

Regulatory Heterogeneity and PTAs

Achim Vogt

World Trade Institute, University Bern
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Motivation

- With low tariffs the focus shifts to deep RTAs that include integration provisions for standard-like NTMs
- Previous estimates and firm-surveys show that the potential trade enhancing effect of reducing barrier effects of such measures are a manifold of abolishing remaining tariffs.
- Often achieving integration via (partial) mutual recognition easier than via regulatory harmonization
- Potentially different channels of regulatory heterogeneity (structure vs. intensity)
- Do deep SPS and TBT integration clauses in PTAs address the trade restrictiveness effect of regulatory differences?

Literature: PTAs & Trade

PTA estimates

- Cross-section: [Magee, 2003](#) using instrumental variables, [P. Egger et al., 2015, 2011](#) in a traditional gravity with control functions, and [Baier and Bergstrand, 2009](#); [H. Egger et al., 2008](#) applying matching estimators
- Panel: [Baier and Bergstrand, 2007](#) using *od* fixed effects to address endogeneity of PTAs ($\rightarrow$ estimates $\uparrow$), [Bergstrand et al., 2015](#) to include border effects, i.e. the general development of inter- vs. intra-national trade costs over time ($\rightarrow$ estimates $\downarrow$), [Baier et al., 2018](#) interacting PTA variable with common *od* trade cost variables to gauge heterogeneous effects, [Disdier et al., 2015](#) on diversion effects of standard provisions in N-S agreement, and [Kohl et al., 2016](#) for positive effects of increasing depth of agreements.

Literature: NTMs & Trade

NTM estimates:

- Panel: [Fontagne et al., 2015](#) using WTO STCs find that trade restrictive effects are larger for small firms than large firms, [Crivelli and Groeschl, 2016](#) also using SPS STCs find a negative impact on the extensive margin but positive impacts once selected into a trading relationship, [Ghodsi, 2019](#) on trade enhancing impacts of Chinese TBTs, and [Grundke and Moser, 2019](#) on protectionist effects of border inspections in the US during the financial crisis.
- Cross-section: [Disdier et al., 2008](#) for SPS and TBT measures implemented by OECD countries, [Winchester et al., 2012](#) find negative effects of regulatory heterogeneity in pesticide, process control, and labeling measures on agri-trade, [Bratt, 2017](#) with broad brushed NTM measure finding more restrictive measures implemented by developing countries, [Cadot and Gourdon, 2016](#) for a price-based approach to estimate that PTA SPS and TBT clauses reduce ad-valorem equivalents of MFN measures by ca. 25%

Estimating equation

Standard empirical gravity equation estimated via PPML

$$Y_{odk} = \exp(X_{od}\gamma + \theta \ln(1 + t_{odk}) + PTA_{odk}\beta + NTM_{odk}\delta + \mu_{ok} + \eta_{dk})\varepsilon_{odk} \quad (1)$$

$$NTM_{odk}\delta = \delta_1 RDist_{odk} + \delta_2 RPrev_{odk} + \delta_3 RPrevBord_{dk} + \delta_4 RNontech_{dk}$$

$$PTA_{odk}\beta = \beta_1 PTA_{od} + \beta_2 PTA_{od} * RNontech_{dk} + \beta_3 PTA_{od}^{Tech} + \beta_4 PTA_{od}^{Tech} * RDist_{odk} + \beta_5 PTA_{od}^{Tech} * RPrevBord_{dk} + \beta_6 PTA_{od}^{Tech} * RPrev_{odk}$$

Endogeneity correction

Regulatory distance

- Residual inclusion from a first-stage OLS

$$\text{RDist}_{odk} = Z_{od}\gamma + \theta \ln(1 + t_{odk}) + \text{PTA}_{od}\beta + \delta \text{RPrev}_{odk} + \mu_{ok} + \eta_{dk} + \xi_{odk} \quad (2)$$

- Instruments excluded in the second stage are dummies indicating a colonial history after 1945 and common legal history before 1991

Trade agreements and provisions

- Mill's ratios λ_{cat} derived from first-stage Probit regressions on mutually exclusive levels of PTA and technical provision depth (P. Egger et al., 2015)

$$\text{PTA}_{od}^{\text{cat}} = S_{od}\gamma + \text{NTM}_{od}\delta + \mu_o + \eta_d + \phi_{od} \quad (3)$$

- Instruments excluded in the second stage: absolute time difference between o and d , and whether o and d used to be the same country

Regulatory Heterogeneity Indicator

Two sources of regulatory heterogeneity, a) intensity, captured by the average number of measures, and b) structure, captured by the Jaccard distance

$$\text{RDist}_{odig} = 1 - \frac{a}{a + b + c} \quad \text{and} \quad \text{RPrev}_{dkg} = \frac{\sum^g \sum_{i=1}^k M_{di}}{\sum_{i=1}^k D_i}$$

- a : number of measures in common: $|O \cap D|$
- b : number of measures only imposed by O , but not D : $|O - D|$
- c : number of measures only imposed by D , but not O : $|D - O|$
- M_{di} : number of MFN measures imposed by d on product i
- D_i : Indicator if product i is part of sector k

Note, regulatory distance can only decrease by joint occurrence of measures.

NTMs included & identification

Measures imposed on foreign and domestic firms

- $RDist_{odk}$ and $RPrev_{odk}$: packaging & labeling, tolerance limits, hygiene, post-production treatment, conformity assessment, product documentation and performance requirements

Measures imposed on foreign firms

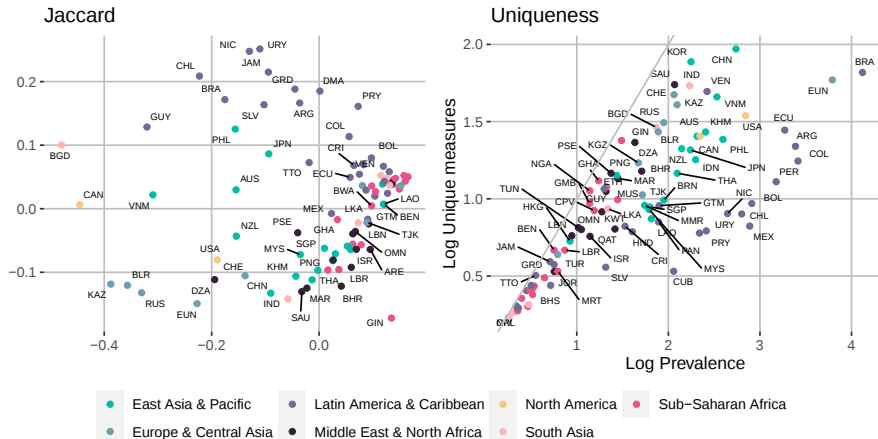
- $RPrevBord_{dk}$: authorization (A1, B1) and quarantine requirements (A86), pre-shipment inspections (C))
- $RNontech_{dk}$: Quantity- (E) and price-control (F) measures, except non-discriminatory internal charges (F7)

Notes:

- $RPrevBord_{dk}$ and $RNontech_{dk}$ identified via [Heid et al., 2021](#).
- As noted by [Beverelli et al., 2018](#), variables affecting imports and exports cannot be identified separately by a border interaction. $RPrev_{odk}$ is pair-wise average of number of measures.

Patterns of technical measures

Figure: Technical Measures, total average



Data

- Trade: 2014 GTAP without energy sectors (15-18, 46-47) and services sectors
- NTMs: UNCTAD NTMTRAINS (measures in force 2014)
- Distance: Standard bilateral trade cost variables from CEPII
- Tariffs: Blended tariff rate from multiple source with preference ranking at the 6-digit level: ITC EPA > ITC pref > TRAINS pref > ITC MFN > TRAINS MFN > WTO bound
- Internal trade costs (PCA): Geographic size (CEPII, WDI), quality of the physical, technological, and financial infrastructure (WEF), logistics performance (WB LPI), the quality of governance (WB WGI), and the state of the political landscape (FH)
- Absolute difference (PCA): KL-ratio and human capital (PWT), the quality of governance (WB WGI), and the state of the political landscape (FH)

First-stage regressions

	Reg Dist	PTA 1	PTA 2	PTA 3
inter_dist	0.004*** (0.0006)	-0.685 (0.235) ***	-0.664 (0.219) ***	0.926 (0.408) **
contig	-0.0009 (0.003)	0.224 (0.326)	-0.136 (0.342)	2.175 (1.394)
comcol	0.003 (0.003)	0.042 (0.440)	0.300 (0.252)	-0.650 (0.318) **
comleg_posttrans	0.003 (0.002)	0.238 (0.117) **	-0.351 (0.133) ***	0.387 (0.110) ***
col_dep_ever	0.018*** (0.005)	-0.641 (0.198) ***	0.301 (0.327)	-0.122 (0.296)
sibling_ever	-0.001 (0.002)	-1.181 (0.544) **	0.479 (0.225) **	0.131 (0.458)
comlang_off	0.003 (0.002)	-0.021 (0.347)	0.673 (0.264) **	-0.644 (0.539)
comlang_ethno	-0.003 (0.003)	1.390 (0.304) ***	-0.983 (0.242) ***	0.070 (0.296)
mass	-0.0003* (0.0002)	-0.043 (0.022) *	-0.023 (0.022)	0.166 (0.027) ***
diff_PCA1	-5.99e-5 (0.0003)	-0.119 (0.066) *	0.033 (0.044)	0.269 (0.101) ***
diff_PCA2	0.0009*** (0.0003)	0.021 (0.047)	-0.063 (0.060)	-0.120 (0.079)
diff_PCA3	0.0003 (0.0005)	-0.008 (0.127)	-0.111 (0.105)	0.374 (0.147) **
shTP	-0.016 (0.014)	3.556 (1.473) **	3.023 (2.364)	-14.741 (4.189) ***
Reg Prev od	0.028*** (0.004)	2.415 (0.750) ***	0.125 (0.610)	-0.006 (0.710)
Reg Dist		3.588 (4.027)	4.169 (8.155)	59.371 (10.252) ***
PTA Tech	0.0004*** (0.0001)			
Tariff	0.023 (0.034)			
PTA	0.002 (0.002)			
comleg_pretrans	-0.006** (0.003)			
col45	-0.023*** (0.008)			
smctry		3.300 (0.667) ***	-6.781 (0.514) ***	-2.145 (1.767)
time_diff		-0.181 (0.094) *	-0.133 (0.043) ***	-0.297 (0.058) ***
Observations	8,750	8750	8750	8750
FE	o, d	o, d	o, d	o, d

Note: 1) All regressions are run without $o = d$ observations. 2) All regressions exclude intra-EU observations because regulatory data is collected for EU legislation only and the single market PTA depth is captured by a separate EU dummy. 3) SE are clustered by origin and destination.

Total goods trade

	Model 1	Model 2	Model 3	Model 4	Model 5
Tariff	-6.327 (1.166) ***	-6.932 (1.035) ***	-6.129 (1.067) ***	-5.920 (1.147) ***	
EU	1.506 (0.192) ***	1.173 (0.265) ***	1.504 (0.243) ***	1.550 (0.242) ***	1.871 (0.261) ***
PTA	0.361 (0.136) ***	0.286 (0.145) **	0.335 (0.131) **	0.223 (0.154)	0.432 (0.153) ***
PTA Tech	0.010 (0.009)	0.006 (0.009)	0.009 (0.008)	0.018 (0.010) *	0.021 (0.010) **
Reg Dist	-4.909 (1.085) ***		-6.221 (2.791) **	-8.206 (2.632) ***	-8.972 (2.456) ***
Reg Prev od		0.381 (0.174) **	0.385 (0.164) **	0.357 (0.163) **	0.362 (0.164) **
Reg Prev Border		-0.249 (0.341)	-0.081 (0.337)	-0.083 (0.338)	-0.225 (0.315)
Reg Prev Nontech		0.176 (0.294)	-0.069 (0.329)	0.004 (0.332)	0.138 (0.308)
Reg Dist*PTA Tech				0.405 (0.118) ***	0.413 (0.121) ***
Reg Prev od*PTA Tech				-0.010 (0.007)	-0.010 (0.007)
Reg Prev Border*PTA Tech				-0.004 (0.009)	0.007 (0.008)
Reg Prev Nontech*PTA				-0.098 (0.166)	-0.197 (0.165)
Total PTA Effect	0.512 (0) ***	0.374 (0) ***	0.472 (0) ***	0.5 (0) ***	0.752 (0) ***
SPS and TBT provisions	0.151	0.088	0.137	0.277	0.32
Pseudo-R2	0.992	0.992	0.992	0.993	0.992
Num. obs.	9604	9604	9604	9604	9604
FE	o, d	o, d	o, d	o, d	o, d

Note: 1) Standard controls and home market interactions omitted for brevity. 2) SE are clustered by origin and destination. 3) Models 3-5 include the residual from the first stage OLS. 4) All models include a control function for PTA and PTA Tech. 5) Coefficients and corresponding SE of PTA and PTA Tech are evaluated at the average of the interaction terms for those country pairs that have a PTA.

Next steps

Conclusion

THANKS!

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