Free Trade Agreements, Customs Unions in Disguise?

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Abstract

Using 19 years of tariff data for 121 countries and 4579 products, we document a hitherto overlooked stylized fact: countries' external tariff schedules are surprisingly similar. The correlation is particularly striking for countries belonging to the same deep preferential trade agreement. We show that most of this is due ex post convergence rather than to selection effects. Bilateral tariff differences at the product level are smaller in absolute level than transportation costs for 71% of all country pairs. This has an important implication: In most preferential trade agreements, for a vast majority of products, trade deflection is not profitable even in the absence of costly rules of origin.

Keywords: Free Trade Agreements, Rules of Origin, External Tariffs

JEL-Classification: F10, F13, F15

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1 Introduction

Traditionally, trade economists prefer customs unions (CUs) over free trade areas (FTAs) because the former create as much trade as the latter but typically divert trade less (A. Krueger 1997).[1] Nonetheless, less than 10% of all trade agreements in 2016 are CUs (Dür et al. 2014; Freund and Ornelas 2010).

While CUs have a common external tariff, this is not the case with FTAs, at least formally. For this reason, in contrast to CUs, FTAs require rules of origin (RoOs) that define under which conditions a good is said to originate from a member country of the FTA so that it can benefit from a preferential tariff. Complying with these rules causes costly red tape (Anson et al. 2005; Cadot, Estevadeordal, et al. 2006; Carrere and Melo 2006; Estevadeordal 2000). Moreover, they can distort firms' input sourcing (Conconi et al. 2016; Krishna and A. O. Krueger 1995). But without RoOs, each imported commodity would enter the FTA through the country with the lowest item tariff. This arbitrage activity, often referred to as trade deflection, would, de facto, act as the FTA's common external tariff. If countries formed CUs instead of FTAs, Bhagwati's (1995) spaghetti bowl of bilateral trade regimes would be less indigestible. But, clearly, trade deflection would make the process to reach an agreement harder, imposing similar difficulties as current multilateral negotiations are facing.

In this paper we document an important stylized fact that has been overlooked so far, but that has major implications for the design of FTAs. Using a newly compiled data set of MFN (most favored nation) and preferential tariffs at the 6-digit level, we show that countries tend to set their external tariffs quite similarly. This is even more pronounced amongst members of ambitious FTAs. So, while CUs are empirically rare (only about 10% of preferential trade agreements), it appears that many modern FTAs are, in fact, CUs in disguise. With similar external tariffs, there would be no economic rationale for RoOs and the red tape that they come with. In cases where we observe RoOs nonetheless, they must be due to protectionist motives, e.g., to make the use of preferences more costly or to influence their sourcing decisions. The upshot is that FTAs should not require proof of origin except for those few items which display differences in external tariffs larger than the additional transportation costs that would arise if firms attempt to exploit tariff differences.

[1] In this paper, when we use the term free trade agreements, we mean *preferential* trade agreements.

We study econometrically why external tariffs of FTA members are similar. There are two leading hypotheses: First, similarity could be due to selection if countries with similar economic structures (and, hence, similar schedules of external tariffs) chose to form FTAs. Second, similarity could also result from some convergence process set off as a consequence of FTA formation. We find that the second hypothesis is most plausible, but there is also some evidence for the first.

Concern with rules of origin and their side effects is wide-spread in the literature. It is a key ingredient in Bhagwati's (1995) "Spaghetti Bowl" parabole. In his words, RoOs are "*inherently arbitrary*". They make "*the occupation of lobbyists (who seek to protect by fiddling with the adoption of these rules and then with the estimates that underlie the application of these rules ... immensely profitable at our expense.*" More generally, as also highlighted by Baldwin (2016), with the spread of international production networks it is increasingly problematic to operate trade policy on the assumption that one can cleanly identify the nationality of a product. A a consequence, FTAs are "*tying up trade policy in knots and absurdities and facilitating protectionist capture* " (Bhagwati 1995).[2]

RoOs come under many disguises. All regimes require that a product undergoes "substantial transformation" in the originating country. This could be a minimum value added content requirement, a change in tariff chapter, or a combination of these. For example, the text of a modern trade agreement, the Trans-Pacific Partnership agreement (TPP), defines the following RoOs for a textile good falling under HS heading 5804.10 ("Tulles and other Net Fabrics"): "*A change to a good of subheading 5804.10 from any other chapter, except from heading 51.11 through 51.13, 52.04 through 52.12 or 54.01 through 54.02, subheading 5403.33 through 5403.39 or 5403.42 through 5403.49, or heading 54.04 through 54.08, or chapter 55.*" Needless to say, if countries are members to different FTAs, they have to comply to potentially different and conflicting RoOs.

These bureaucratic costs reduce the value of trade agreements. To maintain the preferential nature of a trade agreement, RoOs are justifiable when members set external tariffs sufficiently different; otherwise, they would simply be one form of messy protectionism. Recently, a host of papers have documented the costs of RoOs. Deardorff (2016) shows analytically by means of

[2]These concerns apply mostly to tariffs; however, they also apply to other provisions in FTAs which are meant to be preferential. The arguments in this paper carry over to these cases.

a simple model that even when every country has an FTA with every other country RoOs can yield a lower level of welfare than in the situation where no FTA was present and only MFN tariffs apply. The theoretical literature points to three reasons why complying with RoOs is costly: first, the detailed and highly complex product-by-product criteria make them hard to meet. Exporter need to build up (legal) know-how to comply with the rules. Second, exporters face different RoOs depending on the export-destination due to multiple FTAs with little overlap in the design of the RoOs[3]. Third, exporters might want to change production processes to meet RoOs requirements, distorting trade patterns and investment flows (Krishna 2006; Krishna and A. O. Krueger 1995).

The empirical evidence confirms the negative effects of complying with RoOs. The compliance costs associated with meeting RoOs requirements range from 3-15% of final product prices depending on the method used to measure the restrictiveness of RoOs (Anson et al. 2005; Cadot, Estevadeordal, et al. 2006; Carrere and Melo 2006; Estevadeordal 2000). Andersson (2015), Augier et al. (2005), and Bombarda and Gamberoni (2013) use the liberalization of the EU RoOs as a natural experiment and find it to have a positive effect on total trade. Constructing a new database on the NAFTA RoOs Conconi et al. (2016) show that RoOs on final goods reduce imports of intermediate goods from third countries by around 30%-points. Further, firm-level evidence suggests heterogeneity across firms as mostly larger firms actually comply with the RoOs (Cadot, Graziano, et al. 2014; Demidova et al. 2012). Firm surveys show that RoOs hinder firms to use FTA preferences (Suominen and Harris 2009; Wignaraja et al. 2010). Also preference utilization rates of less than 100% indicate the high fixed costs associated with RoOs making it unprofitable for exporters to comply with the rules (Keck and Lendle 2012).

According to our reading of the literature, while the effects of the RoOs on trade flows have been analyzed extensively, the question whether they are actually necessary has not been answered yet. We aim to fill this gap. In this paper we want to check how large the differences in external tariffs actually are, and whether country-pairs with an FTA have systematically lower differences in external tariffs.

There is also a theoretical literature on the choice between FTAs and CUs. We have already

[3]Estevadeordal and Suominen (2006) review the types of RoOs used around the world and find significant heterogeneity with respect to the exact requirements as well as the level of restrictiveness.

mentioned the seminal paper by A. Krueger (1997). In contrast to the case of CUs, in FTAs participating countries keep autonomy over external tariffs. This should make it easier to actually conclude a trade agreement because members do not have to delegate policy making authority to a common institution. Facchini et al. (2013) provide theoretical arguments to show that, in a political economy model with imperfect competition, FTAs might yield higher welfare for the prospective member countries when voters strategically choose a very protectionist representative to conduct the negotiations. Clearly, it is possible that, under certain conditions, members in FTAs could find it optimal to choose similar sets of external tariffs. Appelbaum and Melatos (2012) model this possibility and talk about "camouflaged" CUs. Their paper provides a theoretical explanation for our empirical findings.

The rest of this paper proceeds in three steps. Section 2 introduces a new tariff database, that deals with the well-known issue of missing data in the standard sources for tariffs (TRAINS and World Bank). For the MFN tariffs we deal with the missing data in the following way: rather than replacing missing MFN tariffs by linearly interpolating observations, missing values are set equal to the nearest preceding observation. If there is no preceding observation, missing MFN tariffs are set equal to the nearest succeeding observation. For preferential tariffs we use information for more than 500 FTAs[4] on the agreed phasing-in to impute in the most adequate way. Using the new tariff data we calculate the differences in external tariffs for every pair-product combination (6-digits). Further, we construct pair-product specific transportation costs using disaggregated data on cif-fob imports for the US. The cif-fob ratios yield a US-specific measure of transportation costs for every product-exporter combination, which we use than to infer transportation costs for all other product-pair combinations by means of out-of-sample prediction.

Section 3 uses the data to assess countries' differences in external tariffs. We find that the level of tariff similarity is high: for 77% of the import values in 2014 the difference in external tariffs was at most 3%-points. When explicitly accounting for other transportation costs, the picture becomes even clearer, as for 70% of the tariff lines the differences in external tariffs do not exceed the transportation costs. Therefore, trade deflection becomes unprofitable and the economic rationale for RoOs vanishes. Furthermore, the data indicate that members of a deep

[4] The information on the phasing-in regime stems from DESTA (Dür et al. 2014).

FTA choose more similar tariffs schedules than country pairs without an FTA; the opposite holds for shallow FTAs.

This finding raises the question whether tariff similarity in deep FTAs is due to an ex ante *Selection Effect* or to an ex post *FTA Effect*. The former arises if countries with more similar external tariffs are more likely to form a deep FTA, e.g., because the same variables that make the creation of an FTA more likely also make more similar external tariff structures more likely. The *FTA Effect* means that, once the FTA is concluded, countries chose more similar optimal schedules of external tariffs, e.g., because industry structures change through processes like technological transfer or foreign direct investment, or because the FTA induces further external trade liberalization.

In section 4 we use simple panel econometrics to identify the relative strength of these potential channels. More precisely, we employ a difference-in-differences approach. We compare country-pairs with a deep and shallow FTA, respectively, to those without. The structure of our data allows to account in the most flexible way possible for omitted variables by a full set of fixed effects. We find for pairs with a deep FTA the *FTA Effect* to be dominant but also the *Selection Channel* can account for some of the pattern in the data, while for pairs with a shallow FTA only the *Selection Channel* matters. We can show that this pattern is mostly driven by lower tariff levels. The pattern in the data suggests rethinking the current practice of requiring proof of origin by default, which has significant implications for future trade policy.[5]

Finally, in Section 5, we draw policy conclusions. The most important is that one could substantially relax the requirements to prove the origin of goods in many FTAs because trade deflection is profitable only in a few product lines. More specifically, we suggest that, in new FTAs, negotiators do agree on a full set of RoOs for all products, but that that the requirement to prove origin is activated only if external tariffs of FTA members differ by some minimum amount. Our proposal could disentangle Bhagwati's spaghetti bowl a bit. It could also help dealing with the exit of countries from long established CUs, such as Britain's or Turkey's exit from the EU. Under our proposed scheme, countries could exit the CU without unduly

[5]This part of our paper, adds to a literature which analyzes whether preferential trade liberalization leads to lower or higher external tariffs (see Freund and Ornelas (2010) for a review). Empirical analysis based on developing countries finds evidence for a positive correlation (Calvo-Pardo et al. 2011; Crivelli 2016; Estevadeordal, Freund, et al. 2008). For developed countries the evidence is mixed; see Ketterer et al. (2014) for CUSFTA, and Karacaovali and Limão (2008) and Limão (2006) for the EU and the US, respectively.

endangering existing production networks.

2 Data

Our goal is to analyze the differences in external tariffs between country-pairs, check how large they are, and quantify to what amount pairs with an FTA set tariffs in a more similar way than those without. In this section we first describe the newly constructed underlying tariff database, second we explain our measure for tariff similarity, third the source for the FTA data is presented, and fourth we show data on product-pair specific transportation costs.

2.1 New Tariff Database

For the empirical analysis ideally we would need data on the effectively applied tariff imposed by an importer for every good from any destination country. The effectively applied tariff equals the MFN tariff for imports from countries where no FTA is in place, whenever there is an FTA we are interested in the preferential tariff. To minimize the aggregation bias the ideal data would be as disaggregated as possible. As trade deflection could happen in theory with any third country where an FTA exists, the perfect data would provide information for the universe of countries. In the empirical strategy we will use time variation in the presence of the FTAs to disentangle the channels at work. Therefore, the longer the panel, the better for identification.

Using the World Bank's World Integrated System (WITS) software, which pools data from the United Nations and the World Bank, we combine all publicly available information on MFN tariffs, preferential tariffs as well as ad valorem equivalents of non advalorem tariffs. We gather information of more than 150 countries on the 6-digit product level of the common HS system with some of the data dating back to 1988. Whenever more than one preferential scheme applies (i.e. a bilateral FTA and the General System of Preferences), multiple preferential tariffs might be observable for trade in a particular product between two countries. We always assume the lowest preferential tariff to be effectively in place.

Even though in theory the data provided by the WITS should be exactly what we are looking for, its substantial incompleteness is a major issue. As Anderson and Wincoop (2004) state *"the grossly incomplete and inaccurate information on policy barriers available to researchers is* *a scandal and a puzzle" (p. 693).* Most countries do not report tariffs every year: for example in 1999 out of 121 reporting countries only 43% reported tariffs. Although the coverage improved over time, it is far from perfect even in the recent years. Even more troublesome for any empirical analysis is the fact that the set of countries that report only sporadically is not random but rather consists mostly of developing countries (see Figure A1 in the appendix). As tariffs tend to be systematically different between developing and developed countries, the non-random pattern of missing data will bias results.

So far, there is no consensus in the literature how to tackle the problem. We deal with the missing data in the following way: rather than replacing missing MFN tariffs by linearly interpolating observations, missing values are set equal to the nearest preceding observation. The procedure accounts for the fact that countries are more likely to update schedules after a significant tariff change. If there is no preceding observation, missing MFN tariffs are set equal to the nearest succeeding observation. For preferential tariffs interpolating is significantly harder because FTAs have often been phased-in instead of cutting all tariffs immediately when the FTA enters into force. We use information on the agreed phasing-in for more than 500 FTAs provided by DESTA (Dür et al. 2014) to impute the data in the most adequate way (see the appendix for details).

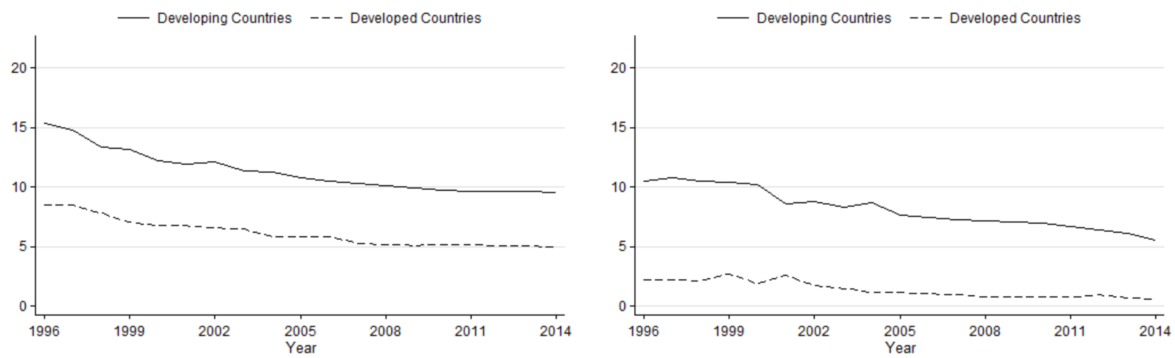
Table A2 in the appendix shows the number of observations that WITS provides and the number of observations that we end up having after the interpolation. The difference is especially in the early years of the sample striking, for later years the reporting coverage improves significantly. As the quality of the tariff data in terms of percentage of countries improves significantly after the entering into force of the World Trade Organization (WTO) in 1995 (see Figure A1 in the Appendix), we will focus on the period 1996-2014. Except for Caliendo et al. (2015)[6] to the best of our knowledge there is no comparable data base for tariffs in terms of country- and time-coverage as well as level of disaggregation at hand.

As Figure 1(a) shows, the MFN tariffs have decreased quite substantially since 1996. We

[6] Caliendo et al. (2015) have constructed a similar database. Additionally to the tariffs provided by the WITS they add data from three other sources: manually collected tariff schedules published by the International Customs Tariffs Bureau, US tariff schedules from the US International Trade Commission, and US tariff schedules derived from detailed US tariff revenue and trade data provided by the Center for International Data at UC Davis. The imputation algorithm is very similar to ours with the drawback that they only have information on approximately 100 FTAs and their phasing-in regimes.

Figure 1: MFN and Preferential Tariffs over Time

(a) MFN Tariffs $\bar{t}_t^{MFN}$ (b) Preferential Tariffs $\bar{t}_t^{Pref}$



We use the UN definition to determine the development status of a country. Developed countries are Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All others belong to the group of developing countries. We show unweighted averages: $\bar{t}_t^{MFN} = \sum_{k\in\mathcal{K}} \frac{1}{|\mathcal{K}|} \sum_{i\in\mathcal{I}} \frac{1}{|\mathcal{I}|} t_{ikt}^{MFN}$ and $\bar{t}_t^{Pref} = \sum_{k\in\mathcal{K}} \frac{1}{|\mathcal{K}|} \sum_{i\in\mathcal{I}} \frac{1}{|\mathcal{I}|} \sum_{j\in\mathcal{J}} \frac{1}{|\mathcal{J}|} t_{ijkt}^{Pref}$, with k products, i importing countries, j exporting countries, and t equals years.

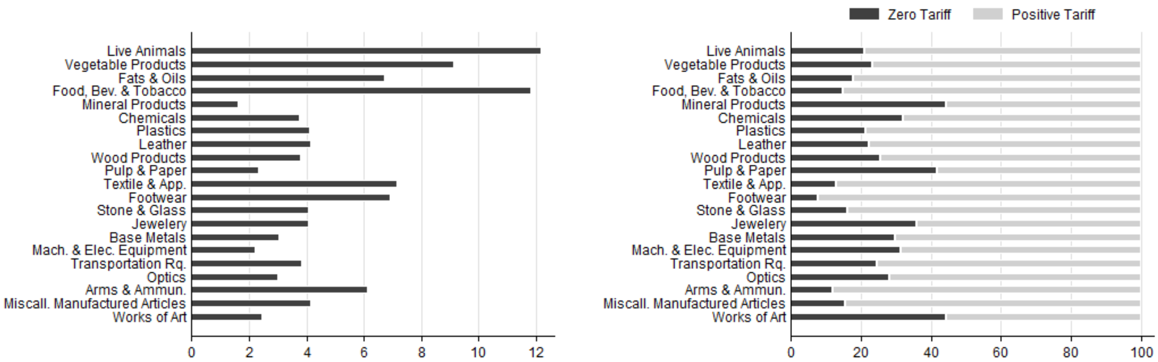
show for each year t the unweighted mean $\bar{t}_t^{MFN} = \sum_{k\in\mathcal{K}} \frac{1}{|\mathcal{K}|} \sum_{i\in\mathcal{I}} \frac{1}{|\mathcal{I}|} t_{ikt}^{MFN}$, with k products, and i importing countries for developing and developed countries separately. For both developed and developing countries the level of MFN tariffs decreased by roughly 5%-points between 1996 and 2014. Developing countries had on average a MFN tariff of 15.36% in 1996, while it equals only 9.58% in 2014. For developed countries MFN tariffs decreased in the period of observation from 8.53% to 4.92%. One can observe for both groups of countries a sharp decline between 1996 and 2005, afterwards the MFN tariffs remain rather stable. The observed pattern shows the success of the Uruguay Round, which was concluded in 1994 and stipulated tariff cuts to be put into effect until 2005. Since 1996 the preferential tariffs (see Figure 1(b)) of the developed countries have been on a rather low level, ranging between 0.57 and 2.72%-points. For the developing countries, a decreasing time trend can be observed resulting in an average preferential tariff in 2014 of 5.52%-points. Again, we are showing an unweighted average of the preferential tariff over all products and country-pairs, $\bar{t}_t^{Pref} = \sum_{k\in\mathcal{K}} \frac{1}{|\mathcal{K}|} \sum_{i\in\mathcal{I}} \frac{1}{|\mathcal{I}|} \sum_{j\in\mathcal{J}} \frac{1}{|\mathcal{J}|} t_{ijkt}^{Pref}$, with k products, i importing countries, j exporting countries, and t equals years.

The preference margin - the difference between MFN and preferential tariffs $\bar{t}_t^{MFN} - \bar{t}_t^{Pref}$ - is essential when determining the relevance of RoOs: exporters will only comply with them, when the preference margin is large. In 2014, it equals on average 4.23%-points. However, there is large heterogeneity across the different industry sectors. Figure 2(a) shows for 2014 the preference

Figure 2: Preference Margin and Share of Zero MFN Tariffs (%-points) by HS-Sections

(a) Preference Margin $\bar{t}_s^{MFN} - \bar{t}_s^{Pref}$

(b) Share of Zero MFN Tariffs $\frac{1}{|\mathcal{K}_s| \times |\mathcal{I}|} \sum_{k \in \mathcal{K}_s} t_{ik}^0$



The preference margin is the difference between the MFN tariff a country applies and the preferential tariff it offers its FTA partners. The share of zero MFN Tariffs is the number of zero MFN tariffs as a percentage of the total number of MFN tariffs. We present unweighted averages for 2014: $\bar{t}_s^{MFN} - \bar{t}_s^{Pref} = \sum_{k \in \mathcal{K}_s} \frac{1}{|\mathcal{K}_s|} \sum_{i \in \mathcal{I}} \frac{1}{|\mathcal{I}|} t_{ikt}^{MFN} - \sum_{k \in \mathcal{K}_s} \frac{1}{|\mathcal{K}_s|} \sum_{i \in \mathcal{I}} \frac{1}{|\mathcal{I}|} \sum_{j \in \mathcal{J}} \frac{1}{|\mathcal{J}|} t_{ijkt}^{Pref}$, with k products, S sections, i importing countries, j exporting countries, and $t_{ik}^0 = \{1 | t_{ik}^{MFN} = 0\}$.

margin by section, $\bar{t}_s^{MFN} - \bar{t}_s^{Pref} = \sum_{k \in \mathcal{K}_s} \frac{1}{|\mathcal{K}_s|} \sum_{i \in \mathcal{I}} \frac{1}{|\mathcal{I}|} t_{ikt}^{MFN} - \sum_{k \in \mathcal{K}_s} \frac{1}{|\mathcal{K}_s|} \sum_{i \in \mathcal{I}} \frac{1}{|\mathcal{I}|} \sum_{j \in \mathcal{J}} \frac{1}{|\mathcal{J}|} t_{ijkt}^{Pref}$, with k products, S sections, i importing countries, and j exporting countries.

It is lowest for mineral products (1.44%-points), and highest for live animals (11.66%-points). Overall it is largest for the agricultural sector - live animals, vegetable products, fats & oils, and food, beverages & tobacco. The textile sector (textile & apparel and footwear) as well as arms and ammunition are with 5 to 6%-points somewhat in the middle, while the preference margin is rather low for the remaining products.

Every product for which the MFN tariff equals zero is not affected by RoOs at all because the exporter has no incentive to comply with the RoOs in the first place. Again, depending on the specific sector the probability of a zero MFN tariff differs. The higher the share of products with a zero MFN tariff, the weaker the argument in favor of the RoOs for the respective sector, because trade deflection is not an issue in these cases. Figure 2(b) shows the share of zero MFN tariffs by the different sections. The sections with the highest percentage of zero MFN tariffs (more than 40%) are Mineral Products, Pulp & Paper, and Works of Art. In contrast, the share only equals 7.78%-points for Footwear, for Textiles & Apparel, and Arms & Ammunition it equals roughly 12%-points.

2.2 Tariff Similarity

To evaluate whether harmful RoOs are justified, the external tariff vectors between country i and country j have to be compared. The most intuitive way to do so is to use the absolute difference between the tariff that country i imposes against a third country c and the tariff that country j imposes against c. If i and j set the same external tariffs, e.g. if they are members of a customs union, the difference equals zero. Thus, tariff similarity is lower the higher the difference. In theory we could calculate these differences for every country-pair ij with respect to a third country c. As we have data on the HS-6-digit level we can do so for every product k. However, with more than 5,000 products, the time- and pair-dimension, the number of observations would increase to a level impossible to handle. We deal with this issue by constructing first an import weighted tariff t^w_{ikt} for country i, product k, and time t. In a second step we calculate absolute differences in external tariffs using the weighted tariff.

Equation 1 describes how, in the first step, we construct the weighted tariff for each country i product k and time t combination. t^w_{ikt} is an import weighted average of the effectively applied tariff of country i for imports from country j. t_{ijkt} equals the preferential tariff if the country-pair ij has an FTA. Otherwise, t_{ijkt} equals the MFN tariff. The import weight $\frac{imp_{ijkt}}{imp^{tot}_{ikt}}$ equals the imports from j to i for a specific product k imp_{ijkt} as a share of the total value of imports of country i for product k (imp^{tot}_{ikt}), so the higher the relevance of a tariff in terms of import flows, the higher its weight in the import weighted tariff. The data for the imports stems from BACI (Gaulier et al. 2010). We end up with one weighted external tariff for country i, product k, for each year t.

$$t^w_{ikt} = \sum_{j=1}^{n} t_{ijkt} \times \frac{imp_{ijkt}}{imp^{tot}_{ikt}} \tag{1}$$

In a second step we construct the measure for tariff similarity between country i and j by calculating the absolute difference between the weighted tariff t^w_{ikt} of country i and t^w_{jkt} of country j for every product k at time t (see equation 2). The smaller the absolute difference in external tariffs Δt_{ijkt} for country-pair ij the higher the level of congruency of the external tariff vector of country i and j. As Table 1 shows, on average the absolute difference in external tariffs equals

10.62%-points.

$$\Delta t_{ijkt} = |t^w_{ikt} - t^w_{jkt}| \tag{2}$$

As mentioned above, due to data quality reasons we will focus on the period 1996-2014 for our analysis. In order to have a balanced panel we only keep countries for the analysis that are observed in every year of interest, leaving us with 121 countries (see the appendix for a complete list of the countries in the sample). Again, dimensionality is a curse: with 19 available years, roughly 2,500 products for each country-pair, and $121 \times 120 = 14,520$ country-pairs, if we did a yearly analysis the number of observations would exceed 666 Million. We restrict therefore the analysis to 1996 and 2014.

Table 1: Summary Statistics

	Mean	SD	Shallow PTA	Deep PTA	Δ
Absolute Difference in Tariffs	10.62	31.41	12.44	6.81	5.63***
Trade Costs (Product-Pair)	7.30	7.32	6.65	5.88	0.77***
Year of Entry into Force	1,998.17	9.11	1,991.84	2,005.59	-13.75***
Depth-Index $[0,7]$	2.25	2.25	1.27	5.89	-4.62***
FTA	0.40	0.49			
Deep PTA $[0,1]$	0.08	0.26			
Shallow PTA $[0,1]$	0.34	0.47			
Customs Union $[0,1]$	0.06	0.24			

The maximum number of observations equals 34.5 Million. The tariff data stems from WITS, the trade costs are based on own calculations using data from Schott (2008), the Year of Entry Into Force of the RTAs is based on own research, while all other information concerning RTAs is taken from DESTA (Dür et al. 2014).

2.3 FTA Data

Our analysis builds on the DESTA database by Dür et al. (2014), in the version of 27^{th} of June 2016. It comprises over 600 RTAs (FTAs as well as CUs) and the corresponding accessions and withdrawals, which is to the best of our knowledge the most complete list currently available (see Dür et al. (2014) for a detailed description)[7]. For our sample, on average the probability of

[7]Country-pairs might have signed more than only one FTA. For example, the Canada-United States FTA was signed in 1988 and was superseded by NAFTA in 1994. In our data such cases are modeled as follows: from 1988 until 1994 the Canada-United States FTA is the FTA between Canada and the US, and as soon as NAFTA entered into force it takes its place. Thus, the database accounts for changes in the FTA-landscape. In the few cases where the more recent FTA features a lower depth-index than the already existing one, the latter was used.

a country-pair having an FTA equals 40%, while it equals 6% for having a CU[8]. For the analysis it is important to clearly distinguish between those two types as RoOs are only an issue with FTAs. Besides the extraordinary high number of RTAs included in DESTA, for each agreement a measure of coverage depth is provided. The depth-index ranges from 0 to 7 and counts the number of provisions (partial scope agreement, substantive provisions on services, investments, standards, public procurement, competition, and intellectual property rights). So, if an RTA covers all seven provisions it will get assigned a depth-index of 7.

This classification is a big advantage of the DESTA database over other FTA-compilations like the WTO-RTA gateway or also the database provided by Baier, Bergstrand, and Feng (2014), as it allows to exploit the heterogeneity across RTAs. In our analysis we group all FTAs into two groups, namely shallow and deep agreements. All FTAs with a depth-index of less than 4 belong to the shallow FTAs, the remainder to the deep FTAs. The later is less common in our data: the probability of having a deep FTA equals 8% while the probability of having a shallow FTA is more than four times as much (34%). As the summary statistics show, for shallow FTAs the tariff similarity is significantly smaller than for deep FTAs, the differential equals 5.63%-points. We have manually researched the year of entry into force (EiF) for the FTAs in DESTA. In the few cases when we could not find an EiF-year, we used the year of ratification instead. On average the FTAs in our sample were entered into force between in 1998, however, there seem to be two generations of FTAs: the deep FTAs are a lot younger than the shallow FTAs (see Table 1).

2.4 Transportation Costs

When evaluating the necessity of RoOs, it is important to compare the absolute differences in external tariffs with the trade costs arising from trade deflection. A third country c will only transship its exports through country i to the final destination j when the difference in external tariffs $|t_{jck} - t_{ick}|$ exceeds the additionally arising trade costs. Therefore, it is crucial to have for every product-pair combination an adequate measure for those costs. Besides tariffs, other trade

The procedure ensures that for each country-pair only one FTA is included in the database.

[8] One shortcoming of the DESTA data is that it does not include information on whether the RTA is still in place. During our analysis we have found that the problem is especially pronounced for CUs. Therefore, we cross-check the DESTA data with the RTA dataset provided by Baier, Bergstrand, and Feng (2014) and use their data to determine whether a CU is in place.

costs like transportation costs, information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs arise (Anderson and Wincoop 2004). Ideally we would have a product-pair measure of all trade costs other than tariffs. However, due to data availability and partly the private nature of certain types of trade costs such as those associated with information barriers and contract enforcement this is impossible to do. We focus therefore in our analysis on transportation costs i.e. freight charges and insurance and present now how we construct those.

Anderson and Wincoop (2004) propose industry or shipping firm information to be the first best source of data for transportation costs as it is a direct measure. However, available data is scarce. Alternatively one can use cif/fob ratios. The ratio gives, for each country, the value of imports inclusive of carriage, insurance and freight, relative to their free on board value, the cost of the imports and all charges incurred in placing the merchandise aboard a carrier in the exporting port. Therefore, the closer the ratio gets to one, the lower the costs arising due to trade costs other than tariffs. Again, data limitations make this approach unfeasible: reliable data on cif- and fob-imports are not available for the set of countries we are interested in.

We go about this problem in the following way: first, using US data, originally provided by the US Census and cleaned by Schott (2008), we can determine bilateral ad-valorem transportation costs between the US and all its trade partners for every product k. The data includes information on the import value at fob and cif bases at the ten-digit HS level by exporter country and entry-port for the years 1989 until 2015. As the tariff data is on a 6-digit level we also have to aggregate the transportation costs up. We do so by taking the median of the cif/fob ratios within the 6-digit group. Thus, we end up with a US-specific measure of transportation costs $\tau^k_{US,i} = \frac{imp^{k,cif}_{US,i}}{imp^{k,fob}_{US,i}} \geq 1$ for every product-exporter $k - i$ combination.

In a second step we want to use the cif-fob ratios for the US to infer transportation costs for all other product-pair combinations. We assume the transportation costs to be a function of distance such that $\tau^k_{ij} = \alpha^k \left(D_{ij}\right)^{\delta^k}$ with $\delta^k \in (0, 1)$ so that non-tariff trade costs are an increasing, strictly concave function of geographical distance. Thus, it is possible to estimate the parameters α^k and δ^k for every product k for the US using $\tau^k_{US,c}$ and the bilateral distances between the US and its trading partners i, $D_{US,i}$. The information about the bilateral distances stem from CEPII. Taking logs makes OLS a feasible estimator. The regression equation equals

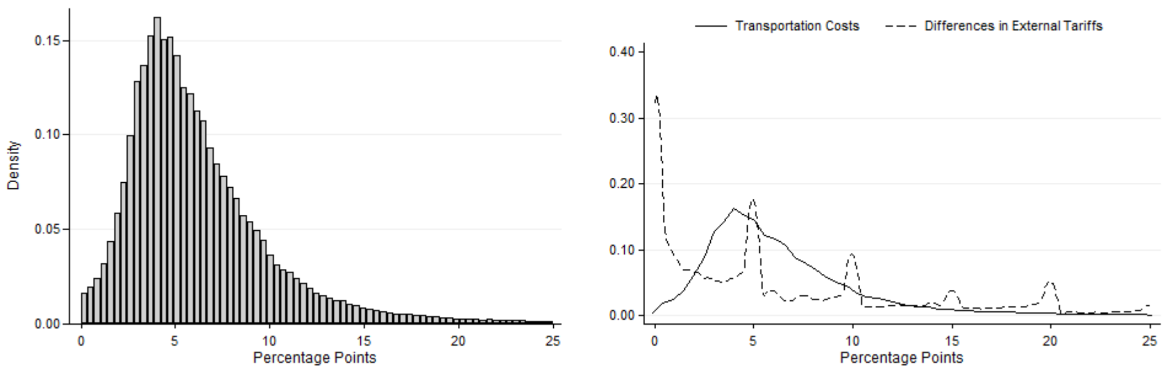
$ln(\tau^k_{US,i}) = \alpha^k + \delta^k ln(D_{US,i}) + u^k$. We regress the cif/fob ratios on the bilateral distance for every product separately. We end up with an average R^2 of 0.1, ranging between 0.003 and 0.93 depending on the specific product. On average $exp(\alpha) = 1.02$ indicating transportation costs of 2% that arise in case of a bilateral distance of zero. The coefficient for distance δ equals on average 0.02.

Now, it is possible to out-of-sample predict, for every country-pair and for every product k, an estimate transportation cost $\hat{\tau}^k_{ij} = exp(\hat{\alpha^k} + \hat{\delta^k} ln(D_{ij}))$. The trade costs equal on average 7.30% but are significantly lower between country-pairs with an FTA. The reason for this is most likely that the probability of an FTA increases with geographic proximity and transportation costs are lower for closer countries as well. Further, the deeper an FTA, the lower the transportation costs (see Table 1). Figure 3(a) shows the distribution of the estimated transportation costs. In Panel(b) the density functions for the difference in external tariffs and the transportation costs are plotted. One can see at a glance that there exist many tariff lines for which the tariffs are very similar (i.e. identical or at most 5%-points) and the transportation costs are greater than zero.

Figure 3: Transportation Costs (Pair-Product Specific)

(a) Distribution of Transportation Costs

(b) Density Function of Transportation Costs and Tariffs



The estimated transportation costs for every product-pair combination are for the year 2014. The data are truncated to values ≤ 25 and ≥ 0.

The transportation costs are by no means the only costs arising due to trade deflection. As Anderson and Wincoop (2004) report only roughly 7% of total trade costs can be alloted to transportation costs arising due to freight costs. A much higher fraction of total trade costs arise due to nontariff barriers, retail and whole-sale distribution costs, and border-related barriers. For our context this means that the transportation costs are understating the actual additional trade costs arising due to trade deflection.

3 Tariff Similarity and FTAs

In this section we will present new stylized facts about tariff similarity in terms of the overall level, the comparison with transportation costs, and heterogeneity across types of RTAs, regions, and industry sectors. We show cross-sectional data on the 6 digit product-level for 2014.

3.1 High Tariff Similarity

To evaluate whether RoOs are necessary it is important to understand better how large the differences in the external tariffs between countries actually are. A good indication is the cumulative distribution function for Δt^a_{ijk}, which is shown in figure 4(a). The higher up the graph, the higher the probability of having similar external tariff vectors. For 12% of the product-pair combinations the tariffs are identical between i and j, and for 42% the absolute difference in external tariffs amounts to at most 3%-points. In 61% of the cases Δt^a_{ijk} equals at most 5%-points, and for less than 20% it exceeds 10%-points. The evidence so far already suggests a rather high degree of tariff-similarity between country-pairs. However, it is hard to tell whether the congruency between countries is high enough to make trade deflection unprofitable and therefore RoOs unnecessary from an economic point of view.

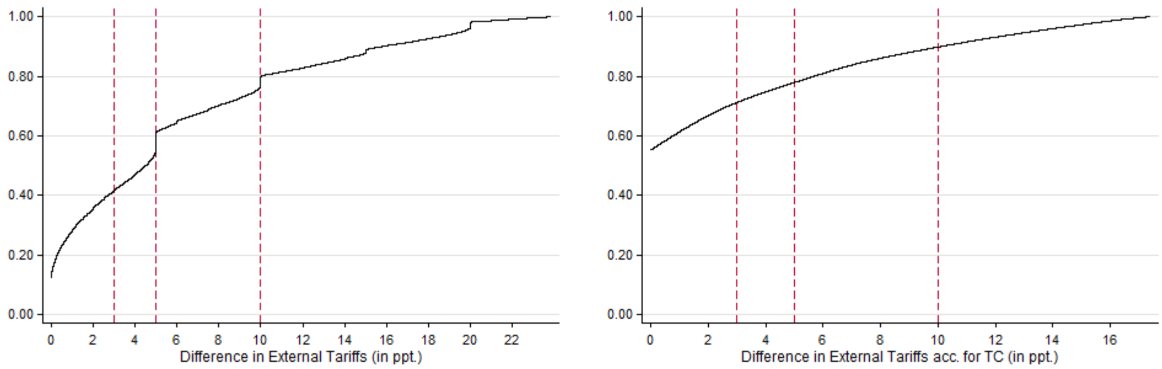
A definite statement on the necessity of RoOs is only possible when also considering the transportation costs and checking how many tariff lines could be possibly affected by trade deflection. To understand better how we can determine whether exporter have an incentive to transship products, consider the following reasoning: let total trade costs between i and j (for some product k) be given by tariffs t^k_{ij} and the minimum non-tariff trade costs τ^k_{ij} such that

$$T^k_{ij} = t^k_{ij} + \tau^k_{ij}.$$

Figure 4: Cumulative Distribution Function

(a) Absolute Difference Δt^{a}_{ijk} in External Tariffs

(b) Share of Tariff Lines possibly affected by Trade Deflection Δt^{t}_{ijk}



$\Delta t^{a}_{ijkt} = |t_{ikt} - t_{jkt}|$ with country i, country j, product k, and time t; $\Delta t^{t}_{ijkt} = max\{0, |t^{w}_{ikt} - t^{w}_{jkt}| - \tau_{ijkt}\}$ with country i, country j, product k, time t, and τ transportation costs. We show data for 2014. Panel (a): truncated to values ≤ 22, Panel (b): truncated to values ≤ 18.

Trade deflection would be worthwhile if cross-hauling through country c, with whom country i has a preferential trade agreement (FTA), leads to lower total trade costs, i.e., if

$$\begin{aligned} T^{k}_{ij} &> T^{k}_{ic} + T^{k}_{cj} \\ t^{k}_{ij} - \left(t^{k}_{ic} + t^{k}_{cj}\right) &> \left(\tau^{k}_{ic} + \tau^{k}_{cj}\right) - \tau^{k}_{ij} > 0, \end{aligned}$$

where the last inequality follows from the definition of τ^{k}_{ij}. So, the tariff saving through deflection must be at least as large as the additional transportation costs that arise when the good is channeled through country c. The last inequality follows from the fact that we define τ^{k}_{ij} as being the minimum non-tariff trade costs between i and j.

Since countries i and c are both member in the same FTA, we posit $t^{k}_{ic} = 0$. We may have the following cases:

1. Country c and countries i have the same external tariff such that $t^{k}_{ij} = t^{k}_{cj}$. Then, it is clear that the above inequality never can be met since $0 > 0$ is impossible.

2. Trade deflection is possible if $t^{k}_{cj} < t^{k}_{ij}$. However, this would require that

$$\Delta t^{k}_{ic} \equiv t^{k}_{ij} - t^{k}_{cj} > \tau^{k}_{ic} + \tau^{k}_{cj} - \tau^{k}_{ij}.$$

To make further progress, assume that transportation costs are a function of distance such that $\tau_{ij}^{k} = \alpha^{k} \left(D_{ij}\right)^{\delta^{k}}$ with $\delta^{k} \in (0,1)$ so that non-tariff trade costs are an increasing, strictly concave function of geographical distance. Since we define τ_{ij} as the minimum trade costs between i and j, it cannot be, that passing through c lowers trade costs. Moreover, even in the extreme case, where passing through c does not entail a longer route, so that $D_{ic} + D_{cj} = D_{ij}$, with a strictly concave functional form, we have

$$\left(\tau_{ic}^{k} + \tau_{cj}^{k}\right) > \tau_{ij}^{k}$$

since

$$\left(D_{ic}\right)^{\delta} + \left(D_{cj}\right)^{\delta} > \left(D_{ic} + D_{cj}\right)^{\delta}.$$

Now, it is an empirical question, whether the difference in external tariffs Δt_{ic}^{k} is large enough relative to the additional trade costs.

As described in section 2.4, we can generate an adequate measure for transportation costs for every product-pair combination. The transportation costs are in ad-valorem terms. Therefore, it is possible to compare them directly with the differences in external tariffs Δt_{ijk}^{a}. Trade deflection is only profitable if the savings in paid tariffs exceed the arising costs of transshipment. Therefore, even though there might be products with a strictly positive difference in external tariffs, the difference might not be sufficiently large enough for trade deflection to become profitable once an FTA is in place. Subtracting the predicted product-pair specific trade costs $\hat{\tau_{ij}^{k}}$ from the absolute difference in external tariffs Δt_{ijkt}^{a} yields a modified measure of tariff similarity $\Delta t_{ijkt}^{t} = max\{0, |t_{ikt}^{w} - t_{jkt}^{w}| - \tau_{i\hat{j}kt}\}$ that accounts directly for this. Whenever we find the transport costs to exceed absolute differences in external tariffs, we assume Δt_{ijkt}^{t} to be equal to zero since the prohibitive high transport costs have the same effect as a difference in external tariffs of zero: trade deflection becomes unprofitable. Recall, the trade costs other than tariffs exceed the transportation costs. Thus, even if t_{ijkt}^{t} is greater than zero, trade deflection might still not be profitable because of the other trade costs than tariffs and transportation costs that arise due to trade deflection and which we are unable to capture in our analysis. Thus, the results we present are a conservative assessment of the potential for trade deflection.

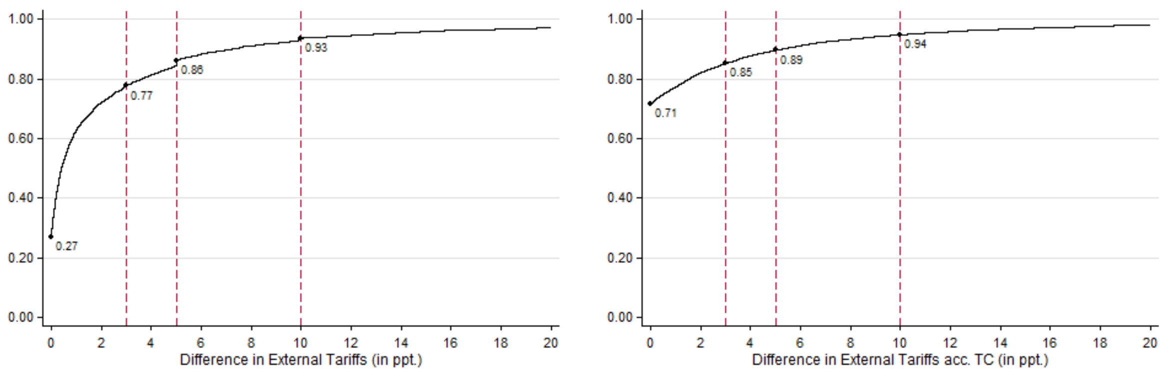
Figure 4(b) plots the cumulative distribution of the modified measure of tariff similarity Δt_{ijkt}^{t}

accounting for transportation costs. For almost 60% of the cases the difference in external tariffs does not exceed the trade costs, and for almost 80% of the product-pair combinations the Δt^t_{ijkt} is at most 5%-points. For more than half of the product-pair combinations the necessity of RoOs is more than doubtful, because there is no potential for trade deflection whatsoever.

Figure 5: The Share of Imports by the Differences in External Tariffs

(a) Absolute Difference Δt^a_{ijk} in External Tariffs

(b) Transportation Costs vs. Differences in Ext. Tariffs Δt^t_{ijk}



$\Delta t^a_{ijkt} = |t_{ikt} - t_{jkt}|$ with country i, country j, product k, and time t; $\Delta t^t_{ijk} = max\{0, |t^w_{ikt} - t^w_{jkt}| - \tau_{ijkt}\}$ with country i, country j, product k, time t, and τ transportations costs. The trade data stem from BACI. We show data for the year 2014. Truncated to values $\leq$ 20.

For RoOs imports matter: only if the demand for foreign products is there, trade deflection could potentially be a problem. Therefore, we check next how much of the total imports fall upon products with small differences in external tariffs. If most of the imported products had large differences in external tariffs, we could not make a statement about the necessity of RoOs. Figure 5(a) shows the share of imports as a function of the absolute difference in external tariffs. For 27% of the imports the difference in external tariffs is non-existent, for 77% it is less or equal 3%-points, and for 86% it amounts to at most 5%-points. So, indeed by far the most imports take place when the difference in external tariffs is low. When we account for the transportation costs the pattern is even more pronounced: for 71% of the products the differences in external tariffs do not exceed the transportation costs and thus RoOs are not necessary.

3.2 Heterogeneity across Regions and Types of RTAs

We check next for heterogeneity in the absolute differences in external tariffs across regions and types of RTAs. The results are summarized in Table 2 showing conditional cumulative probabilities. It shows in column (1) to (6) the probability of the absolute difference in external tariffs to be less than a certain threshold c, $P(t^a_{ijk}) \leq c)$. The remainder of the table shows the same for the tariff-differences when accounting for transportation costs ($P(t^t_{ijk}) \leq c)$). Panel (a) shows the probabilities for North-North, North-South, and South-South country-pairs. We use again the UN definition to determine the development status of a country. Panel (b) differentiates between pairs without an FTA, with a deep FTA, shallow FTA, and a Customs Union. The information on the type of the RTAs is taken from DESTA (Dür et al. 2014). In Panel (c)-(e) we look at the different regional and RTA types simultaneously. The cumulative distributions functions focusing on heterogeneity can be found in the appendix (Figures A2, A3, and A4).

The way countries set tariffs differs quite substantially between developing and developed countries since the former have a higher overall level of tariffs than the latter (see Figure 1). Therefore, for the tariff similarity we expect heterogeneity across regions. North-North countries show the highest degree of tariff similarity. For 24% of the tariff lines no difference in external tariffs is apparent whatsoever and for 85% the difference amounts to at most 3%-points (see Table 2 Panel(a)). Furthermore, for the vast majority of products (73%) trade deflection is not profitable, because even when the external tariffs are not identical, the transportation costs exceed the difference as column (7) shows. More pronounced intra-industry trade and therefore more similar industry-structures as well as low levels of tariffs overall can explain the high degree of tariff similarity for developed countries. For North-South and South-South pairs the differences in external tariffs are larger than for North-North. Nevertheless, also for those country-pairs the tariff similarity is strikingly high: for around half of the tariff lines the transportation costs exceed the differences in the tariffs (see Column (7)).

If FTAs were only formed in order to promote inter-industry trade, the tariff structure between country-pairs with an FTA would not necessarily be similar but instead differ quite substantially. However, if the main goal of an FTA is to promote intra-industry trade or to make general trade liberalization possible, the opposite were true. Furthermore, there might be confounding factors that matter for both, tariff similarity and the probability of having an FTA (i.e. countries'

Table 2: Heterogeneity across Regions and Types of RTAs: Conditional Cumulative Probabilities $P(t^a_{ijk}) \leq c)$ and $P(t^t_{ijk}) \leq c)$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	t^a_{ijk}						t^t_{ijk}					
	0	3	6	9	12	max	0	3	6	9	12	max
(a) ***Regions***												
North-North	24	85	95	98	99	100	73	88	94	97	98	100
North-South	11	39	60	67	77	100	54	67	76	82	87	100
South-South	10	31	56	64	76	100	47	64	74	82	88	100
(b) ***PTA***												
No PTA	12	35	59	66	76	100	53	68	77	83	89	100
Deep PTA	14	48	74	81	86	100	64	79	85	89	93	100
Shallow PTA	8	28	51	59	73	100	41	57	69	78	84	100
Customs Union	24	85	94	96	98	100	63	82	91	95	96	100
(c) ***North-North***												
No PTA	23	76	93	96	98	100	90	96	98	99	99	100
Deep PTA	31	72	87	94	96	100	73	88	94	97	98	100
Shallow PTA	40	80	93	95	97	100	87	94	96	98	99	100
Customs Union	25	89	96	98	99	100	65	85	93	96	98	100
(d) ***North-South***												
No PTA	12	42	62	69	78	100	57	70	78	84	88	100
Deep PTA	13	49	74	80	85	100	66	79	85	89	92	100
Shallow PTA	7	25	42	49	64	100	37	50	61	70	76	100
Customs Union	19	80	89	91	92	100	66	83	89	91	93	100
(e) ***South-South***												
No PTA	10	29	54	62	74	100	49	64	74	82	88	100
Deep PTA	21	41	76	86	93	100	50	72	85	91	94	100
Shallow PTA	8	30	55	65	78	100	44	61	73	82	88	100
Customs Union	25	68	82	88	92	100	52	71	82	89	93	100

The table shows the shares of tariff lines (in %-points) whose absolute difference in external tariffs lies below a certain threshold c. We focus in the different panels on heterogeneity across regions and types of RTAs and show data on the absolute difference in external tariffs in column (1)-(6), and when accounting for transportation costs in column (7)-(12). Panel (a) shows the distribution of the absolute difference in external tariffs for North-North, North-South, and South-South country-pairs. I.e. for North-North countries 24.99% of the tariff lines are identical. We use the UN definition to determine the development status of a country. Developed countries (North) are Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All others belong to the group of developing countries (South). Panel(b) differentiates between pairs without an FTA, with a deep FTA, shallow FTA, and a Customs Union. The information on the type of the RTAs is taken from DESTA (Dür et al. 2014). In Panel (c)-(e) we look at the different regional and RTA types simultaneously. I.e. for North-North countries without an FTA the share of identical tariff lines equals 22%, while for North-South countries without an FTA only 11% of the tariff lines have the same external tariff. We use data for 2014.

GDPs or bilateral distance). To check for potential heterogeneity across country-pairs depending on the presence of an FTA we add information on FTAs and its depth and calculate again the conditional cumulative probability of a tariff line lying different thresholds c ($P(t^a_{ijk}) \leq c|RTA_i = 1)$, with RTA_i indicating a CU, deep or shallow FTA). In the appendix the cumulative distribution functions can be found. Distinguishing between the different types of the RTAs yields a very interesting picture.

As Figure A3(a) and (b) and Table 2 Panel (b) show, while country-pairs with a deep FTA set their tariffs more alike than when no FTA is present, for those with a shallow FTA the opposite is true. The probability of having a tariff difference of at most 3%-points equals 35% for pairs without an FTA, 48% for pairs with a deep FTA, and only 28% for pairs with a shallow FTA. When accounting for transportation cost the picture becomes even clearer (see column (7)-(12)). For both types of FTAs the Kolmogorov-Smirnov test shows that the distributions of the differences in external tariffs are significantly different from the pairs with no FTA.

By definition, the absolute difference in external tariffs should equal 0 as in a CU countries agree to a common external tariff. Although the external tariffs exhibit a higher degree of similarity, the common external tariff cannot always be observed as Table 2 and Figure A3(c) show. One reason could be that specific products are excluded from the agreement. Since only information about the agreement is available but not on the specific arrangement for the respective products, differences in external tariffs can arise. Another reason could be that although countries are officially part of a CU, they might not be able or willing to stick to the common external tariff.

We have shown significant differences in tariff similarity across regions as well as across the types of FTAs. We check next whether the differences between deep and shallow FTAs can be found in the data for all regional types. Figure A4(a) and Table 2 Panel(c) show the results for North-North country-pairs for the different types of FTAs. Independently of the depth, North-North pairs with an FTA also set tariffs more similarly than those pairs without an FTA. Overall, the North-North pairs with a deep FTA set tariffs even more alike than those with a shallow FTA.

For North-South pairs a completely different picture emerges (Table 2 Panel(d) and Figure A4(b)): pairs with a deep FTA have a higher degree of tariff similarity than those North-South pairs without an FTA, whereas pairs with a shallow FTA set tariffs more differently. One potential explanation could be the very different nature of deep and shallow FTAs between North-South countries. The scope of shallow North-South FTAs is often not so much on bilateral trade lateralization but instead North countries try to promote growth and implement better living conditions via the FTA. For South-South pairs no large differences between different types of FTAs can be observed (Table 2 Panel(e) and Figure A4(c)), although the pairs with a deep FTA set again their tariffs somewhat more similarly. Thus, the heterogeneity across types of

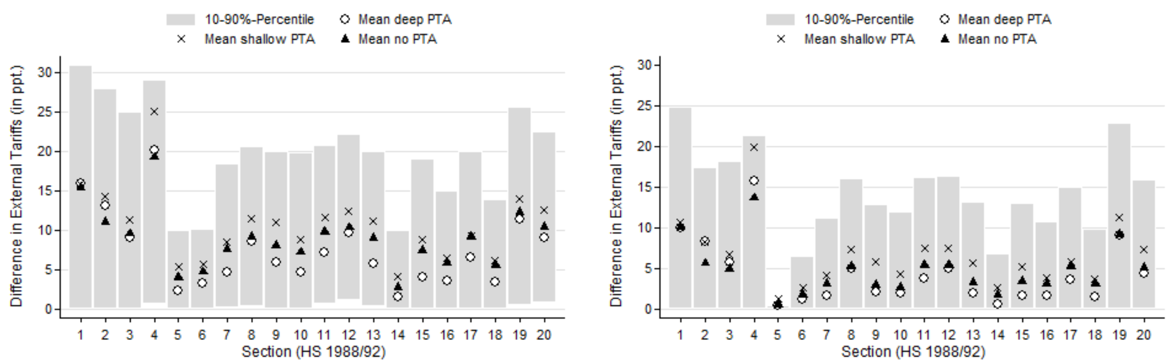
RTAs that can be observed in the aggregate, seems to stem mostly from North-South pairs.

3.3 Heterogeneity across Products

Even though we can present compelling arguments for an overall high degree of tariff similarity, we want to check for heterogeneity across products. Assume for all but one sector low differences in external tariffs. Only analyzing the mean will suggest redundancy of harmful RoOs, however, for this one sector, the RoOs have indeed a right to exist. Figure 6 shows the heterogeneity across products. The products are grouped into 20 sections. We show the range of the differences in external tariffs within a section excluding the extreme values. Then we plot the means within each section for pairs with a deep FTA, with a shallow FTA, and those without an FTA. All pairs that are in a CU are excluded to avoid to bias the measures with pairs that do not matter when thinking about RoOs. The analysis is conducted for both, the absolute difference in external tariffs Δt^a_{ijkt} and the modified measure Δt^t_{ijkt} to account for transportation costs.

Figure 6: Absolute Differences in External Tariffs - by Goods (Sections HS 1988/92)

(a) Absolute Difference Δt^a_{ijk} in External Tariffs (b) Trade Costs vs. Differences in Ext. Tariffs Δt^t_{ijk}



Sections (HS88/92-2 digits): 1 *Live Animals* (01-05); 2 *Vegetable Products* (06-14); 3 *Fats and Oils* (15); 4 *Food, Bev. & Tobacco* (16-27); 5 *Mineral Products* (25-27); 6 *Chemicals* (28-38); 7 *Plastics* (39-40); 8 *Leather Goods* (41-43); 9 *Wood Products* (44-46); 10 *Pulp and Paper* (47-49); 11 *Textile and App.* (50-63); 12 *Footwear* (64-67); 13 *Stone and Glass* (68-70); 14 *Jewelery* (71); 15 *Base Metals* (72-83); 16 *Mach. & Elec. Eq.* (84-85); 17 *Transportation Rq.* (87-89); 18 *Optics* (90-92); 19 *Arms & Ammun.* (93); 20 *Works of Art.* (97-98). The information about the RTAs stems from DESTA (Dür et al. 2014) and no CUs are included. $\Delta t^a_{ijk} = |t_{ik} - t_{jk}|$ with country i, country j and product k; $\Delta t^t_{ijk} = max\{0, |t^w_{ikt} - t^w_{jkt}| - \tau_{ijkt}\}$ with country i, country j, product k, time t, and τ transportation costs. We show data for 2014.

First, the range of the observed differences in external tariffs varies quite substantially across the sections. The products with the biggest variation in the absolute tariff differences belong to the agricultural sector (section 1 to 4) and the sector of arms and ammunition (19). In contrast, for mineral products (5), chemicals (6), and jewelery (14) the tariff differences do never exceed 10%-points. Second, large heterogeneity within sections is apparent depending on the type of the FTA. The absolute difference in external tariffs is for country-pairs with a shallow FTA never lower than for those pairs without an FTA, in fact, in many cases it is on average substantially larger. This is also true when taking the transportation costs into account (see figure 6(b)). The same is true for pairs with a deep FTA for the agricultural sector. However, in all the other sectors, pairs with a deep FTA set their tariffs much more alike than pairs without an FTA. Furthermore, the level of the average difference in external tariffs is for country-pairs with a deep FTA in many sectors particularly low (i.e. mineral products or jewelery).

When accounting for transportation costs, the level naturally decreases, and also the differential between deep FTAs and pairs without an FTA decreases. The most remarkable example are the products within the mineral products section, for which the differences in external tariffs never exceed the transportation costs. But also in other sections the means are rather low, indicating the little threat for trade deflection. The large heterogeneity across sectors stresses the different implications for RoOs: while for some products they might be indeed justified, for many other products the tariff similarity is high. The differences across types of FTAs cannot be observed in the agricultural sector, but hold up for all of the remaining sectors.

4 Selection vs. Convergence: Why have FTA Members Similar External Tariffs?

So far, we have presented new stylized facts that already question the current practice of installing harmful RoOs by default when an FTA is negotiated. We find large differences across the types of FTAs. For country-pairs with a deep FTA the tariff similarity is even higher than for pairs without an FTA, for pairs with a shallow FTA this cannot be said. In the remainder of the paper we want to try to give some more insights to this discussion and find out what drives these results. Are the pairs with a deep FTA systematically different and are those different characteristics the reason for the higher tariff similarity or does the FTA itself induce a change in the external tariffs?

4.1 Potential Channels and Empirical Strategy

The difference in external tariffs depends crucially on the "depth" of the agreement, defined as *"the extent to which (an agreement) requires states to depart from what they would have done in its absence" (Downs et al. 1996).* The very different nature of the two types of FTAs - deep versus shallow - could most likely cause the observed heterogeneity: first, the extent of the FTAs differs starkly across types. In shallow FTAs often whole sectors are excluded from the FTA, which is not the case for deep FTAs. Second, especially shallow FTAs between developed and developing countries might not have the primary goal to liberalize trade but instead serve as means to reach other goals. Third, deep FTAs often include many additional aspects than just tariff cuts potentially resulting in the observed differences across FTA types.

For the similarity in external tariffs industry structures as well as the overall level of tariffs matter: countries with more similar industry structures and therefore also higher similarity in the preferences for protectionism will exhibit a high congruency in the external tariff vectors. But also the level of tariffs matters: the more similar the overall level of tariffs, the higher the observed similarity in the external tariffs. Based on the existing literature we see two distinct channels through which FTAs, their depth, and tariff similarity might be related.

First, the literature on the formation of trade agreements (e.g. Baier and Bergstrand 2004) has identified some variables to increase the probability of agreeing upon an FTA, namely geographical distance, relative economic size, and factor endowment. These variables also determine the optimal tariff. Therefore, omitted variables could be the reason why we observe in the data country-pairs with an FTA to set tariffs in a more similar way. For deep FTAs reconciling special interests is even harder and therefore omitted variables might be of greater importance. Further, the overall level of tariffs decreases with the degree of development: industrialized countries have significantly lower levels of tariffs than their developing counterpart. At the same time in most of the deep FTAs at least one of the participating countries is a highly developed one. As the differences in external tariffs naturally decline with lower levels, the degree of development could drive the results. We will call this the *Selection Channel*.

Second, the FTA might have an effect of itself on tariff similarity. We will refer to the *FTA Effect* when talking about this mechanism. An FTA might change the economic structures of the partner-countries and thus induce convergence for example through technological transfers or FDI. Then the preferences for protection also converge, yielding more similar tariffs. As suggested by the "building block" literature, bilateral FTAs might give rise to further external trade liberalizations (see Freund and Ornelas (2010) for an overview). If both countries respond to an FTA with lower external tariffs, the absolute difference in the external tariffs will decrease as well, as tariffs of both countries converge to zero. One theoretical explanation for this behavior is the "Juggernaut Effect" put forward by Baldwin and Robert-Nicoud (2015)[9].

The domestic-commitment theory suggested by Maggi and Rodríguez-Clare (2007) can serve as an explanation for higher tariff similarity for North-South country-pairs. It says that trade agreements can serve as a commitment device for a government to close the door to domestic lobbies[10]. If the objective of a South country is to liberalize, one will observe as a result of the FTA a decrease in overall tariffs of this specific country. The difference in external tariffs will diminish because the former high-tariff country from the South transforms by means of the FTA to a low-tariff country and is as such more similar in its tariff-structure to the North-country than before.

To disentangle these two effects we employ a difference-in-differences (DiD) approach. When simply comparing differences in means the differential between those country-pairs with an FTA and those without includes both effects, the *Selection* and the *FTA Effect*. The main idea is to remove any potential bias induced by selection and to carefully identify the effect of the FTA. We do so by exploiting time variation in terms of having an FTA within a country-pair and the same product. We regress the absolute difference in external tariffs on the FTA dummy and control with a full set of fixed-effects in the most flexible way for omitted variables. Equation 3 shows the final specification:

[9] They can show that trade liberalizations might shift interests of lobbyists such that trade talks based on the principle of reciprocity lead to lower MFN tariffs. The key ingredients in this model are reciprocity and gradual firm exit and entry. Because of reciprocity exporters become anti-protectionists at home since foreign tariffs will come down only if domestic tariffs decrease as well. At the same time due to the trade liberalization the number of exporting firms increases while the opposite is true for importer. The result is a reshaped political economy landscape where lobbyists are more pro-trade, yielding lower MFN tariffs.

[10] For example Whalley (1998) states that Mexican negotiators of NAFTA *"were less concerned to secure an exchange of concessions between them and their negotiating partners, and were more concerned to make unilateral concessions to larger negotiating partners with whom they had little negotiating leverage... The idea was clearly to help lock in domestic policy reforms".*

$$\Delta t^a_{ijkt} = \beta_0 + \beta_1 FTA_{ijt} + \beta_2 Deep_{ijt} + \beta_3 CU_{ijt} + \gamma_{it} + \gamma_{jt} + \gamma_{kt} + \gamma_{ijk} + u_{ijkt} \quad (3)$$

where Δt^a_{ijk} equals the absolute difference in external tariffs between country i and j for product k at time t, FTA_{ijt} is a dummy variable, switching to 1 when an FTA between country i and j is at time t in place and 0 otherwise; $Deep_{ijt}$ equals 1 whenever the FTA is a deep one and CU_{ijt} is 1 if the agreement is a CU. γ_{it}, γ_{jt}, γ_{kt}, and γ_{ijk} are respectively importer-year, exporter-year, product-year, and pair-product fixed-effects. u_{ijkt} represents the error term. As mentioned above, to keep the number of observations as small as possible we only focus on two years, namely 1996 and 2014.

The country-pair-product fixed-effects account for all variables that might affect both the probability of having an FTA as well as the general propensity of having similar external tariffs within a 6-digit product. All time-invariant variables like distance, remoteness, and also - at least to a certain extent - the development status are accounted for when only exploiting time variation. The structure of our data allows to control for more potentially omitted variables: we allow country i and country j to be on different time trends by including $i - year$ and $j - year$ fixed-effects. Thus, we can eliminate any potentially time varying factors i.e. general country-trends like election cycles. As the analysis is conducted with only two periods, the γ_{it} and γ_{jt} fixed-effects also account for country-specific differences i.e. due to historical reasons. Product-time fixed-effects even potentially different levels depending on the specific product in the differences in external tariffs out and account for differing time trends of products. The standard-errors are two-way clustered on the pair- and the product-level. We do so to address the Bertrand et al. (2004)-critique, saying that the conventional DiD standard-errors severely understate the standard deviation of the estimators.

The size of the causally interpretable coefficient will determine which effect is driving the pattern in the data: if the dominant mechanism is the *FTA Effect*, we expect the difference between country-pairs with an FTA and the ones without to remain big and significantly different from zero once we control for omitted variables. If this is not the case, the *Selection Channel* seems to be stronger.

4.2 Results and Discussion

The results of the baseline regression analysis are reported in Table 3. Column (1) and (2) show how the absolute differences in tariffs Δt^a varies with the different types of FTAs, column (3) and (4) focus on the average on the two tariffs of the country-pair Δt^{mean}, column (5) and (6) includes import weights (Δt^w), (7) and (8) show results for the absolute difference in external tariffs normalized with the average tariff of the rest of the world Δt^n, in (9) and (10) we show how things change when instead of using the simple mean instead of the weighted one when calculating the differences (Δt^{simple}), and in column (11) and (12) we show the results when aanlyzing the absolute differences in MFN tariffs Δt^{MFN}. The results of the unconditional comparison in means for 2014 are presented in column (1), (3), (5), (7), (9), and (11), the other columns report the results for the specification including the full set of fixed-effects (importer-time, exporter-time, product-time, and pair-product fixed-effects).

As suggested by the descriptive evidence, our results (see column (1) and (2)) show that country-pairs with a deep FTA set tariffs in a more similar way than those without an FTA, while the opposite is true for pairs with a shallow FTA. Country-pairs with an FTA have on average a higher difference in external tariffs by 0.75%-points, when no controls are included. More interestingly, the coefficient is close to zero and insignificant when fully controlling for selection. This contrasts the findings for the pairs with the deep FTAs, where a higher degree of tariff-harmonization can be found.

The comparison in means for 2014 yields a 1.98%-point ($\beta_1 + \beta_2 = 0.752 - 2.733$) lower absolute difference in external tariffs compared to pairs without an FTA. On average the absolute difference in external tariffs equals 7.72%-points in 2014. Thus, a coefficient of -1.98%-points can be considered as rather large. When accounting for selection (see column (2)), and therefore only exploiting time-variation in the FTA variable, one can see that having a deep FTA yields a 1.57%-point lower absolute difference in external tariffs. Comparing this coefficient with the unconditional difference in means of column (1) in terms of size, stresses the importance of the *FTA-Effect*: our estimates suggest that 79% of the observed lower difference in tariff similarity between pairs with and without a deep FTA is caused by the FTA, the remainder is due to positive selection.

RoOs are not an issue for CUs since no proof of origin has to be provided. We conduct therefore the analysis for this type of RTAs more as a sort of robustness check for our findings: it would be very troubling if we do not find an effect of the CU on the difference in external tariffs as the common external tariff is the main feature of a CU. As expected we find them to have a significantly higher degree of tariff similarity than pairs without an RTA as well as those pairs with an FTA. The unconditional comparison in means suggests the difference in external tariffs to be 6.02%-points lower than for pairs with no RTA. In light of an average difference in external tariffs of 7.72%-points, the coefficient for CUs can be considered as large. Most of the observed difference seems to be caused by the CU, as the *FTA-Effect* equals 93%.

So far, we have established two interesting facts: first, country-pairs with a deep FTA seem to be systematically different from those without an FTA, causing them to set the external tariffs more alike. This positive selection accounts for 21% of the differential in the absolute difference in external tariffs between pairs with a deep FTA and those, without while the *FTA Effect* equals 79%. Second, for pairs with a shallow FTA the opposite is true since the level of tariff similarity is in general lower than for pairs without an FTA.

Next, we check to what extent the level of tariffs matters in this context: the higher the level of tariffs, the higher also the potential for differences in external tariffs. Thus, the higher differences in external tariffs for pairs with shallow FTA could be explained - at least partly - by a higher overall level of protection while the opposite might be true for pairs with a deep FTA and those with a CU. We can check for this channel directly, looking at the mean of the tariffs $\Delta t_{ijkt}^{mean} = \frac{1}{2}(t_{ikt}^{w} + t_{jkt}^{w})$ for country i, country j, and product k, at time t. The results of the analysis are displayed in Table 3 column (3) and (4).

Table 3: Analyzing the Channels of the Heterogeneity in Differences in External Tariffs by the Type of RTAs

	Δt^a		Δt^{mean}		Δt^w		Δt^n		Δt^{simple}		Δt^{mfn}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Shallow FTA	0.752***	-0.077	0.509***	-0.028***	0.374**	0.062	0.098***	0.042***	0.731***	0.481***	0.231**	0.353**
	(0.128)	(0.170)	(0.106)	(0.009)	(0.146)	(0.171)	(0.014)	(0.015)	(0.119)	(0.161)	(0.114)	(0.138)
Deep FTA	-2.733***	-1.497***	-3.448***	0.006	-2.026***	-1.467***	-0.420***	-0.157***	-2.286***	-1.492***	-1.899***	-0.852***
	(0.162)	(0.184)	(0.112)	(0.009)	(0.226)	(0.164)	(0.017)	(0.015)	(0.141)	(0.163)	(0.149)	(0.143)
Customs Union	-6.771***	-5.679***	-4.589***	0.071***	-6.273***	-5.337***	-0.842***	-0.616***	-7.535***	-6.691***	-7.433***	-5.457***
	(0.190)	(0.315)	(0.172)	(0.019)	(0.351)	(0.428)	(0.015)	(0.025)	(0.189)	(0.331)	(0.224)	(0.301)
R^2	0.005	0.908	0.010	0.921	0.007	0.860	0.035	0.802	0.006	0.899	0.005	0.903
Cross-Section	✗		✗		✗		✗		✗		✗	
Panel		✗		✗		✗		✗		✗		✗

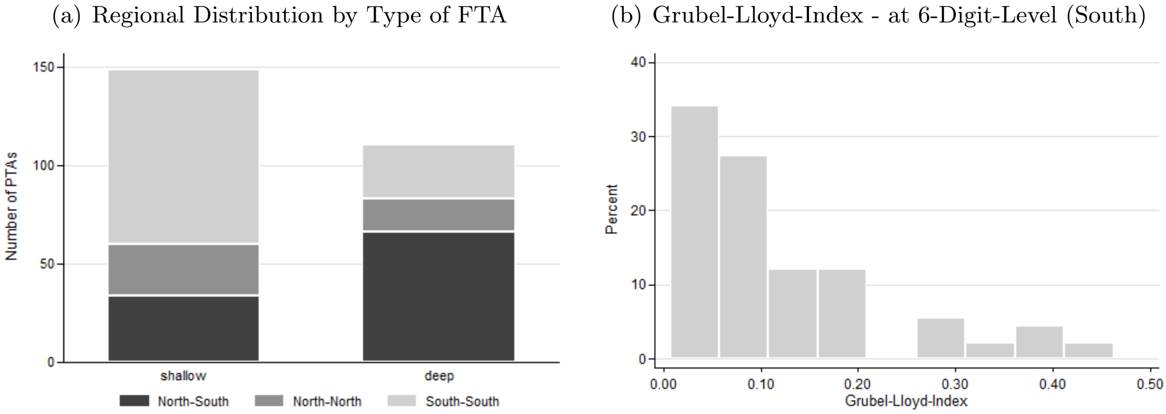
Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), (5), (7), (9), and (11) report the results for the unconditional comparison in means. In the remaining columns the full set of fixed-effects (importer-time, exporter-time, product-time, and pair-product fixed-effects) is included. Δt^a is the absolute difference in external tariffs, Δt^{mean} is the average of the two tariffs of the country-pair, Δt^n is the absolute difference in external tariffs normalized with the average tariff of the rest of the world, Δt^w includes import weights, t^{simple} uses instead of the trade-weighted average a simple average of import tariffs to calculate the differences in external tariffs, and Δt^{MFN} is the absolute difference in MFN tariffs. The number of observations equals in the panel 34,544,032 and in the cross-section 17,272,076.

The unconditional comparison in means shows that country-pairs with a shallow FTA have a slightly higher level of tariffs than pairs without an RTA (0.51%-points). Furthermore, the deeper the level of integration the lower the overall level of tariffs compared to pairs without an RTA: pairs with a deep FTA have on average a 2.94%-point lower level of tariffs and pairs with a CU 4.08%-points, respectively. The comparison in means already sheds some light on the drivers of the baseline results: the level of tariffs is inversely related with the level of integration, thus some of the pattern we observe in the difference in external tariffs is due to the level of tariffs. When controlling properly for selection having a shallow FTA decreases the average level of tariffs by 0.03%-points and no significantly different on-top effect can be found for introducing a deep FTA. For CUs however, the opposite is true and we find a small positive effect. These results go in line with Estevadeordal, Freund, et al. (2008).

At first sight it seems a bit puzzling that although both types of FTAs - shallow and deep - lower the level of tariffs, only for pairs with a deep FTA the difference in external tariffs decrease after the entry into force of the agreement. To understand the discrepancy across types of FTAs better, we group in figure 7(a) the FTAs by regional distribution of the country-pairs. Most of the shallow FTAs are agreements between South-South countries, while the majority of the deep FTAs are between North-South countries. The unweighted average tariff in 2014 for South countries equals 8.74%-point, while for North countries it is only 1.30%. Therefore, if South countries react to an FTA as our results and the literature proposes with further decreases in external tariffs (e.g. Crivelli (2016) and Estevadeordal, Freund, et al. (2008)), the difference in external tariffs between the low-tariff North and the former high-tariff South will decline. This effect will be stronger for deep FTAs for two reasons: first, the number of North-South agreements is higher for deep FTAs than for shallow FTAs. Second, the scope of shallow North-South FTAs is often not so much on bilateral trade lateralization but instead North countries try to promote growth and implement better living conditions via the FTA. This fact can explain the negative and significant *FTA Effect* for deep FTAs.

For the shallow FTAs, a higher degree of specialization in different sectors could be one potential explanation for the higher difference in external tariffs in the baseline specification in spite of the lower level of tariffs. If country-pairs engaging in shallow FTAs mostly exhibit inter-industry trade one will observe very different industry structures, resulting in large differences across sectors in the level of protection. Instead of importing the same goods and thus having lower tariffs for these goods, the trading countries will have very different tariffs for the same goods. As figure 7(b) shows, for the South-countries the Grubel-Lloyd Index is close to zero, indicating indeed inter-industry trade to be prevalent. If countries react to an FTA with reducing the tariffs also against third countries but the adjustment is not symmetric across the two countries, larger differences in external tariffs will be the result, as suggested by our baseline results for shallow FTAs.

Figure 7: Differences between North and South countries



We use the UN classification for developing (south) and developed (north) countries. North: Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All remaining countries belong to South. The Grubel-Lloyed-Index is an unweighted mean and calculated using trade data for 2014.

One could be concerned that all the products with low differences in external tariffs are products that are not actually being traded. We address this issue twofold: first, since we use trade-weights in order to calculate the weighted tariff t^w_{ikt} for country i all products that country i does not demand from abroad and are thus also not at risk for potential trade deflection are already excluded from the analysis. Second, we conduct the baseline analysis including trade weights (see column (5) and (6)), thus $\Delta t^w_{ijkt} = |t^w_{ikt} - t^w_{jkt}| \times w_{ijkt}$ with country i, country j, product k, and time t. The import weights equal $w_{ijkt} = \frac{imp_{ikt}+imp_{jkt}}{imp^{tot}_{it}+imp^{tot}_{jt}}$ where imp_{ikt} corresponds to imports (in \$ Dollar), of country i, of product k, in year t, and imp^{tot}_{it} equals the total imports of country i in t. If a certain product accounts for most of the total imports of a country-pair it will receive a higher weight than those that do not matter. As the coefficients of interests only change slightly, we conclude that our baseline results hold this robustness check.

We want to check next for the importance of multilateral trade liberalization as an omitted variable when looking at the unconditional comparison in means. One of the achievements of the Uruguay Round, which was concluded in 1994, was the commitment to reduce tariffs globally by one-third over ten years. As the overall level of tariffs has been for developed countries already rather low, most of the liberalization took place for developing countries leading to lower differences in external tariffs. At the same time the number of trade agreements increased significantly. To control for multilateral trade liberalizations we normalize the absolute difference in external tariffs Δt^a_{ijkt} with the average tariff of the rest of the world (RoW) for product k t^{RoW}_{kt}: $\Delta t^n_{ijkt} = \frac{|t^w_{ikt} - t^w_{jkt}|}{t^{RoW}_{kt}} = \frac{\Delta t^a_{ijkt}}{t^{RoW}_{kt}}$. The results are shown in Table 3, columns (7) and (8). For all types of RTAs the sign of the coefficients stays the same as in the baseline specification but the magnitude decreases substantially. However, also when controlling for multilateral trade liberalizations the *FTA Effect* can still be observed for pairs with a deep FTA and pairs with a CU. Thus, on top of the multilateral liberalizations for pairs with those sort of RTAs the differences in external tariffs decreased even further.

Recall the differences in external tariffs are calculated using a trade-weighted tariff t^w_{ikt} for each country i, product k at time t, $\Delta t^a ijkt = |t^w_{ikt} - t^w_{jkt}$. One concern with the weighted average is that our results could be driven by a change in trade flows instead of a change in tariffs. In addition, if tariffs are prohibitively high and thus no trade is happening at all, those tariffs are excluded from the weighted average. However, whenever tariffs are high, the probability for larger differences in external tariffs is higher. Therefore, if many products with such tariffs exist we could not make a statement about the necessity of RoOs as we might wrongly disregard many products.

We deal with this concern by calculating the simple mean instead of the weighted one, $t^{simple}_{ikt} = \frac{1}{n}\sum_{j=1}^{n} t_{ijkt}$. For the differences in external tariffs we then use the simple mean $\Delta t^{simple}_{ijkt} = |t^{simple}_{ikt} - t^{simple}_{jkt}|$. Therefore, all products for which we have information on tariffs are included in the modified measure for tariff similarity Δt^{simple}_{ijkt} - also for the products with no trade. The results of this analysis are shown in table 3, column (9) and (10) and overall no large changes occur.

We can further check, whether it is only the preferential tariffs that are low and also get a high weight in trade weighted tariff as typically trade flows within an FTA are higher than outside, that drive the results or whether also MFN tariffs show a similar pattern of tariff similarity. We do so by using the MFN tariffs instead of the weighted tariffs when calculating the differences in external tariffs, thus $\Delta t^{MFN}_{ijkt} = |t^{MFN}_{ikt} - t^{MFN}_{jkt}|$. The results are displayed in column (11) and (12). The coefficients are somewhat smaller than in the baseline specification but overall show the same pattern suggesting that countries also change MFN tariffs due to FTAs.

A second concern that can be addressed when conducting the analysis using MFN tariffs instead of the weighted tariffs is the one of RoOs being the reason for lower differences in external tariffs: it might be the protective effects of the RoOs making large tariff cuts in an FTA possible inducing a higher degree of tariff similarity for the country-pair. If this were the case than one could not argue for the abolishment of RoOs as they are the very reason for the observed *FTA Effect*. However, the substitution argument should not hold for MFN tariffs. Our results displayed in table 3 column (12) weaken this alternative explanation.

To eliminate the concern entirely we would need a measure for the restrictiveness of the product-specific RoOs. Then we could control explicitly for any potential substitution effect. Unfortunately due to data availability this is not possible. The best data publicly available is the "Facilitation-Index" proposed by Estevadeordal and Suominen (2006). Besides product-specific RoOs in every FTA there are also so-called "regime-wide" RoOs (Estevadeordal and Suominen 2006), which are general RoO that are employed for every product - including the degree of de minimis, the type of cumulation, drawback, and the certification method[11]. The "Facilitation-Index" is based on five components: de minimis, diagonal cumulation, bilateral cumulation, drawback, and self-certification. The maximum index value of 5 results when the level of de minimis is 5% or higher and when the other four variables are permitted[12].

To check, whether stricter RoOs might actually cause a higher degree of tariff similarity we include the "Facilitation-Index" ($RoOs_{ijt}$) in the baseline specification. As we do not have

[11]The De minimis rule allows for a specified maximum percentage of non-originating materials to be used without affecting origin. The higher the defined percentage, the easier it is to meet the RoOs. Cumulation allows producers of one FTA member to use materials from another FTA member without losing the preferential status on the final product. Besides bilateral cumulation (two FTA partners), there is also diagonal cumulation, under which countries tied by the same set of preferential origin rules can use products that originate in any part of the common RoO zone. Many FTAs prohibit duty drawback - the refunding of tariffs on non-originating inputs that are subsequently included in a final product that is exported to an FTA partner. This increases the costs of non-originating components and makes therefore a shift to suppliers in the cumulation area more likely. A complex method of certifying the origin of goods can impose high administrative costs on exporters. The most lenient one is self-certification by exporters. For a more detailed description of "regime-wide" RoOs see Estevadeordal and Suominen (2006)

[12]Unfortunately no digital data is available. We digitized the information included in the text and then calculated the Index using the rule proposed in the text. Then we matched manually by using the name of the FTA the "Facilitation-Index" to the FTAs in our data

information on the RoOs regime for CUs we exclude pairs with a CU entirely for this part of the analysis. The more permissive RoOs are in an FTA, the higher $RoOs_{ijt}$. Thus, if strict RoOs were indeed a substitute to high tariffs then we would observe in the panel-analysis a positive coefficient: the more lenient RoOs, the higher the difference in external tariffs. The results are shown in table 4, column (4) to (7).

Unfortunately only for a small subset of FTAs (102) information about the RoOs are available. In column (4) and (5) we report the baseline results with the adjusted sample. In column (6) we have included the measure for RoOs and do not control for omitted variables. The coefficients for the two types of FTAs are quite robust to this modification and more permissive RoOs correlate with lower differences in external tariffs. When including the full set of fixed-effects (see column (7)) the coefficient for shallow FTAs changes quite substantially compared to the baseline results reported in column (4). However, in both specifications the coefficient is estimated imprecisely. For deep FTAs the results remain basically the same. Most importantly, the measure for the restrictiveness of RoOs is not statistically significant, suggesting that the substitution-argument has no foundation, at least for the subset of FTAs we have data on.

We want to check next whether our results still hold when using different measures of depth. The DESTA data on RTAs comes with at least two shortcomings: first, its measure of depth is rather crude as it only includes seven provisions. Second, unfortunately no information is provided on the current status of the RTA i.e. whether it is still in force. Both types of FTAs, deep and shallow, are affected by the former, yielding attenuated coefficients due to measurement error. The latter is a bigger concern for shallow FTAs[13] and it attenuates the coefficient even further: we wrongly assume country-pairs to have an FTA while in fact they do not.

[13]When comparing DESTA with the World Bank's Global Preferential Trade Agreements Database we can see this. One potential explanation for this pattern might be the higher costs associated with a deep FTA: it is much harder to reach a deep agreement. Therefore the costs of dissolving such an FTA are higher.

Table 4: Robustness Checks - Dependent Variable: Absolute Difference in External Tariffs t^a_{ijkt}

	DESTA	WB-Core	WB-All	RoOs				Aggregation Bias					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Shallow FTA	0.752***	-0.096	-0.351**	-0.768***	-0.468*	0.851	-2.104*	2.222***	-1.118***	2.214***	-1.055***	2.297***	-1.247***
	(0.128)	(0.172)	(0.152)	(0.193)	(0.275)	(0.535)	(1.148)	(0.573)	(0.237)	(0.575)	(0.233)	(0.581)	(0.254)
Deep FTA	-2.733***	-1.732***	-1.908***	-2.380***	-1.016***	-2.508***	-0.942**	-1.487***	-0.481	-1.498***	-0.490	-1.570***	-0.467
	(0.162)	(0.215)	(0.214)	(0.277)	(0.360)	(0.266)	(0.368)	(0.521)	(0.492)	(0.521)	(0.485)	(0.522)	(0.480)
Customs Union	-6.771***	-6.067***	-5.811***					-5.143***	-5.830***	-5.154***	-5.278***	-5.217***	-4.846***
	(0.190)	(0.208)	(0.197)					(0.473)	(1.079)	(0.472)	(1.055)	(0.474)	(0.984)
RoOs						-0.570***	0.557						
						(0.193)	(0.381)						
SD										-0.326	2.870***	0.017	0.521*
										(0.344)	(0.474)	(0.386)	(0.283)
SD × Shallow												-2.067***	1.410**
												(0.666)	(0.591)
SD × Deep												6.555***	4.984***
												(2.108)	(1.023)
SD × CU												6.270**	-0.738
												(2.485)	(1.258)
R^2	0.005	0.004	0.004	0.001	0.874	0.001	0.874	0.144	0.890	0.144	0.890	0.145	0.891
Cross-Section	✗	✗	✗	✗		✗		✗		✗		✗	
Panel					✗		✗		✗		✗		✗

Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (2), (3), (4), (6), (8) and (10) report the results for the unconditional comparison in means. In the remaining columns the full set of fixed-effects (importer-time, exporter-time, product-time, and pair-product fixed-effects) is included. For the cross-section we use data for the year 2014. The number of observations equals in in column (1) to (3) 17,272,076; in column (4) and (6) 8,959,264; in column (5) and (7) 17,918,460; in column (8), (10), and (12) 820,310; in column (9), (11), and (13) 1,640,578.

Both issues are addressed in the World Bank's Global Preferential Trade Agreement Database (GPTAD). It only includes agreements in force as of 2015 and covers many more dimensions of the heterogeneity in content across FTAs by coding 52 provisions instead of only seven. Additionally, it specifies which provision is legally enforceable and allows therefore a finer distinction between deep and shallow FTAs (see Hofmann et al. (2017) for a detailed description of the database). On the other hand, because it only focuses on RTAs in force as of December 2015 it does not include FTAs that have been superseded by newer ones i.e. Canada-US Free Trade Agreement or all FTAs between the EU and its new members that preceded their accession to the EU. Therefore, the World Bank data is unfortunately not suitable to disentangle between the *Selection Channel* and the *FTA Effect* but we can use it for the cross-sectional analysis. Depending on how much the results alter, we can say something about the severity of the measurement error in the DESTA data.

The results of this analysis are shown in Table 4, column (1) to (3). In column (1) we use the FTAs provided by DESTA, in column (2) and (3) we show the results using data from the World Bank's GPTAD. In column (2) we use the presence of core provisions as a measure for depth, which is comparable to the depth-index constructed by DESTA. Any differences in the results between Panel A and B should be due to FTAs that are actually no longer in force. In column (3) the depth index is based on all 52 provisions coded and can therefore differentiate on a finer margin between the depth of FTAs. As with the DESTA data, we group agreements into deep and shallow: all FTAs including less than half of the possible provisions are considered shallow, the remainder belong to the group of deep FTAs.

The measures of depth derived from the GPTAD yield higher tariff similarity for all pairs with an FTA irrespectively of the depth. As expected, the measurement error induced due to FTAs in the sample that are no longer in force is a larger problem for shallow FTAs as the coefficient of interest is no longer positive. For deep FTAs only a relatively small change in the coefficient of interest is apparent ($0.752 - 2.733 = 1.98$ for DESTA compared with $-0.0957 - 1.732 = 1.82$ when using the GPTAD). When we use the stricter measure of depth ("WB-All") some of the former deep FTAs will now belong to the shallow FTAs. With this definition we find for all types of RTAs a negative and statistically significant coefficient of interest. Summing up, as expected even though all FTAs are affected by measurement error, it is more severe for shallow

FTAs. The sensitivity check shows, when using the FTAs provided by DESTA for the analysis we understate the degree of tariff similarity because of many agreements in the data that are not in force anymore. Therefore, our baseline results should be considered as conservative.

One potential pitfall in our analysis is aggregation bias. We tried to address this issue as good as possible by using the most disaggregated data available, namely 6-digit level. However, tariffs are often defined at the 8-, 10- or even 12-digit level. Therefore, it could be possible that although on the 6-digit level pairs' tariff-vectors are pretty much aligned, this is for the more disaggregated products.Even if data on tariffs at such disaggregated level were available the used nomenclatures at those finer levels are country-specific and therefore no longer comparable across countries.

We use a different approach to check for this problem. The original data provided by the IDB also provides the Standard Deviation of tariffs within a 6-digit product. We construct a dummy variable SD_{ijkt} that equals 1 whenever at least for one of the two tariffs used t^a_{ijkt} the standard deviation is larger than zero. Otherwise SD_{ijkt} is zero. We include this new variable and its interaction terms with the RTA types in baseline specification. The results are reported in Table 4. Column (1) and (2) show again the baseline results with the modified sample[14], the remainder shows how things change when we account for the aggregation bias.

First, when controlling for omitted variables, having a higher standard deviation seems to yield also higher differences in external tariffs (see column (11)). However, the effects of the different types of RTA are not very sensitive to the inclusion of SD_{ijkt} (compare column (9) with (11)). The coefficients of interest also hold when including the interaction terms in column (13). Thus, although it is indeed true that products with a standard deviation higher than 0 also have higher differences in external tariffs, there does not seem to exist a systematic pattern across the different types of FTAs.

We reproduce Table 3 only using original data and omitting all differences in external variables where at least one of the two tariffs t^w_{ikt} and t^w_{jkt} was imputed. The results are reported in Table A3. We expect the results for the shallow FTAs to be more sensitive to the modification, because

[14]Unfortunately only IDB provides data on the standard deviation of tariffs and not also TRAINS. This reduces the number of reporters and available tariff lines substantially. Further, we only use original data and do not carry out any interpolation as we did it for the tariff data. Therefore, the sample shrinks substantially and we end up in the panel analysis with only 1,640,578 observations.

the issue of missing tariff data is more pronounced for developing countries. The general picture does not change, which is reassuring, as it suggests that our results are not just due to data manipulation. On the other hand, the coefficients vary quite a lot in size and level of significance, indicating the severity of missing data when working with tariff data.

5 Conclusion

We introduce a new tariff database, that deals with the well-known issue of missing data in the standard sources for tariffs (TRAINS and World Bank), and use it to assess the differences in external tariffs. Analyzing the similarity in external tariffs is relevant because it is the only justification for costly RoOs in FTAs. RoOs are installed to prevent trade deflection, which only becomes possible when countries set tariffs differently. The level of tariff similarity is high, especially when focusing on imported goods: for 77% of the imports in 2014 the difference in external tariffs was at most 3%-points. When explicitly accounting for transportation costs, the picture becomes even clearer, as for 70% of the tariff lines the differences in external tariffs do not exceed the transportation costs. Therefore, trade deflection becomes unprofitable and the economic rationale for RoOs vanishes. Further, we find that for countries with a deep FTA the tariff similarity is even more pronounced, however, the opposite is true for shallow FTAs. The pattern is robust to various robustness checks.

We analyze in more detail what drives the diverging results for pairs with deep and shallow FTAs. We find that pairs with higher differences in external tariffs self-select themselves into shallow FTAs, while the deep FTAs seem to have a strong effect on itself on tariff similarity, as 79% of the observed lower differences in external tariffs can be directly attributed to the deep FTA. In line with the existing literature we can show that much of the empirical pattern can be attributed to lower tariffs due to FTAs. We also check for potential other factors at work - substitution effect of RoOs, measurement error, and aggregation bias - but overall our results hold the robustness checks.

The empirical facts we present are new and highly relevant as they question the necessity of costly and welfare-reducing RoOs. Furthermore, they have important policy implications: in most preferential trade agreements, for a vast majority of products, trade deflection is not profitable even in the absence of costly rules of origin. It is common practice for RoOs to be automatically implemented when an FTA is negotiated. One could substantially relax the requirements to prove the origin of goods in many FTAs because trade deflection is profitable only in a few product lines. More specifically, we suggest that, in new FTAs, negotiators do agree on a full set of RoOs for all products, but that that the requirement to prove origin is activated only if external tariffs of FTA members differ by some minimum amount. Our proposal could disentangle Bhagwati's spaghetti bowl a bit. It could also help dealing with the exit of countries from long established CUs, such as Britain's or Turkey's exit from the EU. Under our proposed scheme, countries could exit the CU without unduly endangering existing production networks.

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A Appendix

A.1 How we tackle the Issue of Missing Tariff Data

In this section we will present in more detail our new approach to the solution of the well-known issue of missing data when working with tariff data. Using the World Bank's World Integrated System (WITS) software, which combines data from the United Nations and the World Bank, we combine all publicly available information on MFN tariffs, preferential tariffs as well as ad valorem equivalents of non advalorem tariffs. We gather information of 156 countries on the 6-digit product level of the common HS system with some of the data dating back to 1988. Whenever more than one preferential scheme applies (i.e. a bilateral FTA and the General System of Preferences) multiple preferential tariffs might be observable for trade in a particular product between two countries. We always assume the lowest preferential tariff to be effectively in place.

Unfortunately we have found some errors in the preferential tariff data. In some cases even though no RTA is in place WITS nevertheless reports a preferential tariff[15]. To minimize errors, we cross-check preferential tariffs with the presence of a RTA: only if our list of agreements, which combines bilateral RTAs form DESTA (Dür et al. 2014) and unilateral GSPs from Baier, Bergstrand, and Feng (2014) as well as the WTO's list of preferential trade agreements[16], indicates that preferential market access is granted we use the preferential tariffs otherwise the MFN tariff is used.

We deal with the missing data in the following way: rather than replacing missing MFN tariffs by linearly interpolating observations, missing values are set equal to the nearest preceding observation. The procedure accounts for the fact that countries are more likely to update schedules after a significant tariff change. If there is no preceding observation, missing MFN tariffs are set equal to the nearest succeeding observation. As the MFN tariff only applies when a country is a member of the WTO, inferring tariffs without inducing large margins of error is only possible for countries that are WTO members. Thus, whenever the exporting or importing

[15] The issue seems to be that the list of beneficiary countries does not always account for changes over time. For example Bulgaria is coded to be a member of the Global System of Trade Preferences among Developing Countries since 1988 even though it left the program when it acceded the EU in 2007.

[16] http://ptadb.wto.org/ptaList.aspx

country is not a WTO-member we drop the tariff line.

Due to revisions of the Harmonized System in 1996, 2002, 2007 and 2012 the product-identifiers are not uniform across countries and over time in the original data. Thus, to impute the data it is necessary to convert all products into one revision. We use the HS-1988/92 revision.

For preferential tariffs interpolating is more problematic because FTAs have often been phased-in instead of cutting all tariffs immediately when the FTA enters into force. Typically, the tariffs are cut by the same amount over a certain number of years until the agreed tariff is reached (usually zero). Thus, if we knew for each product the target tariff and the year at which the FTA members are supposed to meet it, one could linearly interpolate the missing values. Unfortunately, such data are currently unavailable. However, although no product-specific information can be found, DESTA (Dür et al. 2014) provides the maximum years allowed for tariff cuts for more than 500 FTAs. Hence, we can clearly differentiate between those FTAs that are phased-in and those that are not. Combining the information on phasing-in with the year the FTA entered into force (EiF), which we have manually researched by ourselves, yields three scenarios that require a different way of interpolation. They are shown in Table A1. Again, whenever one of the two - the importing or the exporting country - are not members of the WTO, we drop the observation altogether.

(1) *(Multiple) observation(s), no Information about FTA*

DESTA only includes agreements with some sort of reciprocity, therefore no additional information is available for unilateral agreements like the Generalized System of Preferences under which developed countries grant preferential tariffs to imports from developing countries. When an entry in the original data exists but no information about the FTA is available we assume the preferential tariff to be unilateral. Whenever the original data reports observations for at least two years we interpolate linearly, when only one original entry is on hand, no further interpolation can be done.

(2) *One observation when year equals EiF*

When tariff data is only available for the EiF-year and DESTA tells us that the tariff cuts were put into effect immediately we use that tariff for all succeeding observations. We use the same method when phasing-in is allowed but only the tariff for the EiF-year is

Table A1: Algorithm for Interpolating the Missing Data

Tariff available	**FTA Phased-In?** Yes	No
(1) (Multiple) observation(s), no Information about FTA	Interpolate linearly	Interpolate linearly
(2) One observation when year equals EiF	Use the tariff for all succeeding observations	Use the tariff for all succeeding observations
(3) (Some) observation(s) after year equals EiF	Assume MFN tariff for the year before EiF, interpolate linearly between all available tariffs, and use the last available year for all succeeding years	Use the tariff for all preceding (whenever FTA has already entered into force) and succeeding observations

We have researched the entry into force (EiF) year for every FTA contained in DESTA by ourselves.

available. Even though in this case the actual tariffs will most likely be lower after the EiF-year, the target tariff the two countries have agreed to is unknown, making further interpolating impossible.

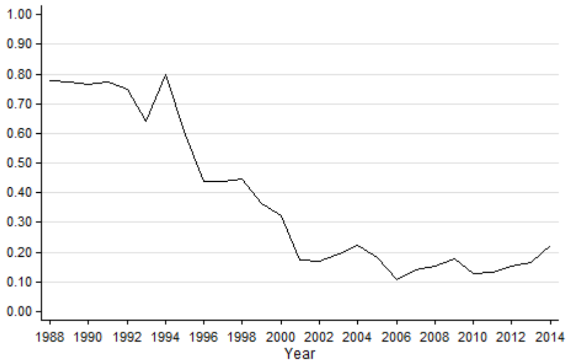
(3) *(Some) observation(s) after year equals EiF*

Again, when no phasing-in is applicable and original data is available for at least one year after the EiF-year we use these data for all years after the FTA was into force. When phasing-in is allowed, we first assume the MFN tariff to be applied in the year before the FTA was entered into force, then one can interpolate linearly between all available tariffs. The last available tariff is assumed to be the target tariff agreed to in the FTA and will be used for all succeeding years.

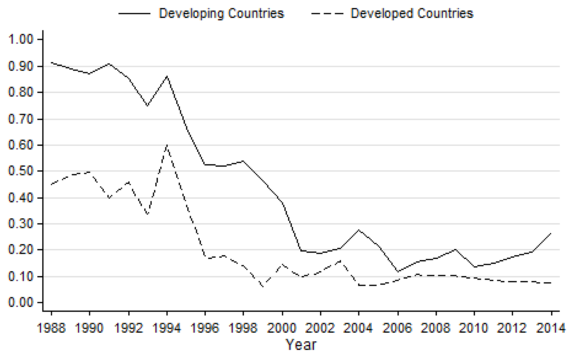
Table A2 shows the number of observations that WITS provides (column (1)) and the number of observations that we end up having after the interpolation (column (2)). We end up in 2014 with more than 120 Million observations. As Figure A1(a) shows, the share of imputed data decreased substantially over the years because of an increase in the number of countries

Figure A1: Share of Imputed Data

(a) Share of Imputed Data



(b) Share of Imputed Data by Regions



We use the UN definition to determine the development status of a country. Developed countries are Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All others belong to the group of developing countries.

reporting. In 1988 the number of tariff lines we imputed equals 77.6% and it stays at such a high level until the establishment of the WTO in 1996, when the availability of original data increases substantially. In the 2000's the percentage of imputed data decreases even further to approximately 20%. The problem of missing data is substantially worse for developing countries (see Figure A1(b)). However, also for developed countries one can observe a jump in 1996, afterwards the share of imputed tariff lines remains rather stable.

Caliendo et al. (2015) have constructed a similar database. Additionally to the tariffs provided by the WITS they add data from three other sources: manually collected tariff schedules published by the International Customs Tariffs Bureau, US tariff schedules from the US International Trade Commission, and US tariff schedules derived from detailed US tariff revenue and trade data provided by the Center for International Data at UC Davis. The imputation algorithm is very similar to ours with the drawback that they only have information on approximately 100 FTAs and their phasing-in regimes. However, other than that to the best of our knowledge there is no comparable data base for tariffs in terms of country- and time-coverage as well as level of disaggregation at hand.

Table A2: The Extent of Missing Data

	Number of Observations		
	(1)	(2)	(3)
Year	Original Data	Imputed Data	Share
1988	9,606,425	42,840,168	77.6%
1989	9,789,272	42,840,169	77.1%
1990	10,539,553	46,629,697	77.4%
1991	11,273,581	42,569,994	73.5%
1992	12,984,417	51,577,671	74.8%
1993	22,467,973	62,209,397	63.8%
1994	15,745,480	77,520,216	79.7%
1995	31,456,706	78,293,204	59.8%
1996	45,354,301	80,801,820	43.9%
1997	47,528,520	84,650,869	43.8%
1998	46,908,799	85,939,566	45.4%
1999	55,235,390	88,566,890	37.6%
2000	63,390,233	95,308,275	33.5%
2001	80,495,039	99,471,885	19.1%
2002	82,191,719	100,889,757	18.5%
2003	81,528,520	103,729,599	21.4%
2004	79,837,640	106,612,441	25.1%
2005	85,602,453	108,060,844	20.8%
2006	93,493,665	108,060,853	13.5%
2007	92,402,919	110,954,104	16.7%
2008	93,810,550	113,899,543	17.6%
2009	91,212,401	113,899,532	19.9%
2010	97,176,014	113,902,869	14.7%
2011	97,166,904	114,676,960	15.3%
2012	98,967,205	118,676,960	16.6%
2013	100,417,500	121,664,637	17.5%
2014	93,919,178	121,667,575	22.8%

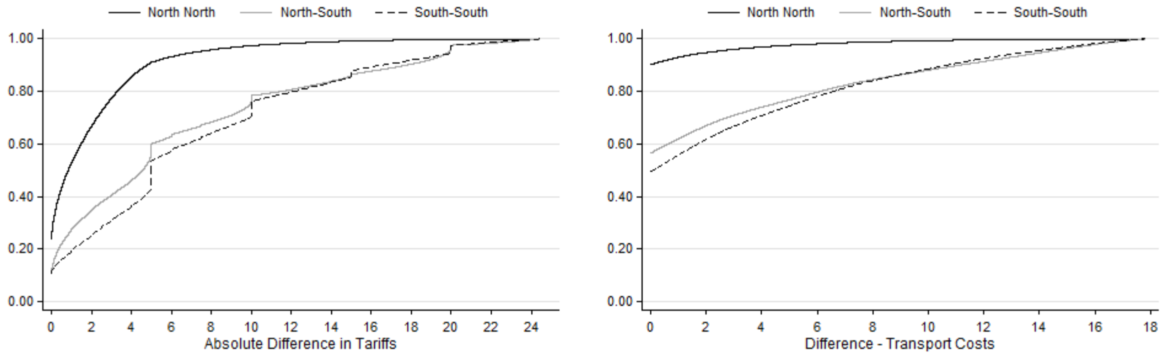
The table shows in column (1) the number of tariff lines that are available when combining TRAINS and IDB, in column (2) the number of tariff lines that we end up having after imputing the data, and column(3) equals the share of imputed data.

A.2 List of Countries in the Sample

The following 121 countries are in the sample: Angola, United Arab Emirates, Argentina, Antigua and Barbuda, Australia, Austria, Burundi, Belgium, Benin, Burkina Faso, Bangladesh, Bulgaria, Bahrain, Belize, Bolivia, Brazil, Barbados, Brunei, Central African Republic, Canada, Chile, Cote d'Ivoire, Cameroon, Congo, Rep., Colombia, Costa Rica, Cuba, Cyprus, Czech Republic, Germany, Djibouti, Dominica, Denmark, Dominican Republic, Ecuador, Egypt, Arab Rep., Spain, Finland, Fiji, France, Gabon, United Kingdom, Ghana, Guinea, The Gambia, Guinea-Bissau, Greece, Grenada, Guatemala, Guyana, Hong Kong, China, Honduras, Haiti, Hungary, Indonesia, India, Ireland, Iceland, Israel, Italy, Jamaica, Japan, Kenya, St. Kitts and Nevis, Korea, Rep., Kuwait, St. Lucia, Sri Lanka, Macao, Morocco, Madagascar, Maldives, Mexico, Mali, Malta, Myanmar, Mozambique, Mauritania, Mauritius, Malawi, Malaysia, Niger, Nigeria, Nicaragua, Netherlands, Norway, New Zealand, Pakistan, Peru, Philippines, Papua New Guinea Poland, Portugal, Paraguay, Qatar, Romania, Rwanda, Senegal, Singapore, Solomon Islands, Sierra Leone, El Salvador, Suriname, Slovak Republic, Slovenia, Sweden, Chad, Togo, Thailand, Trinidad and Tobago, Tunisia, Turkey, Tanzania, Uganda, Uruguay, United States, St. Vincent and the Grenadines, Venezuela, South Africa, Zambia, and Zimbabwe.

Figure A2: Cumulative Distribution Function by Regions

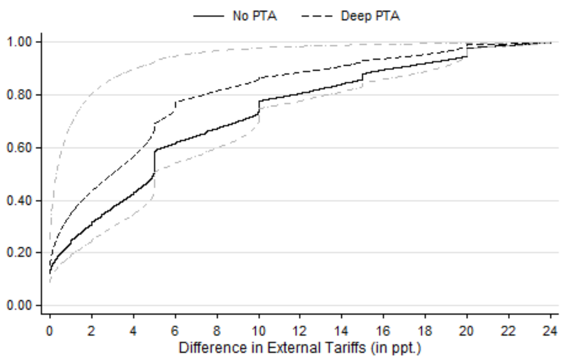
(a) Absolute Difference Δt^a_{ijk} in External Tariffs (b) Trade Costs vs. Differences in Ext. Tariffs Δt^t_{ijk}



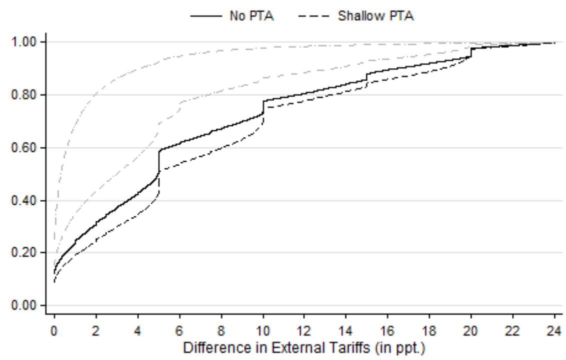
$\Delta t^a_{ijkt} = |t_{ikt} - t_{jkt}|$ with country i, country j, product k, and time t; $\Delta t^t_{ijk} = max\{0, |t^w_{ikt} - t^w_{jkt}| - \tau_{ijkt}\}$ with country i, country j, product k, time t, and τ transportation costs. We use the UN definition to determine the development status of a country. Developed countries (North) are Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All others belong to the group of developing countries (South). All country-pairs with a CU are excluded. We show data for 2014. Panel(a): truncated to values ≤ 25; Panel(b): truncated to values ≤ 18.

Figure A3: Cumulative Distribution of the Absolute Difference Δt^{a}_{ijk} in External Tariffs by RTA-Type

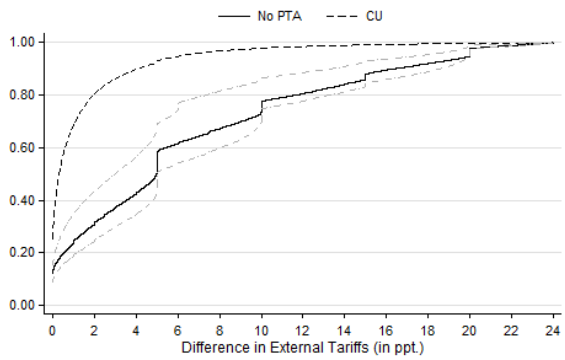
(a) Deep FTA vs. no RTA



(b) Shallow FTA vs. no RTA



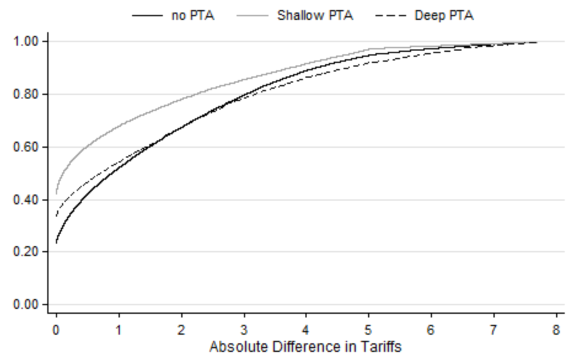
(c) CU vs. no RTA



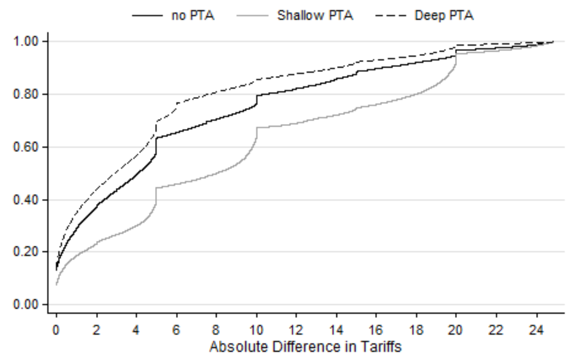
$\Delta t^{a}_{ijk} = |t_{ik} - t_{jk}|$ with country i, country j and product k; $\Delta t^{t}_{ijk} = max\{0, |t^{w}_{ikt} - t^{w}_{jkt}| - \tau_{ijk}\}$ with country i, country j, product k, time t, and τ transportation costs. The information about the RTAs stems from DESTA (Dür et al. 2014). We show data for 2014. Truncated to values ≤ 24. Kolmogorov-Smirnov Test between Deep FTA/Shallow FTA/CU and no FTA: Difference 0.16/0.09/0.28, all significant on the 1%-level.

Figure A4: Cumulative Distribution of the Absolute Difference Δt^a_{ijk} in External Tariffs for Different Regions and Types of FTAs

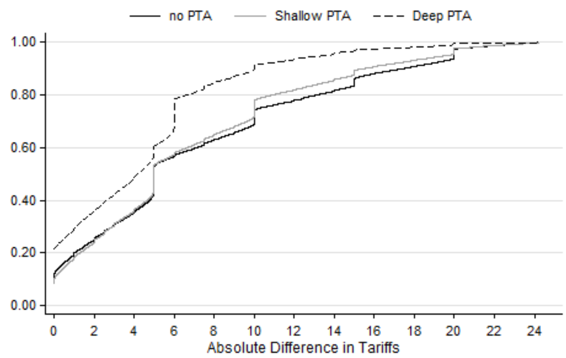
(a) North-North



(b) North-South



(c) South-South



$\Delta t^a_{ijkt} = |t_{ikt} - t_{jkt}|$ with country i, country j, product k, and time t; We use the UN definition to determine the development status of a country. Developed countries (North) are Australia, Canada, the member countries of EFTA and the European Union, Japan, New Zealand, and the US. All others belong to the group of developing countries (South). The information about the RTAs stems from DESTA (Dür et al. 2014) and no CUs are included. We show data for 2014. Panel (a): truncated to values ≤ 8, Panel (b): truncated to values ≤ 24, Panel (c): truncated to values ≤ 24.

Table A3: No Missing Data: Analyzing the Channels of the Heterogeneity in Differences in External Tariffs by the Type of RTAs

	Δt^{a}		Δt^{mean}		Δt^{w}		Δt^{n}		Δt^{simple}		Δt^{mfn}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Shallow FTA	0.500**	-0.399*	0.550***	0.003	0.374*	-0.334	0.085***	0.034*	0.464**	-0.388*	-0.152	-0.108
	(0.207)	(0.228)	(0.162)	(0.007)	(0.204)	(0.230)	(0.028)	(0.019)	(0.205)	(0.227)	(0.166)	(0.198)
Deep FTA	-1.418***	-1.323***	-1.783***	-0.011	-0.664***	-1.494***	-0.291***	-0.094***	-1.376***	-1.422***	-1.153***	-0.801***
	(0.182)	(0.218)	(0.148)	(0.012)	(0.236)	(0.227)	(0.024)	(0.018)	(0.181)	(0.215)	(0.171)	(0.186)
Customs Union	-6.547***	-7.119***	-3.652***	-0.028	-5.896***	-6.934***	-0.854***	-0.621***	-6.437***	-7.173***	-6.048***	-5.509***
	(0.218)	(0.413)	(0.175)	(0.025)	(0.432)	(0.705)	(0.024)	(0.032)	(0.219)	(0.410)	(0.274)	(0.385)
R^2	0.022	0.803	0.021	0.858	0.025	0.860	0.057	0.851	0.021	0.790	0.015	0.817
Cross-Section	✗		✗		✗		✗		✗		✗	
Panel		✗		✗		✗		✗		✗		✗

For the analysis we only use data that has not been imputed. Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), (5), (7), (9), and (11) report the results for the unconditional comparison in means. In the remaining columns the full set of fixed-effects (importer-time, exporter-time, product-time, and pair-product fixed-effects) is included. Δt^{a} is the absolute difference in external tariffs, Δt^{mean} is the average of the two tariffs of the country-pair, Δt^{n} is the absolute difference in external tariffs normalized with the average tariff of the rest of the world, Δt^{w} includes import weights, t^{simple} uses instead of the trade-weighted average a simple average of import tariffs to calculate the differences in external tariffs, and Δt^{MFN} is the absolute difference in MFN tariffs. The number of observations equals in the panel 12,211,352 and in the cross-section 6,105,702.