2 national treatment clause included in the service chapter

d) Does the services chapter grant the right of non-establishment?

0 no service chapter
0 the right of non-establishment is not explicitly allowed (it may be either omitted or explicitly excluded)
1 the right of non-establishment is explicitly granted

e) Does the services chapter allow for the movement of natural persons in the provision of services?

0 no service chapter
0 movement of natural persons is not explicitly allowed (it may be either omitted or explicitly excluded)
1 movement of natural persons in the provision of services is explicitly allowed

f) Does the services chapter include a review provision?

0 no service chapter
0 no review provision in service chapter
1 review provision in service chapter

The DEPTH variable simply adds up the responses to questions (a) through (f).
While not all the questions used in constructing the DEPTH variable may be useful in terms of the impact of their responses on services trade, selective use of the questions in an alternative index is unlikely to alter the main message of our analyses i.e. accounting for the different provisions found in STAs reduces the magnitude of the estimated trade effect compared to the conventional 0/1 STA dummy.