Free Trade Agreements, Customs Unions in Disguise?

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What are RoOs and why are they necessary?

- Multilateral trade liberalizations on a deadlock $\rightarrow$ regional trade agreements Definitions
- FTA $\Leftrightarrow$ CU: CU same external tariff
- Tariff differences $\rightarrow$ trade deflection More
- RoOs prohibit trade deflection and make FTAs preferential
- Products need to undergo a "substantial transformation"
  - Minimum value added content requirement, change in tariff chapter, combination of those or a special rule

Example: TPP, 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.

RoOs: Costly Red Tape (i)

Why is complying with RoOs costly?

- Build up of (legal) know-how
- Little overlap in different FTAs (Estevadeordal and Suominen 2006)
- Change in global value chains (Krishna 2006; Krishna and A. O. Krueger 1995)

RoOs reduce the Gains from FTAs

- Compliance costs associated with meeting RoOs requirement range from 3-15% of the final product prices (Anson et al. 2005; Cadot, Estevadeordal, et al. 2006; Carrere et al. 2006; Estevadeordal 2000)
- Especially intermediate goods are affected (Andersson 2015; Conconi et al. 2016)
- Heterogeneity across firms (Cadot, Graziano, et al. 2014; Demidova et al. 2012)

RoOs: Costly Red Tape (ii)

RoOs are a key ingredient in Bhagwati's Spaghetti Bowl

> *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 out expense (Bhagwati 1995).*

Sad but true...

- RoOs are also defined for products with a MFN tariff of zero
- Brexit $\rightarrow$ EU-UK FTA with RoOs
  - possible that prof of origin is necessary although external tariffs still identical

$\Rightarrow$ **Costs are only justified when external tariffs differ**

Research Question & main Findings

Are RoOs economically justified?

- How big is the difference in external tariffs Δt_{ijkt}? Is trade deflection profitable?
- Do country-pairs with an FTA have systematically lower differences in external tariffs Δt_{ijkt}? If so, why?

Preview of Results

- Differences in external tariffs are small: $\leq$ 5%-points for more than 60% of all product-pair combinations
- For more than 80% no potential for trade deflection
- No potential for trade deflection for 86% of the imports (value)
- The deeper a FTA, the lower differences in external tariffs
- Most of this is due to positive selection, although some ex-post convergence effects also drive results

Related Literature

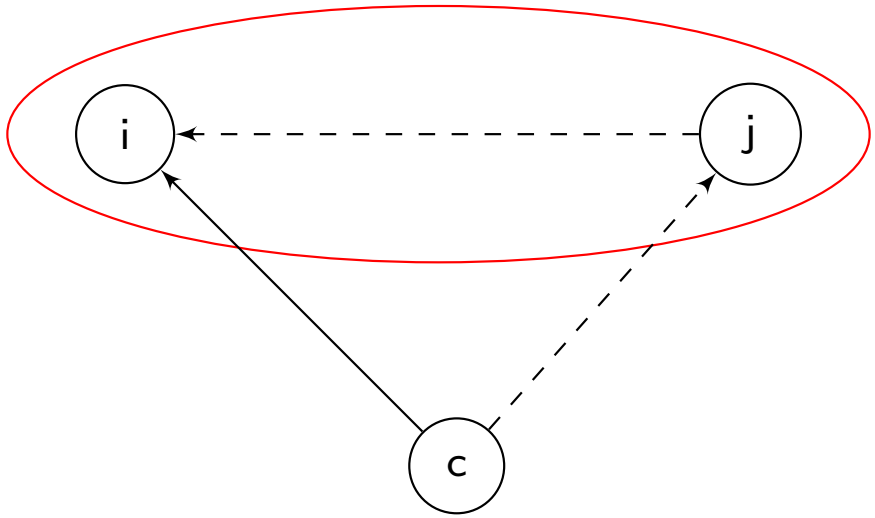
- The theoretical literature points out the protective effects of RoOs on intermediates (Deardorff 2016; Krishna 2006; Krishna and A. O. Krueger 1995; A. O. Krueger 1993)
- Consensus in the literature that RoOs lower utilization rates of tariff preferences (e.g. Anson et al. 2005)
- Empirical evidence shows negative effect of RoOs on trade in general and in intermediates in particular (e.g. Augier et al. 2005; Bombarda et al. 2013; Carrere et al. 2006; Conconi et al. 2016)
- Theoretical literature on the choice between FTAs and CUs: autonomy over external tariffs make it easier to actually conclude a trade agreement (Appelbaum et al. 2012; Facchini et al. 2013; A. Krueger 1997)

$\Rightarrow$ **So far, nobody has questioned the necessity of RoOs**

Overview

1. The simple economics of trade deflection
2. Data (new tariff database, transportation costs, FTA data)
3. Analysis of countries' differences in external tariffs
4. Analysis of different channels
5. Conclusion & policy implications

The Simple Economics of Trade Deflection



Trade deflection only profitable if

$$
\begin{aligned}
T_{ic} &> T_{jc} + T_{ij}, \text{ with } T_{ij} = t_{ij} + \tau_{ij} \\
t_{ic} + \tau_{ic} &> t_{jc} + \tau_{jc} + t_{ij} + \tau_{ij} \\
t_{ic} - t_{ij} - t_{jc} &> \tau_{jc} + \tau_{ij} - \tau_{ic}
\end{aligned}
$$

Tariff Data t

New Database

- Combine TRAINS and IDB data on MFN & preferential tariffs for more than 150 countries on the 6-digit product level (1988-2014)
- Problem: missing data
- MFN Tariffs
  - missing values are set equal to nearest preceding observation, if there is no preceding observation, tariffs are set equal to nearest observation
- Preferential Tariffs
  - cross-check with data on RTAs to minimize errors
  - phasing-in makes interpolation harder: we use information on the agreed phasing-in of more than 500 RTAs to impute the data in the most adequate way

$\rightarrow$ Bilateral data on the effectively applied tariff t_{ijkt} for 24,180 pairs, 5,018 products, and 27 years (over 120 Million observations in 2014)

Measure for Transportation Costs τ

Bilateral Transportation Costs τ_{ij}

- Anderson et al. (2004) propose cif/fob-ratios as a way to approximate τ_{ij} but: data not readily available
- τ_{ij} observable for the US (cif/fob-ratios)
- Assume: $\tau_{ij} = \alpha D_{ij}^{\delta} \leftrightarrow ln(\tau_{ij}) = ln(\alpha) + \delta ln(D_{ij})$
  - estimate $ln(\alpha)$ and δ for every product k for the US
  - out-of-sample prediction for all other pair-product combinations

  estimation | in-sample | out-of-sample
- Robustness check
  - small R^2, some negative values for transportation costs
  - use cif/fob-ratios for the US for all other pairs (conservative estimate)

Measure of Tariff Similarity

- Curse of dimensionality: $121 \times 120 \times 119 \times 5,018 = 8.7$ billion observations per year
- Solution: simple mean over third country dimension

$$t_{ic} - t_{ij} - t_{jc} - (t_{ic} - t_{jc} - t_{ij}) > 0$$

$$\frac{1}{|\mathcal{C}|}\sum_{c\in\mathcal{C}}(t_{ic} - t_{jc} - t_{ij}) - \frac{1}{|\mathcal{C}|}\sum_{c\in\mathcal{C}}(\tau_{jc} - \tau_{ic} + \tau_{ij}) \quad > \quad 0, \text{ with } t_{ij} = 0$$

$$t_i^{avg} - t_j^{avg} - \tau_j^{avg} + \tau_i^{avg} - \tau_{ij} > 0$$

Two measures for tariff similarity:

$\Rightarrow \Delta t_{ijt}^{simple} = t_{it}^{avg} - t_{jt}^{avg}$

$\Rightarrow \Delta t_{ijt}^{t} = max\{0, \Delta t_{ijt}^{simple} - \tau_j^{avg} + \tau_i^{avg} - \tau_{ij}\}$

Aggregation Bias

RTA Data

DESTA

- The Design of International Trade Agreements Database (DESTA) (Dür et al. 2014)
- Most comprehensive database in terms of number of agreements included
- Distinguish between deep and shallow PTAs (seven provisions)
- Shortcoming: measurement error

GPTAD

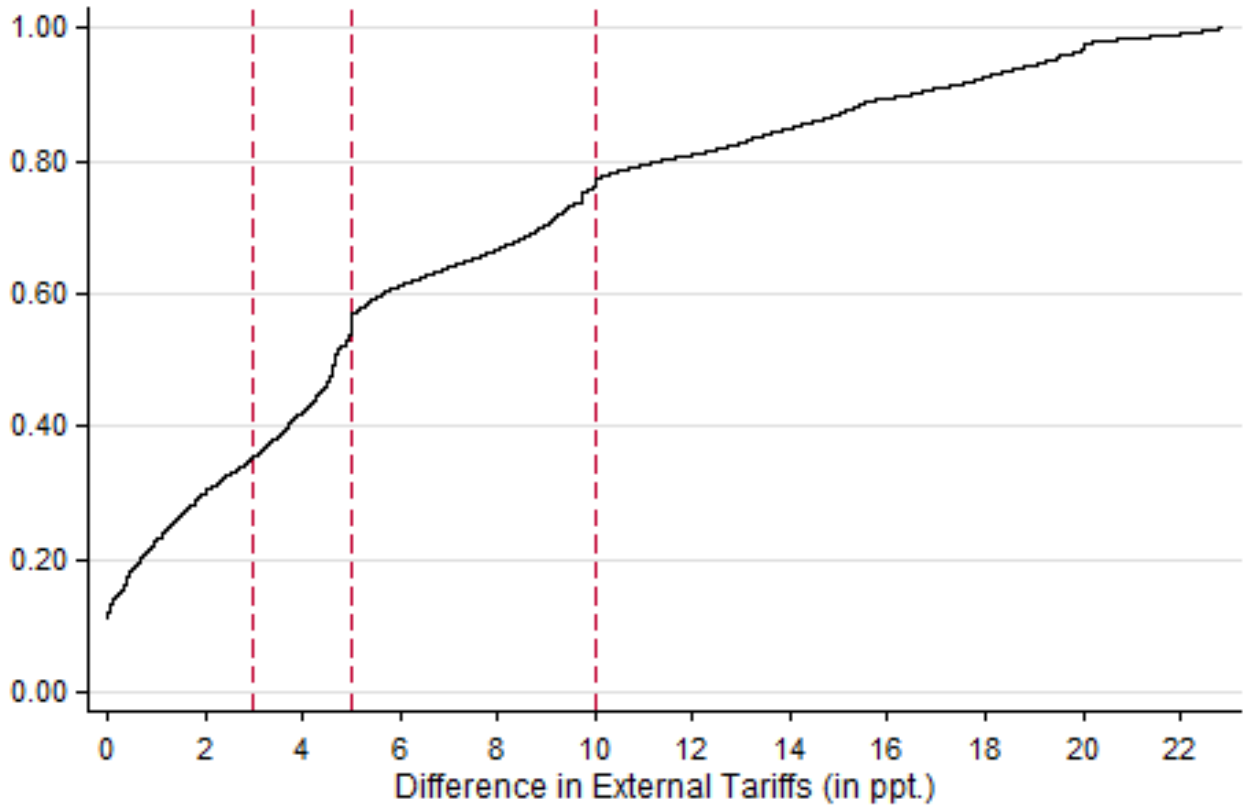
- The World Bank's Global Preferential Trade Agreement Database (GPTAD) (Hofmann et al. 2017)
- Most comprehensive database in terms of items coded (52 provisions)
- But: only include RTAs that were in force as of December 2015 $\rightarrow$ no panel-analysis possible

Sample

- Tariffs: poor data quality before 1996 More
- Again, curse of dimensionality: 19 year, 4,200 products, and $(121 \times 120) = 14{,}520$ pairs
- Solution: compare 2014 with 1996

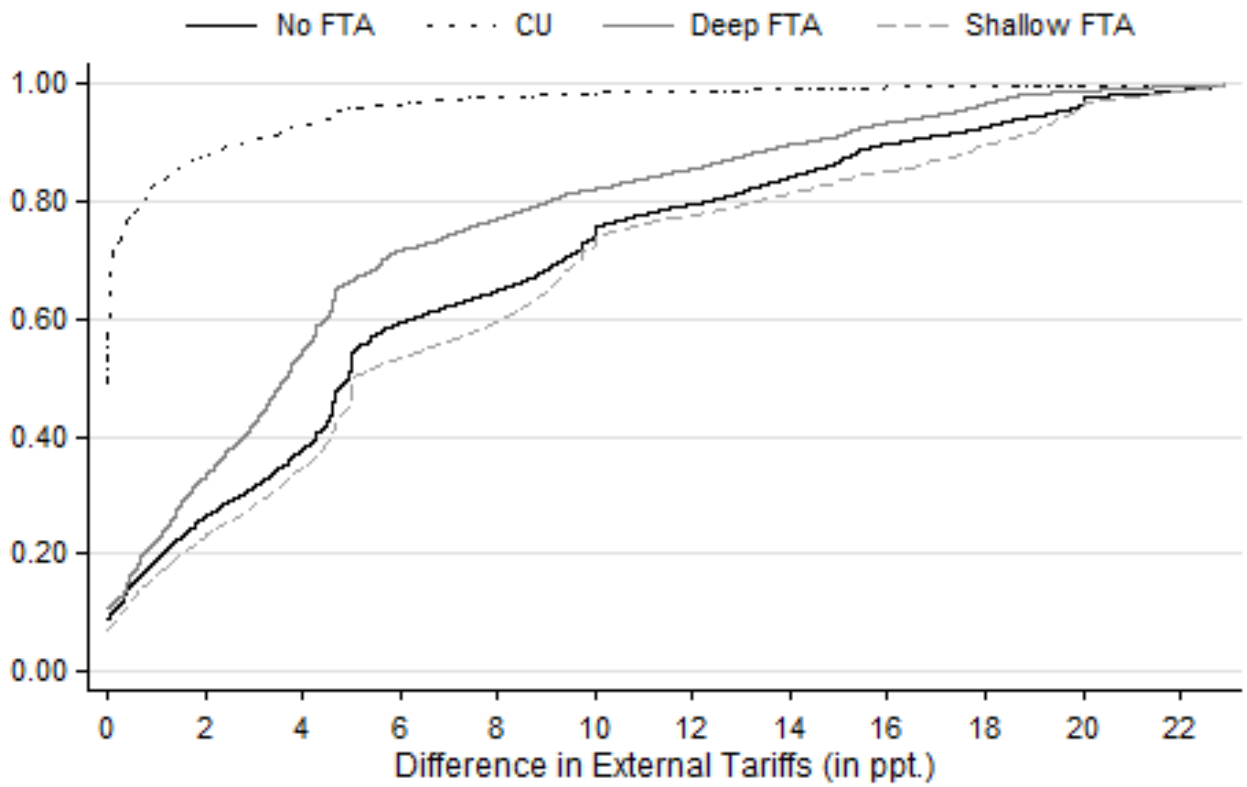
$\Rightarrow$ Over 131 Million observations: 121 countries, 2 years (1996 & 2014), on average 4,227 products

Most Differences in External Tariffs are Small Δt^{simple}



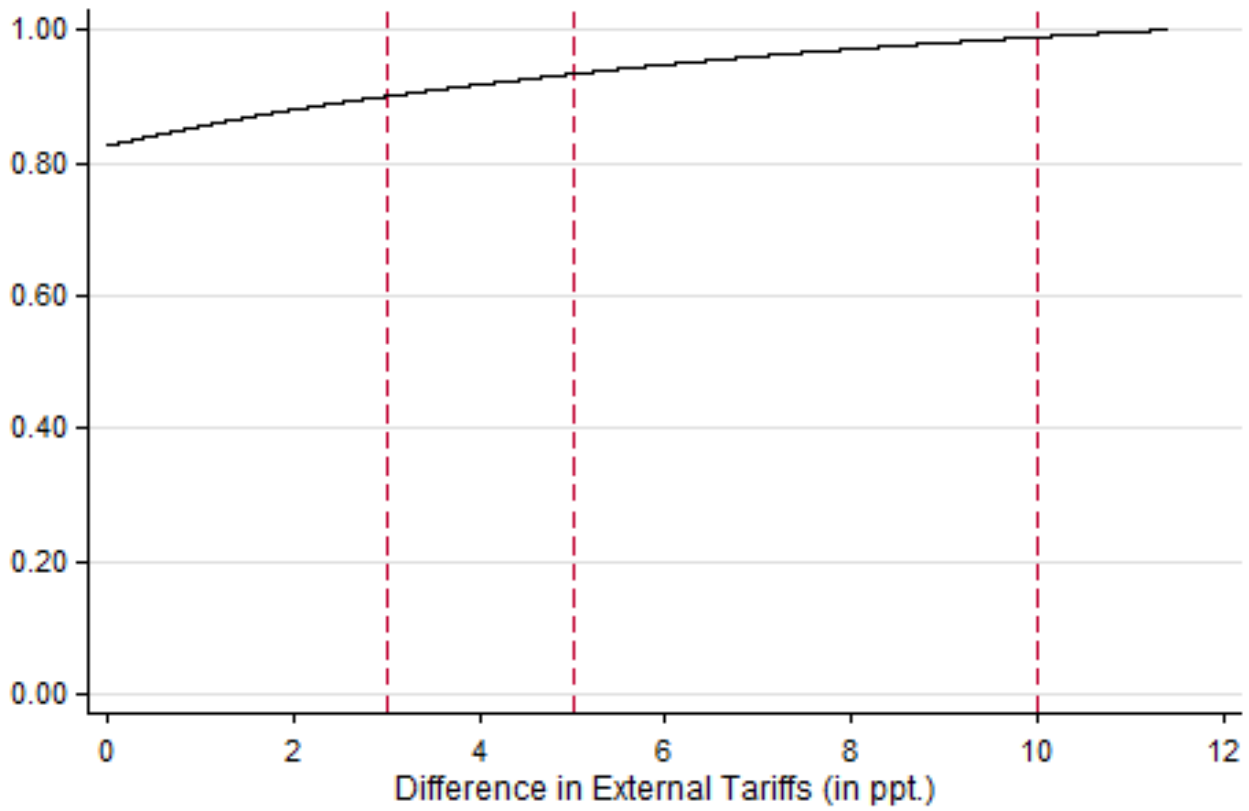
$\Delta t^{simple}_{ijt} = t^{avg}_{it} - t^{avg}_{jt}$ with country i, country j, product k, and time t. Truncated to values ≤ 22 (95% of the values). We show data for 2014.

For pairs with deep FTAs the Tariff Similarity is higher



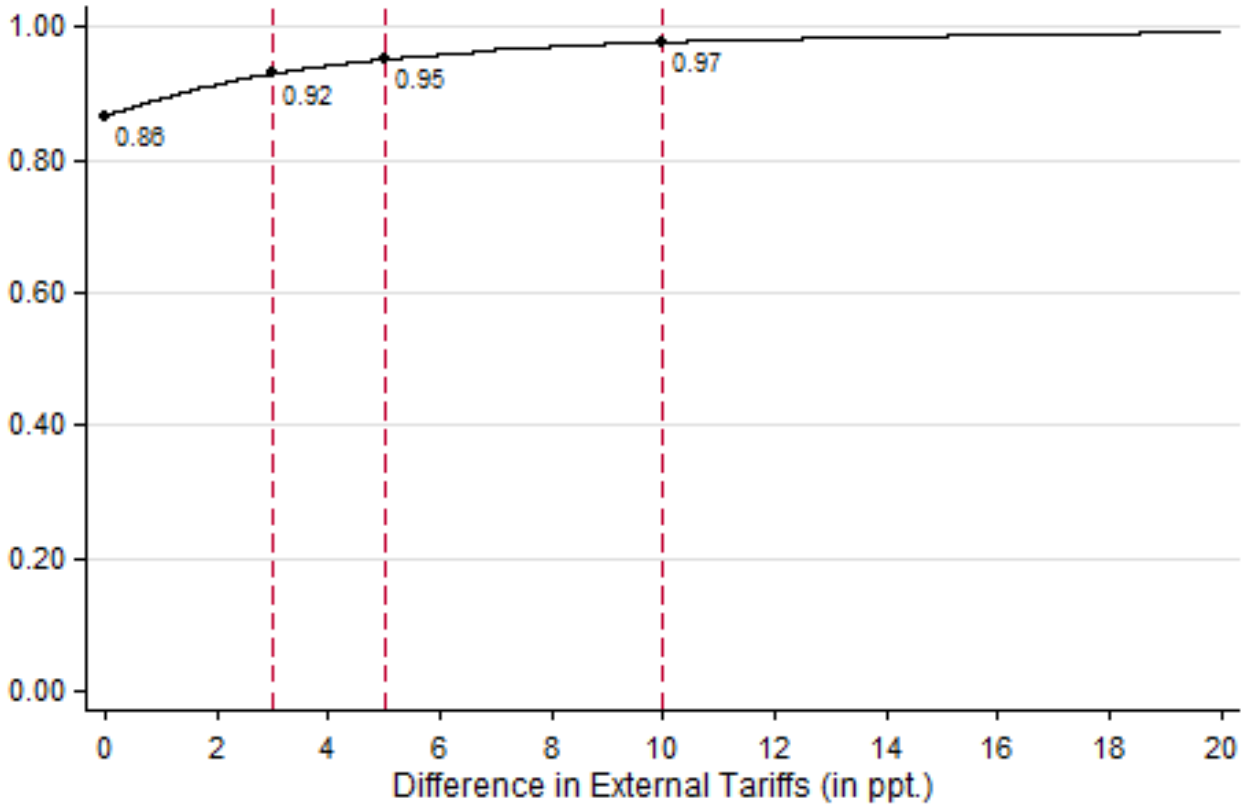
$\Delta t_{ijt}^{simple} = t_{it}^{avg} - t_{jt}^{avg}$ with country i, country j and product k. The information about the RTAs stems from DESTA (Dür et al. 2014). Truncated to values ≤ 22 (95% of the values). The trade data stem from BACI. We show data for the year 2014.

Little Potential for Trade Deflection when accounting for Transportation Costs



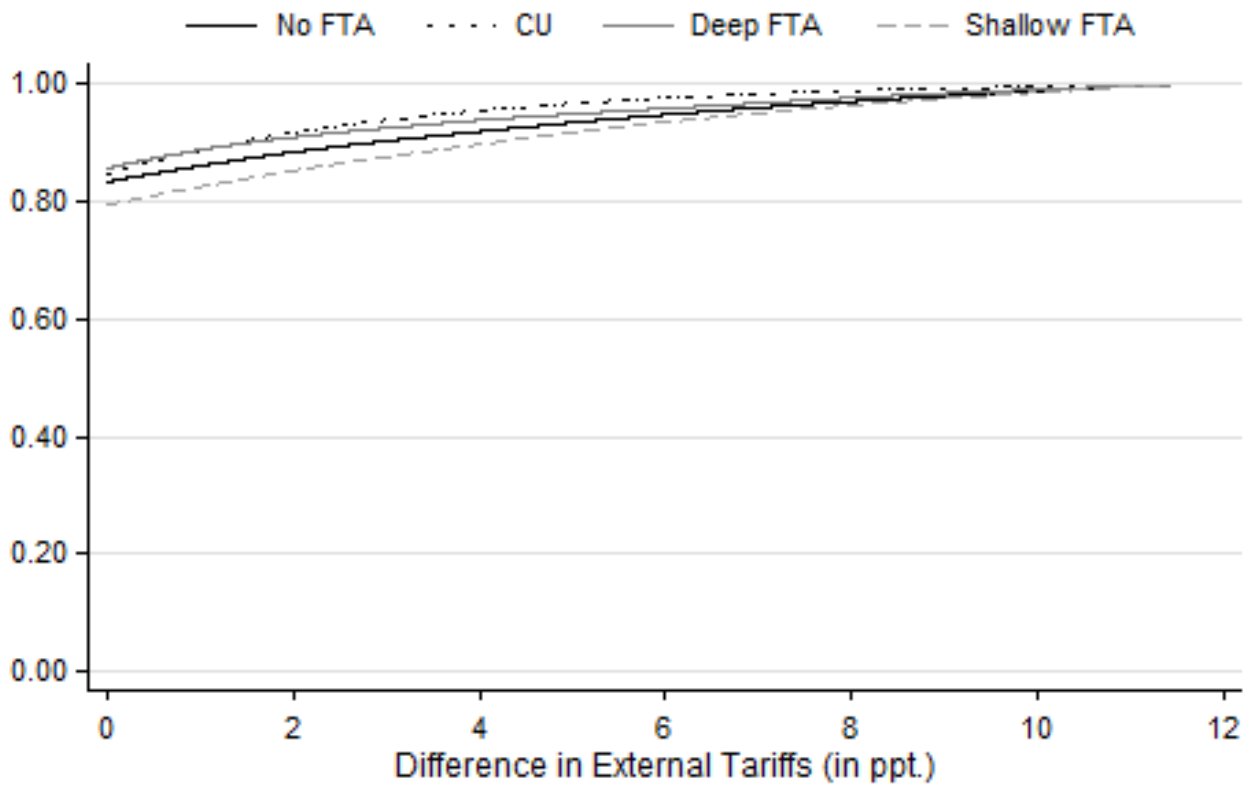
$\Delta t^{t}_{ijt} = max\{0, \Delta t^{simple}_{ijt} - \tau^{avg}_{j} + \tau^{avg}_{i} - \tau_{ij}\}$ with country i, country j, product k, and time t. Truncated to values $\leq$ 12 (95% of the values). We show data for 2014.

Tariff Differences are Low for most of the Imports



$\Delta t^{t}_{ijt} = max\{0, \Delta t^{simple}_{ijt} - \tau^{avg}_{j} + \tau^{avg}_{i} - \tau_{ij}\}$ with country i, country j, product k, and time t. Truncated to values $\leq$ 12 (95% of the values). The trade data stem from BACI. We show data for the year 2014.

Tariff Similarity for deep FTAs is higher



$\Delta t^{t}_{ijt} = max\{0, \Delta t^{simple}_{ijt} - \tau^{avg}_{j} + \tau^{avg}_{i} - \tau_{ij}\}$ with country i, country j and product k. The information about the RTAs stems from DESTA (Dür et al. 2014). Truncated to values ≤ 12 (95% of the values). The trade data stem from BACI. We show data for the year 2014.

Let's Recap

High Tariff Similarity

- Overall high degree of tariff similarity
- Transportation costs make trade deflection even less profitable

$\rightarrow$ Potential for trade deflection is very limited

Heterogeneity across Types of FTAs

- Tariff similarity is higher for deep FTAs
- The opposite is true for shallow FTAs

$\rightarrow$ Trade deflection is less of a problem in (deep) FTAs

$\Rightarrow$ **Result in itself interesting and policy relevant**

Channels

Selection Channel

- Same covariates correlate with the probability of having a FTA and $\Delta t_{ijkt}^{simple} / \Delta t_{ijkt}^{t}$
  - developing vs. developed countries
  - open economy
  - intra-industry trade

FTA-Effect

- The FTA might also have a causal effect on $\Delta t_{ijkt}^{simple} / \Delta t_{ijkt}^{t}$
  - Technology transfer & FDI
  - Commitment Theory (Maggi et al. 1998, 2007)
  - Juggernaut Effect (Baldwin et al. 2015)

Empirical Strategy to disentangle Channels

$$\Delta t_{ijkt} = \beta_0 + \beta_1 shallow_{ijt} + \beta_2 deep_{ijt} + \beta_3 cu_{ijt} + \gamma_{it} + \gamma_{jt} + \upsilon_{kt} + \mu_{ijk} + u_{ijkt}$$

- dependent variable
  - $\Delta t^{simple}_{ijt} = t^{avg}_{it} - t^{avg}_{jt}$ with country i, country j and product k
  - $\Delta t^{t}_{ijt} = max\{0, \Delta t^{simple}_{ijt} - \tau^{avg}_{j} + \tau^{avg}_{i} - \tau_{ij}\}$ with country i, country j and product k
- $shallow_{ijt}$, $deep_{ijt}$ and $cu_{ijt} = 1$ if a deep FTA/shallow FTA/CU has entered into force, and $= 0$ otherwise
- Fixed-Effects
  - γ_{it} importer-year FE
  - γ_{jt} exporter-year FE
  - υ_{kt} product-time FE
  - μ_{ijk} pair-product-FE

Results

	Δt^{simple}		Δt		Δt^{mfn}	
	(1)	(2)	(3)	(4)	(5)	(6)
Shallow FTA	0.396***	0.588***	0.467***	0.200***	1.222***	0.108***
	(0.127)	(0.126)	(0.084)	(0.054)	(0.179)	(0.016)
Deep FTA	-4.896***	-1.319***	-1.802***	-0.522***	-0.033	-0.022
	(0.121)	(0.114)	(0.082)	(0.052)	(0.187)	(0.017)
Customs Union	-10.300***	-6.023***	-2.520***	-1.930***	2.306***	-1.227***
	(0.154)	(0.235)	(0.088)	(0.096)	(0.167)	(0.080)
R^2	0.007	0.867	0.001	0.866	0.001	0.875
Cross-Section	✗		✗		✗	
Panel		✗		✗		✗

Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), and (5) 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. The number of observations equals 131,054,724. Δt is the absolute difference in external tariffs, Δt^{simple} is the absolute difference in external tariffs, and Δt^{MFN} is the difference in external tariffs using MFN tariffs instead of the effectively applied tariffs.

Robustness Checks

- Restrictiveness of RoOs More
- Measurement error in FTA data More
- Aggregation bias More
- Sensitivity to measure of transportation costs More
- Is the pattern driven by multilateral liberalizations (WTO-rounds)?
- Does the collapsing of the data bias results? Shallow Deep CU
- How sensitive are results to data cleaning process? More

Conclusion

- Using a new dataset we show that the level of tariff similarity is high
- It is even higher for pairs with a deep FTA, for pairs with a shallow FTA this is however not true; positive selection as well as ex-post convergence drive this result

$\Rightarrow$ Economic justification for RoOs questionable

Policy Implication

- Relax requirements to prove origin of goods
  - Negotiators should agree of a full set of RoOs for all products
  - But prove of origin is only required if external tariffs of FTA members differ by some minimum amount
- Bhagwati's spaghetti bowl could be a bit disentangled
- Countries could exit a CU without unduly endangering existing production networks (Brexit)

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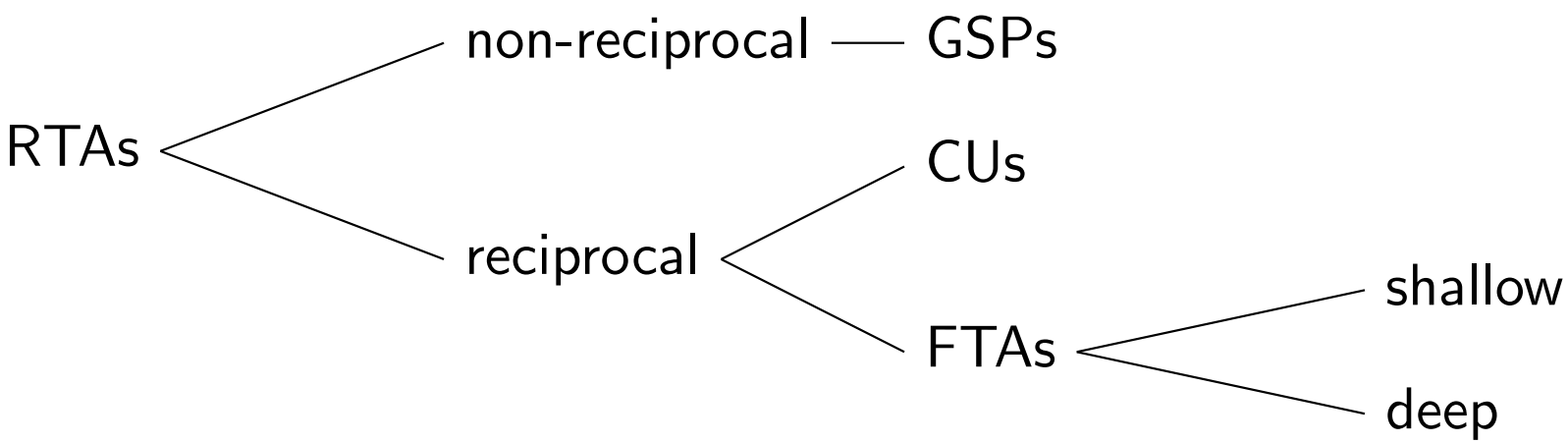
Vocabulary: RTA vs. FTA vs. CU



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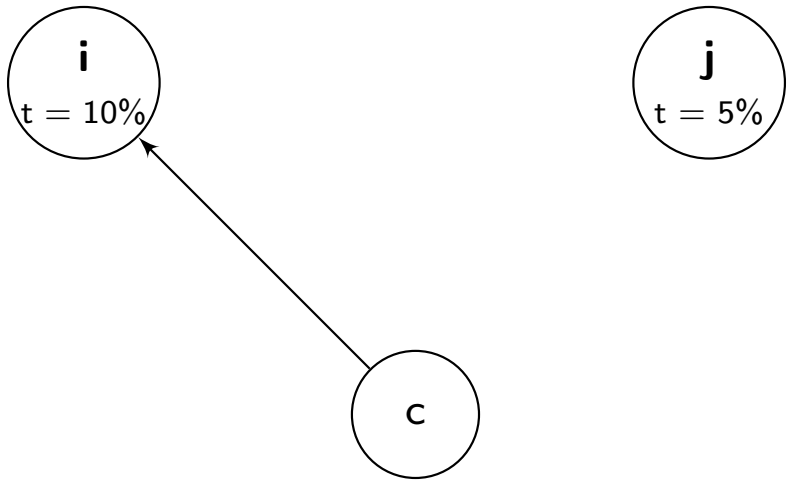
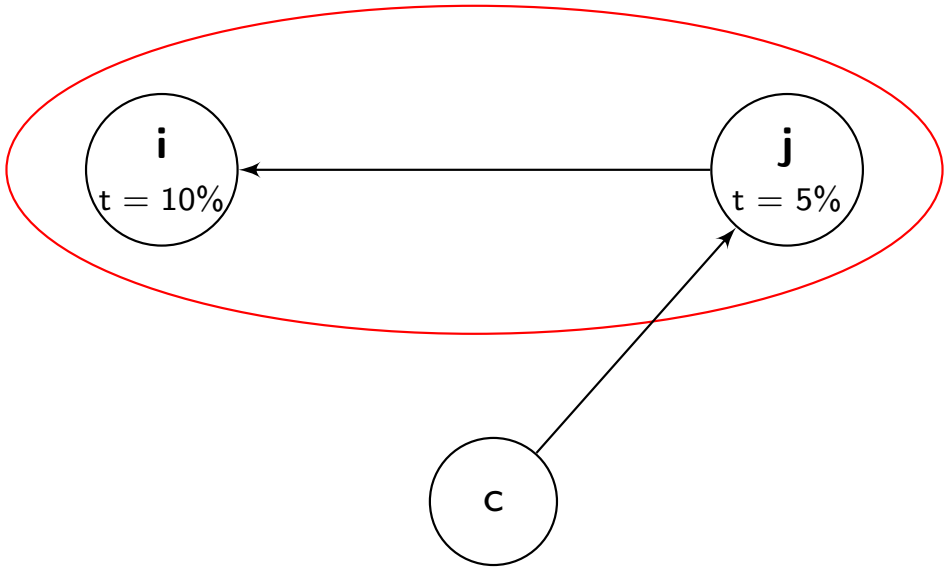
Threat of Trade Deflection in FTAs

No FTA



Threat of Trade Deflection in FTAs

FTA



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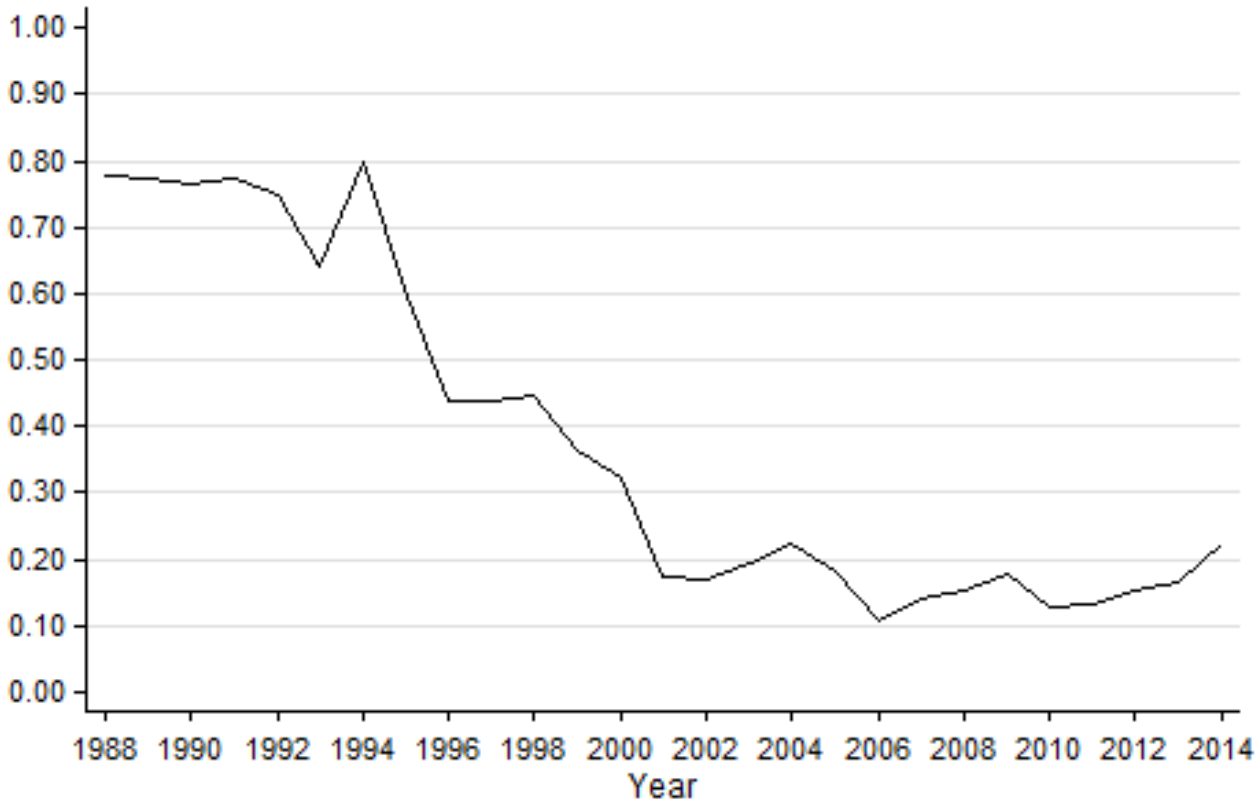
Share of Imputed Data



We show the share of imputed data for each year. With the entry into force of the WTO in 1995 the availability of tariff data increased substantially. Before that, especially developing countries did not report any tariffs. The data uses all available tariffs provided by the UN and the World Bank (downloaded in November 2016).

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cif/fob-ratios for the US

$$ln(\tau_{US,j}) = ln(\alpha) + \delta ln(D_{USj})$$

- Data
  - bilateral import-values for the US on the 10 digit level by entry-port and entry-mode (Schott 2008)
  - aggregate to 6-digit flows by calculating the median
- Procedure
  - regress for every 6-digit product $\rightarrow$ predictions for transportation costs for pair-product combinations
- Results
  - Mean $R^2 = 0.1$, ranges between 0.003 and 0.93
  - Mean $\delta = 0.02$, with average $ln(D_{US,j}) = 9.04$
  - Mean $\alpha = 1.02$

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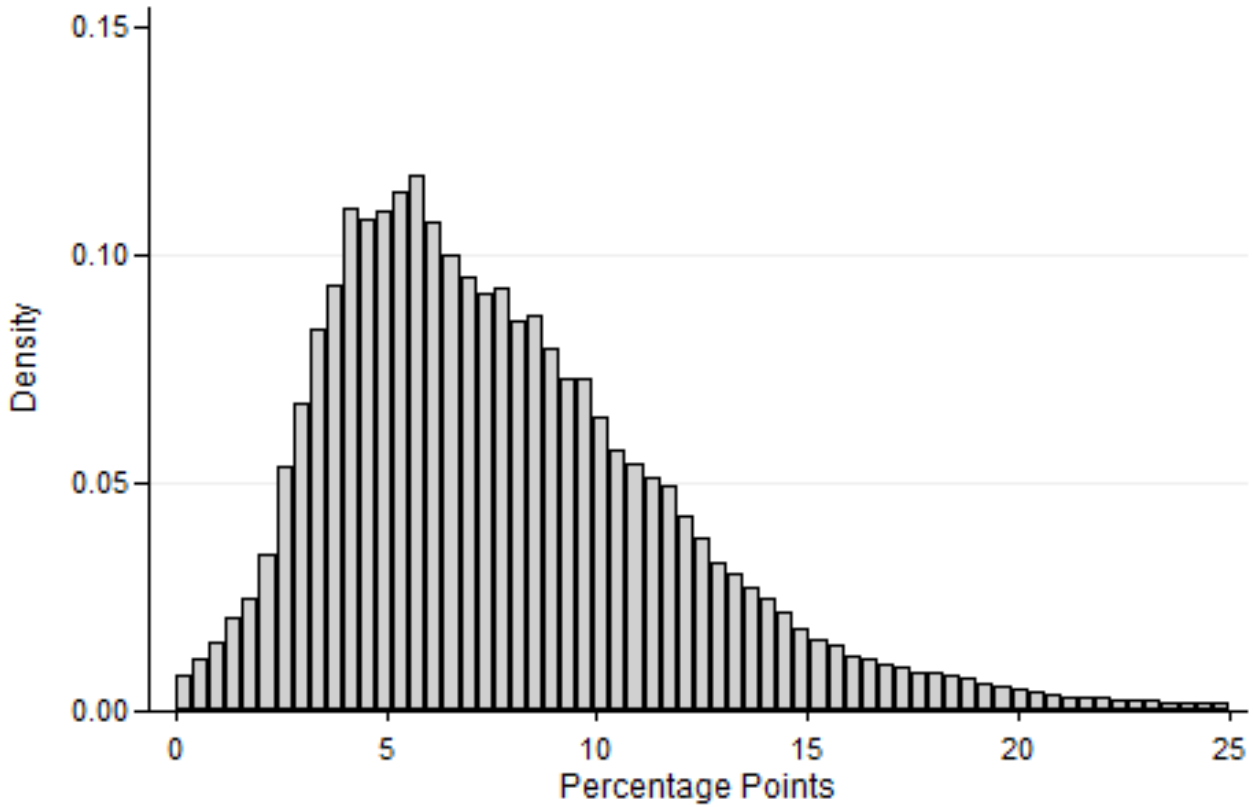
Distribution of Transportation Costs



We show data for 2014. 3.5% of the transportation cost estimates are negative. We only show values ≤ 25.

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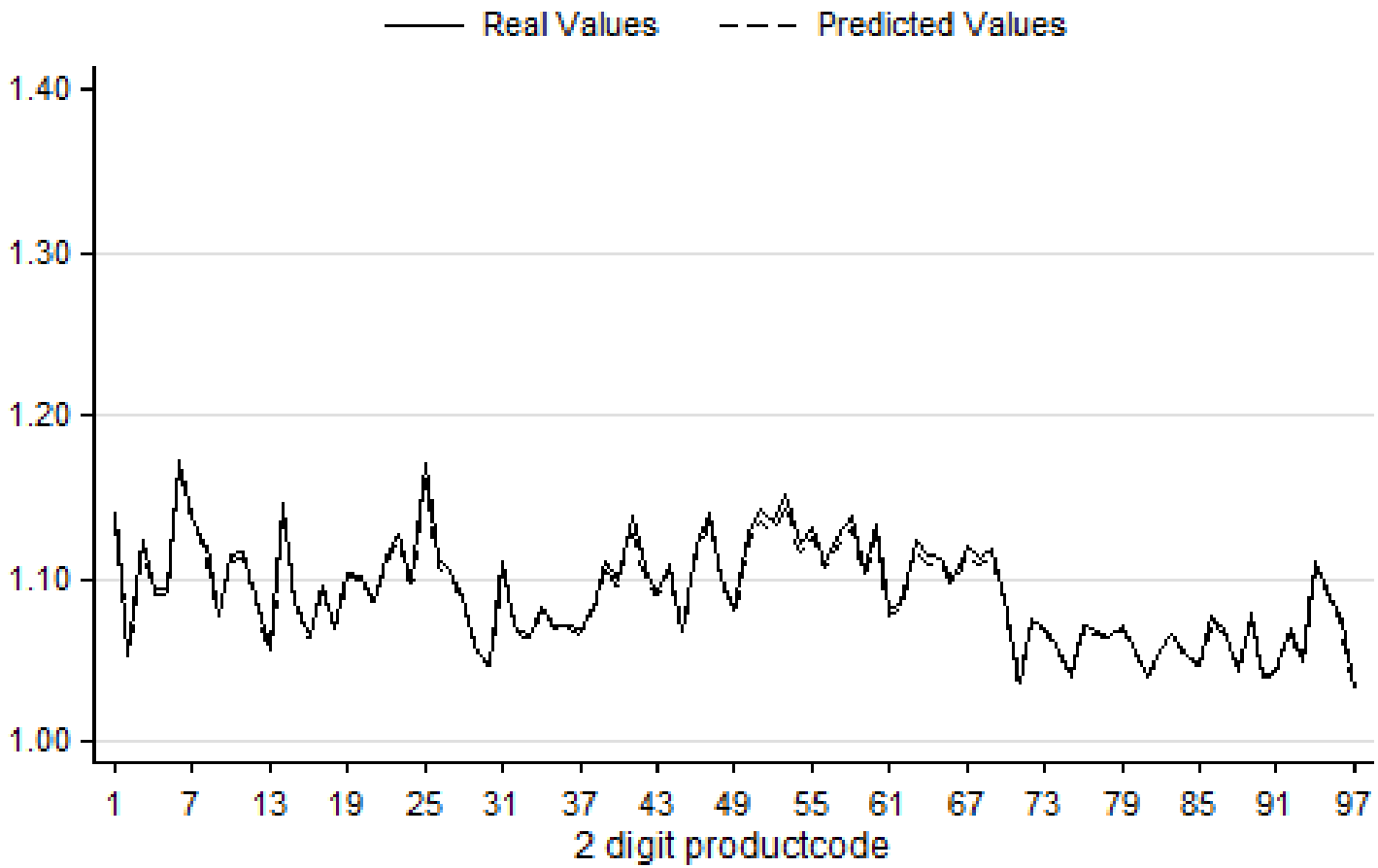
In-Sample Prediction: USA



The graphs shows the observed cif/fob ratios and the predicted values for the US $\hat{\tau}_{US,j} = exp(ln(\hat{\alpha}) + \hat{\delta} ln(D_{US,j}))$. We aggregate by taking the simple mean over sections. The data stem from the US Census and CEPII.

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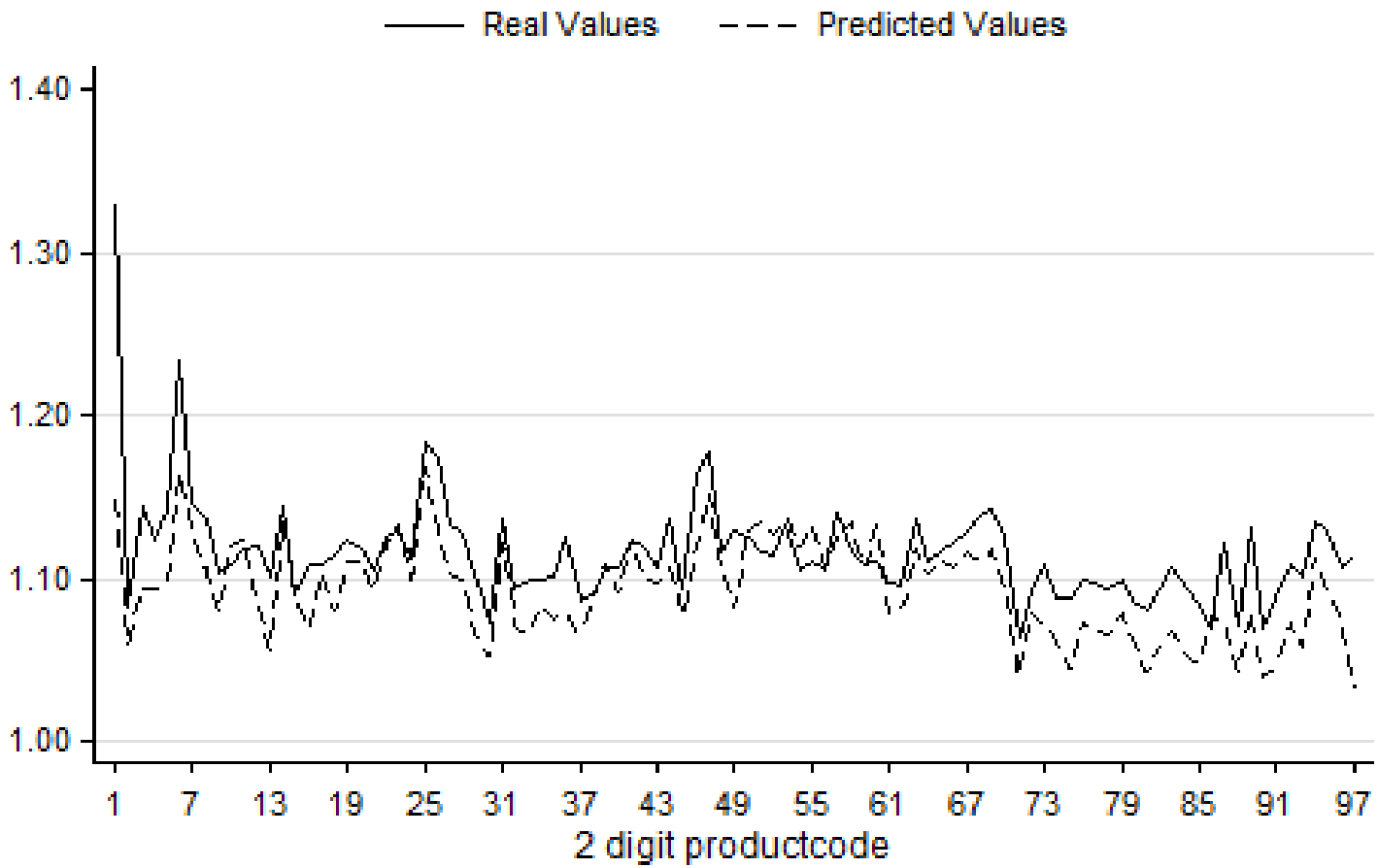
Out-of-Sample Prediction: New Zealand



The graphs shows the observed cif/fob ratios and the predicted values for New Zealand $\hat{\tau}_{NZ,j} = exp(ln(\hat{\alpha}) + \hat{\delta} ln(D_{NZ,j}))$. We aggregate by taking the simple mean over sections. The data stem from the Statistics New Zealand and CEPII.

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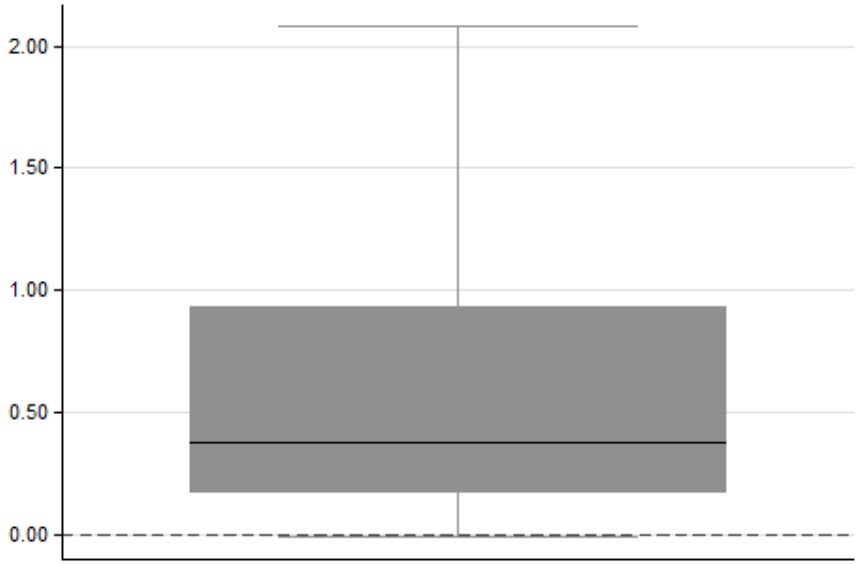
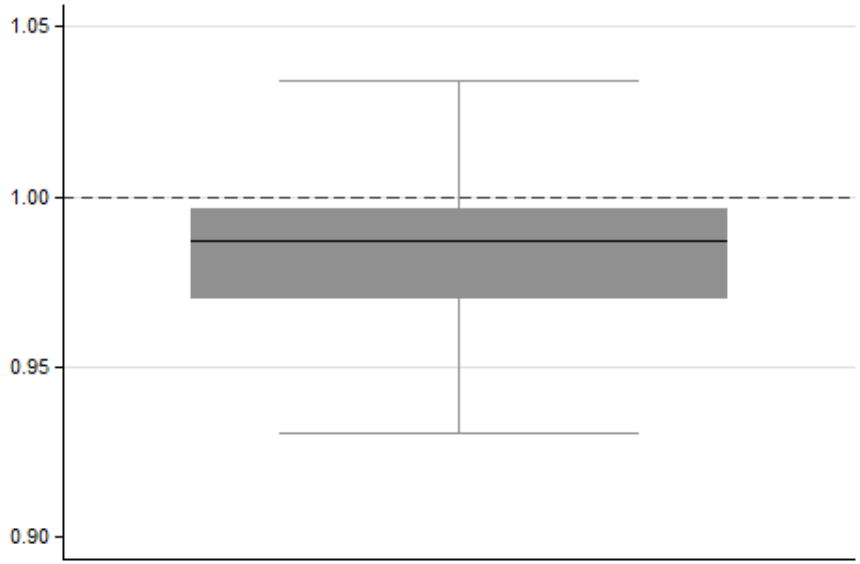
Aggregation Bias: Simple Mean vs. First Best

Figure 1: Quantification of the Potential Aggregation Bias

(a) Constant δ_0



(b) δ_1 Coefficient



The boxplots show the results of the comparison of the first best solution for the differences in external tariffs Δt^c_{ijkt} and the aggregated measure Δt_{ijkt}. We regress for every product the first best solution on the aggregate measure, $\Delta t^c_{ijk} = \delta^k_0 + \delta^k_1 \Delta t_{ijk} + u^c_{ijk} \forall k$. The analysis is based on the year 2014. The figure shows the distribution of the constants δ^k_0 and the slope-coefficients δ^k_1 for all 5,018 products k.

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Sensitivity Analysis: Restrictiveness of RoOs

	Δt^t		RoOs	
	(1)	(2)	(3)	(4)
Shallow FTA	1.942***	-0.666***	2.917***	-0.669***
	(0.313)	(0.105)	(0.304)	(0.111)
Deep FTA	-3.965***	0.069	-2.878***	0.068
	(0.321)	(0.110)	(0.317)	(0.110)
RoOs			-0.868***	0.002
			(0.031)	(0.026)
R^2	0.000	0.834	0.001	0.834
Cross-Section	✗		✗	
Panel		✗		✗

Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), and (5) report the results for the unconditional comparison in means. In the remaining columns importer-time, exporter-time, product-time, and pair-product fixed-effects are included. The number of observations equals 69,246,064. The information about the restrictiveness of RoOs is from Estevadeordal and Suominen (2006).

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Sensitivity Analysis: FTA Data

	DESTA	WB-Core	WB-All
	(1)	(2)	(3)
Shallow FTA	0.440***	-1.438***	-1.046***
	(0.050)	(0.060)	(0.058)
Deep FTA	-0.769***	0.969***	0.375***
	(0.064)	(0.071)	(0.078)
Customs Union	-1.405***	0.362***	-0.030
	(0.065)	(0.067)	(0.072)
R^2	0.000	0.001	0.001

Clustered (country-pairs) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. We use different data for the "depth" of the FTAs, namely data from the DESTA database and the World Bank's Global Preferential Trade Agreement Database. The number of observations equals 65,527,362 and we show unconditional comparison in means for the year 2014.

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Sensitivity Analysis: Aggregation Bias

	Δt^t		Standard Deviation			
	(1)	(2)	(3)	(4)	(5)	(6)
Shallow FTA	2.825***	-0.390***	2.820***	-0.366***	2.818***	-0.559***
	(0.563)	(0.100)	(0.564)	(0.099)	(0.593)	(0.119)
Deep FTA	-3.334***	0.045	-3.327***	0.035	-3.439***	0.180
	(0.534)	(0.202)	(0.536)	(0.204)	(0.558)	(0.216)
Customs Union	-4.055***	-0.936***	-4.039***	-0.796**	-4.062***	-0.519
	(0.546)	(0.313)	(0.550)	(0.314)	(0.574)	(0.326)
SD			0.169	0.826***	-0.200	-0.034
			(0.242)	(0.215)	(0.266)	(0.159)
SD × Shallow					0.138	1.970***
					(0.833)	(0.649)
SD × Deep					1.943**	-0.151
					(0.903)	(0.737)
SD × CU					0.637	-3.355***
					(0.920)	(1.207)
R^2	0.035	0.837	0.035	0.837	0.035	0.837
Cross-Section	✗		✗		✗	
Panel		✗		✗		✗

Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), and (5) 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. The number of observations equals 3,628,280. *SD* equals 1 if the standard deviation within the HS6 product is > 0.

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Sensitivity Analysis: Transportation Costs

	Δt^t		Δt^{US}	
	(1)	(2)	(3)	(4)
FTA	1.445***	0.017	1.263***	0.015
	(0.150)	(0.074)	(0.154)	(0.073)
Deep FTA	-3.014***	-0.555***	-3.190***	-0.480***
	(0.138)	(0.073)	(0.139)	(0.068)
Customs Union	-4.623***	-2.501***	-5.389***	-1.882***
	(0.142)	(0.126)	(0.142)	(0.128)
R^2	0.004	0.871	0.006	0.870
Cross-Section	✗		✗	
Panel		✗		✗

Twoway clustered (country-pairs and products) standard errors in ( ). ***/**/* Indicate significance at the 1%/5%/10% level. Column (1), (3), (5), and (7) 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 and the number of observations equals 36,200,898. Δt equals the absolute difference in external tariffs, while Δt^{US} uses the US cif/fob ratios as a proxy for the bilateral pair-product transportation costs.

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Sensitivity Analysis: Imputed Data

	Δt		Δt^{mean}		Δt^{n}		Δt^{mfn}	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FTA	0.857***	0.060	1.691***	-0.003	0.111***	0.018	0.167	-0.008
	(0.280)	(0.289)	(0.221)	(0.004)	(0.025)	(0.026)	(0.265)	(0.253)
Deep FTA	-4.405***	-1.454***	-4.971***	-0.014**	-0.338***	-0.078***	-3.846***	-0.933***
	(0.243)	(0.230)	(0.203)	(0.006)	(0.023)	(0.020)	(0.238)	(0.205)
Customs Union	-9.599***	-6.654***	-6.340***	0.018***	-0.906***	-0.621***	-8.785***	-5.428***
	(0.299)	(0.375)	(0.277)	(0.002)	(0.024)	(0.031)	(0.348)	(0.380)
R^2	0.020	0.810	0.027	0.854	0.043	0.838	0.015	0.822
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), and (7) 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 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, and Δt^{mfn} uses MFN tariffs instead of the effectively applied one. The number of observations equals 18,889,688.

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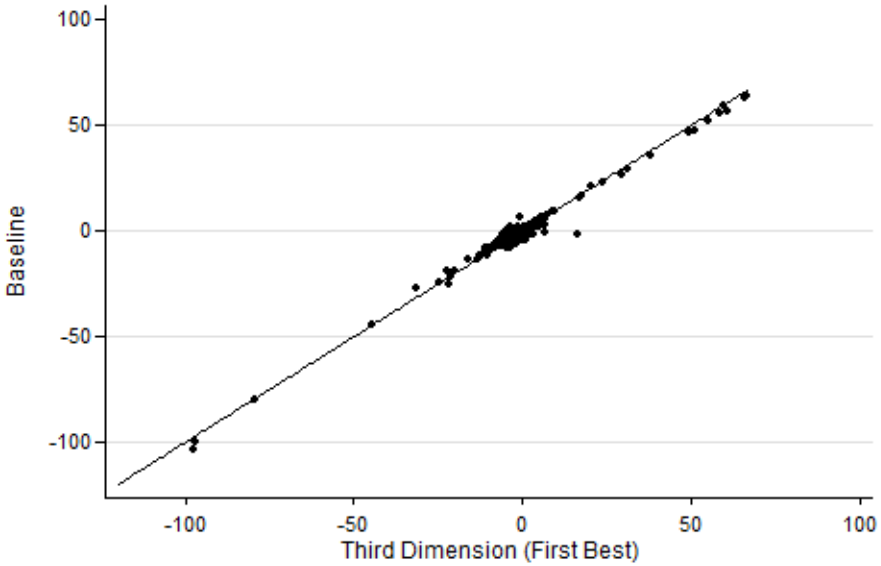
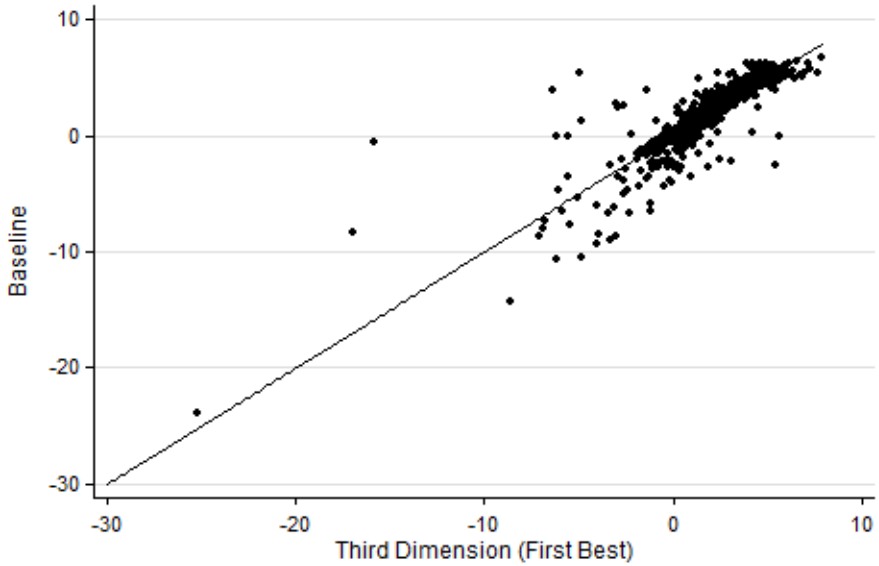
Sensitivity Analysis: First Best vs. Simple Mean (shallow)

(c) Cross-Section: Shallow FTA



(d) Panel: Shallow FTA



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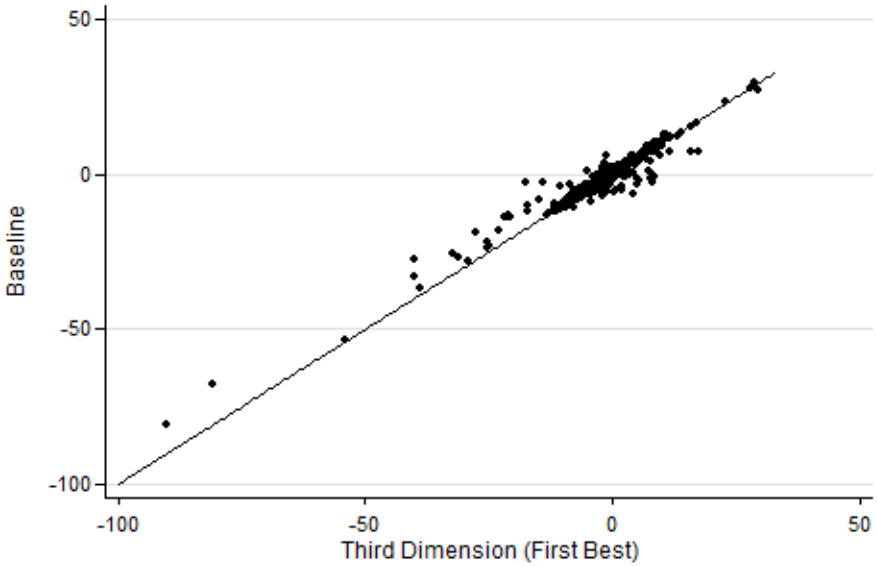
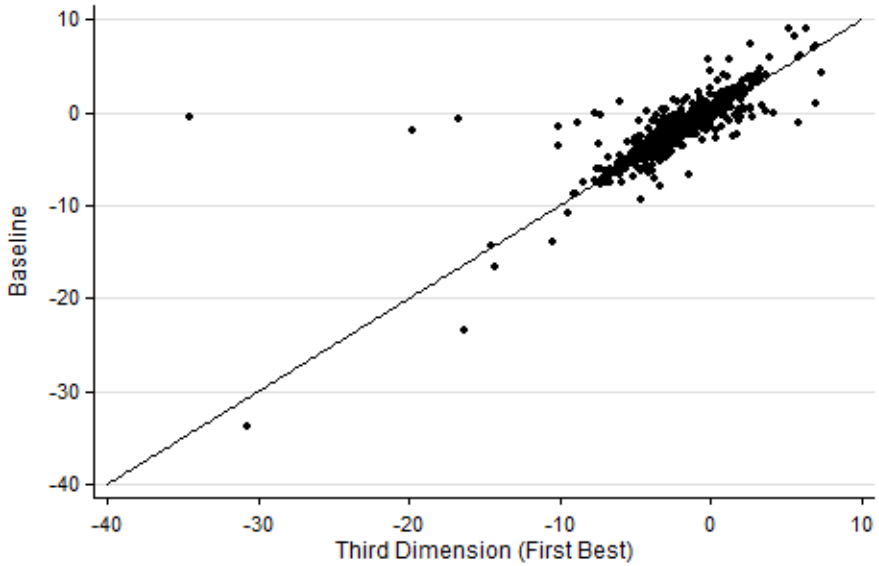
Sensitivity Analysis: First Best vs. Simple Mean (deep)

(e) Cross-Section: Deep FTA



(f) Panel: Deep FTA



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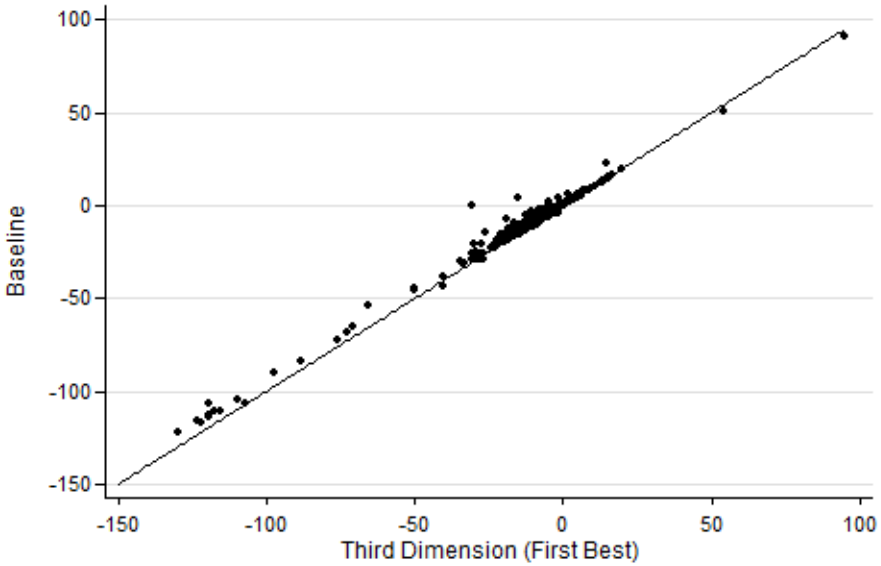
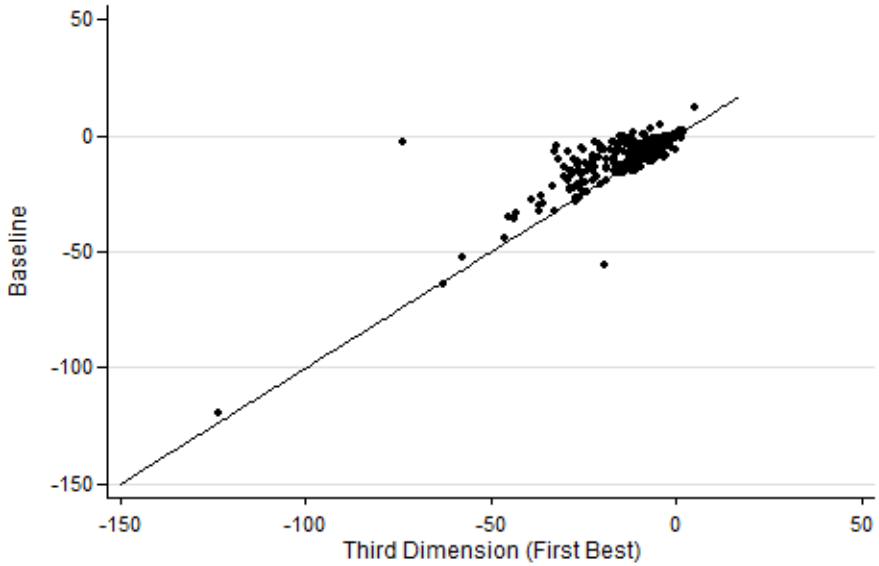
Sensitivity Analysis: First Best vs. Simple Mean (CU)

(g) Cross-Section:: Customs Union



(h) Panel: Customs Union



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