Commitment Behavior in the WTO Trade Facilitation Agreement

(GTAP Resource #6250)

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Motivation

- A notable exception to the lack of progress in the World Trade Organization's (WTO) Doha Round has been the successful negotiation and ratification of the Agreement on Trade Facilitation (TFA).
- The agreement entered into force in 2017 and aims to make the logistics of international trade simpler and less costly by providing a lengthy list of practices and procedures that countries should, eventually, implement.
- The TFA allows each developing country government to choose a subset of the total package of commitments that it is **prepared** to implement.
- This *à la carte* approach represents an alternative framework to WTO agreements concluded with a *single-undertaking*.

Research Questions

- We use a new database of commitments made during the process of ratifying the TFA to study variation in countries' behavior.
- We focus in the so-called *Type A commitments*, which are those that countries agreed to have in place within one year of the entry-into-force of the TFA. We have three major questions.

1. What is the perceived relative difficulty of implementing the TFA commitments? - Implementation Levels
2. What is the relationship between the number of commitments made and different country characteristics? - Cross-country regressions.
3. What is the nature of cross-country variation in the kinds of commitments made? - Factor analysis model - Multidimensional scaling.

Data

- The data used to document countries' Type A commitments are taken from the TFA Database (TFAD), which is published by the WTO (2019).
- The detailed breakdown of countries' commitments, generates data for 238 commitments across the 12 articles of Section I of the TFA, for 113 developing countries.
- We use a broad number of country characteristics such as levels of income, openness, geographical features, aid for trade (AFT) disbursements received, etc.

Implementation Levels

Number of countries committing to different measures

An implementation level, I, is the share of all TFA commitments implemented as Type A. Its formula is given by

$$I_z = \frac{Number\ of\ commitments\ made_z}{Total\ number\ of\ commitments\ possible_z} \times 100 \qquad (1)$$

We calculate these shares for all articles and areas of regulation, z.

Variation in implementation levels may be informative about relative difficulty of each article or area of regulation.

Table 1: Type A commitments implementation levels by article number.

Article	Number of Comm. by Article	Number of Comm. Possible	Number of Type A Comm.	Type A percentage
Article 9 - Movement under Customs Control	1	113	95	84.1
Article 4 - Procedures for Appeal or Review	9	1017	654	64.3
Article 10 - Import, Export and Transit Formalities	30	3390	2147	63.3
Article 11 - Freedom of Transit	21	2373	1493	62.9
Article 6 - Disciplines on Fees and Charges	14	1582	956	60.4
Article 12 - Customs Cooperation	49	5537	3063	55.3
Article 2 - Comment and Consultation	4	452	238	52.7
Article 5 - Impartiality, Non-discrim. & Transparency	8	904	442	48.9
Article 7 - Release and Clearance of Goods	55	6215	2827	45.5
Article 1 - Publication and Availability of Information	22	2486	1101	44.3
Article 8 - Border Agency Cooperation	6	678	263	38.8
Article 3 - Advance Rulings	19	2147	805	37.5

Table 2: Type A commitments implementation levels by area of regulation.

	Area	Number of Comm. By Area	Number of Comm. Possible	Number of Type A Comm.	Type A percentage
1.-	Movement Under Customs Control	1	113	95	84.1
2.-	Pre-Shipment Inspection	2	226	187	82.7
3.-	Detention	1	113	89	78.8
4.-	Use of Customs Brokers	3	339	267	78.8
5.-	Temporary Admission of Goods and Inward and Outward Processing	4	452	355	78.5
..	..	..	..	..	..
32.-	Establishment and Publication of Average Release Times	2	226	86	38.1
33.-	Advance Rulings	19	2147	805	37.5
34.-	Test Procedures	3	339	126	37.2
35.-	Trade Facilitation Measures for Authorized Operators	17	1921	576	30.0
36.-	Single Window	4	452	98	21.7

Movement Under Customs Control relates to the ability of trading firms to move goods from the port of arrival to an inland customs office.

A single window allows trading firm interacts with all government agencies through a single electronic portal.

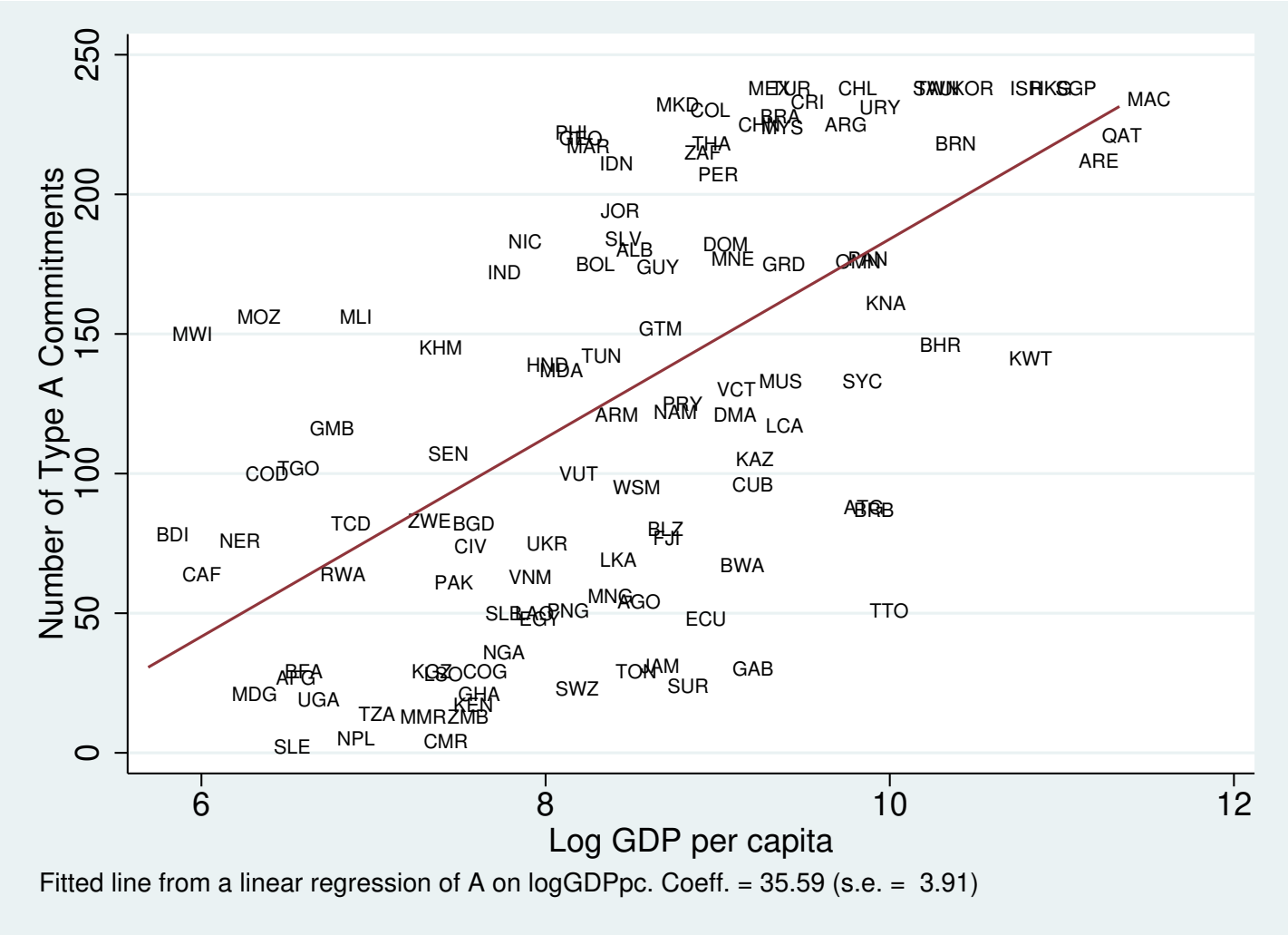
OLS Regression Specification

Variation in the number of commitments made

- To explain cross-country variation in the number of commitmens made, we specify the following regression for the number of Type A commitments made, A for country i:

$$A_i = \beta_0 + \mathbf{x_i}'\boldsymbol{\beta} + \epsilon_i \tag{2}$$

- $\boldsymbol{\beta}$ is a vector of coefficients; $\mathbf{x_i}$ is a vector of country characteristics; ϵ_i is a normally distributed error term.



Fitted line from a linear regression of A on logGDPpc. Coeff. = 35.59 (s.e. = 3.91)

Figure 1: Number of Type A commitments vs. log GDP per capita.

Table 3: OLS Regression. Dependent Variable: Number of A commitments

	(1) A	(2) A	(3) A	(4) A	(5) A	(6) A	(7) A	(8) A	(9) A
log GDP per capita	35.59***	36.44***	40.21***	36.81***	36.46***	36.58***	36.32***	27.28***	25.41***
	(3.91)	(4.41)	(4.47)	(4.66)	(4.55)	(4.58)	(4.68)	(5.80)	(5.97)
Landlocked		-21.29	-11.81	-3.501	-1.608	-5.360	-5.366	-3.394	-7.300
		(15.54)	(16.14)	(16.03)	(15.99)	(15.62)	(15.72)	(15.49)	(15.55)
Island		-49.13***	-27.02	-16.62	-8.844	-11.39	-11.51	-18.10	-18.30
		(13.07)	(16.79)	(17.54)	(18.03)	(18.10)	(18.29)	(17.91)	(19.39)
log Population			8.279**	7.608**	10.02***	11.12***	11.35***	12.93***	13.80***
			(3.17)	(3.31)	(3.48)	(3.48)	(3.54)	(3.47)	(3.67)
US FTA				33.43*	24.26	32.36*	30.48	35.47**	32.58**
				(19.67)	(19.77)	(18.35)	(18.47)	(16.37)	(14.89)
EU FTA				19.69	14.79	-6.976	-6.313	-3.527	-5.895
				(22.11)	(22.89)	(22.59)	(22.79)	(21.57)	(19.97)
Core					-34.70**	-35.15**	-34.04**	-38.99***	-37.98***
					(14.55)	(14.33)	(14.44)	(14.44)	(14.39)
Colorado					15.46	19.25	20.02	7.069	6.386
					(12.38)	(14.19)	(14.21)	(15.25)	(13.88)
AFT per capita						4.470**	4.553**	3.624*	3.193*
						(1.73)	(1.75)	(1.85)	(1.76)
Openness							6.102	-0.0601	-2.354
							(8.87)	(10.74)	(10.57)
Control of Corruption								29.03***	24.26**
								(9.95)	(9.58)
Time to Import (Docum.)									-0.171*
									(0.09)
Constant	-171.9***	-164.2***	-333.5***	-307.1***	-337.0***	-358.9***	-364.6***	-300.3***	-283.9***
	(33.41)	(39.92)	(73.88)	(77.40)	(78.59)	(79.56)	(80.71)	(81.84)	(82.60)
Observations	113	113	113	113	113	113	112	112	110
R^2	0.361	0.425	0.458	0.507	0.534	0.555	0.557	0.587	0.594
Adjusted R^2	0.355	0.410	0.438	0.479	0.498	0.517	0.513	0.542	0.544

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: OLS Regression. Dependent Variable: Number of A commitments

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Observations	113	113	113	113	113	113	112	112	110
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Negative Binomial Regression Specification

Variation in the number of commitments made

- Given that our main dependent variable, A, can only take non-negative integer values (0,1,2,3...) a count data model is probably more appropriate.
- So, as a robustness check, we estimate the following model using a negative binomial regression:

$$A_i = \exp\left(\mathbf{x_i}'\boldsymbol{\beta} + \upsilon_i\right) \tag{3}$$

where υ_i is a random term, such that $\exp\left(\upsilon_i\right)$ follows a gamma distribution.

- The results from this model are consistent with our OLS results. Both models produce quite similar results in terms of the quantitative implications of the coefficients.

▸ NB Regression Results

IV Regressions

Variation in the number of commitments made

- Although it is difficult to establish causality in our context, some of the country characteristics have plausible instruments.
- So, we re-estimate some of the OLS regressions using two-stage least squares (2SLS), where we instrument the following variables:
  - Free Trade Agreement dummy variables ($USFTA_i$, $EUFTA_i$);
  - the openness measure ($Openness_i$);
  - per capita aid for trade facilitation received by country i ($AFTpc_i$)
- The proposed instruments are generally weak.
- However, the 2SLS estimates indicate stronger effects of $AFTpc_i$ on the number of Type A commitments made than OLS results.

▸ 2SLS Regression Results

Multidimensional Scaling (MDS)

Variation in the content of commitments made

- We ask how the content of Type A commitments differs across countries.
- Multidimensional Scaling (MDS) is a technique similar to Principal Components Analysis (PCA) but applied to binary data.
- MDS has been used to study roll-call voting behavior in the US Congress. The results help position individual legislators within a revealed ideological space.
- We apply MDS to reduce the dimensionality of our TFA commitment matrix; and correlate the dimensions with country characteristics.

▸ MDS Technical Details

Table 4: Goodness of fit of MDS and Pearson correlation coefficients

	dim1	dim2	dim3	dim4	dim5	dim6	dim7	dim8	dim9
Panel A									
R^2	0.717	0.836	0.876	0.905	0.915	0.929	0.939	0.953	0.959
ΔR^2	0.717	0.120	0.040	0.029	0.010	0.014	0.010	0.014	0.006
Panel B									
(A) No. of Comm.	-0.998	0.051	0.012	0.010	-0.008	0.005	-0.009	-0.013	0.004
logGDPpc	-0.586	0.227	0.150	-0.003	-0.121	-0.043	-0.052	-0.055	0.088
Landlocked	0.304	-0.154	-0.182	0.034	0.041	-0.073	0.072	-0.047	-0.094
Island	0.082	0.014	0.308	0.151	-0.069	0.090	-0.030	0.018	0.114
logPop	-0.086	0.145	-0.288	-0.156	0.287	-0.156	0.045	0.007	-0.025
EU FTA	-0.342	0.159	-0.090	-0.102	0.092	0.041	0.099	-0.087	0.205
US FTA	-0.427	0.136	-0.033	-0.118	0.040	0.053	-0.005	-0.049	0.141
Core	0.241	0.056	-0.096	0.101	0.149	-0.069	-0.107	0.084	-0.045
Colorado	-0.344	0.051	-0.158	-0.082	0.145	0.095	0.112	-0.024	0.039
AFTpc	-0.151	-0.002	-0.096	0.096	-0.021	0.014	0.140	0.032	0.174
Openness	-0.206	-0.012	-0.046	0.005	-0.208	0.041	0.032	-0.048	-0.096
Control of Corruption	-0.452	0.115	0.157	0.052	-0.087	0.067	-0.122	-0.032	-0.048
Time to Import (Doc.)	0.382	-0.041	-0.039	-0.143	0.056	0.010	0.108	0.050	-0.042
logDistance to US (IV)	0.135	-0.108	-0.211	-0.187	-0.096	-0.185	-0.164	0.043	-0.126
logDistance to EU (IV)	0.033	0.053	0.077	-0.051	0.014	0.102	-0.119	-0.029	-0.160
AFTpc Synthetic (IV)	0.089	-0.135	0.197	0.046	-0.109	0.038	0.004	0.136	0.079
Area (10K sq. km.) (IV)	-0.196	0.063	-0.031	-0.059	0.114	-0.054	-0.055	-0.024	-0.089
logArea (IV)	0.060	0.025	-0.220	-0.131	0.200	-0.153	0.021	-0.141	-0.076

Following the Kaiser (1974) criteria, we kept the nine dimensions with eigenvalues greater than 1. Thus, we label our configurations settings from 1-dimension (dim1) to 9-dimensions (dim9)
Panel A shows the value of the coefficient of determination, R^2, for the observed distances in the initial 238-dimension configuration versus the fitted distances in the different configuration settings. ΔR^2 records the marginal increase in R^2 for adding another dimension to the configuration.
Panel B shows the Pearson correlation coefficients between the score of each country in the last dimension of the reduced configuration dimension and country characteristics.

Conclusions

- We use a new dataset to study cross-country commitment behavior in a novel *à la carte* multilateral agreement framework.
- Commitments related to *movement under customs control* and *pre-shipment inspection* appear to be the easiest for developing countries to implement. *Single windows* and *authorized operator programs* appear to be the most difficult.
- An OLS regression shows that variation in per capita income alone explains 36% of the variation in the number of commitments made.
- Each additional log point of (or doubling) per capita income is associated with **36** more Type A commitments. Thus, reaching full implementation of the TFA is difficult.
- There is only modest variation across countries in the preferred content of their commitments, after controlling for the number of commitments made.

Table A.1: NB Regression. Dep. Variable: Number of A commitments

	(1) A	(2) A	(3) A	(4) A	(5) A	(6) A	(7) A	(8) A	(9) A
logGDPpc	0.287***	0.285***	0.302***	0.285***	0.288***	0.282***	0.280***	0.214***	0.201***
	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)
Landlocked		-0.202	-0.149	-0.0643	-0.0573	-0.101	-0.0985	-0.0718	-0.115
		(0.17)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.17)
Island		-0.369***	-0.247	-0.137	-0.0359	-0.0517	-0.0505	-0.0942	-0.118
		(0.12)	(0.15)	(0.16)	(0.18)	(0.18)	(0.18)	(0.19)	(0.21)
logPop			0.0466*	0.0453	0.0745**	0.0846***	0.0865***	0.0994***	0.107***
			(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
US FTA				0.179	0.120	0.227	0.207	0.265*	0.215*
				(0.14)	(0.14)	(0.15)	(0.15)	(0.15)	(0.13)
EU FTA				0.224	0.200	-0.0233	-0.0207	-0.0194	-0.0501
				(0.16)	(0.17)	(0.19)	(0.19)	(0.18)	(0.17)
Core					-0.360**	-0.369**	-0.361**	-0.395**	-0.414**
					(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
Colorado					0.0133	0.0611	0.0748	-0.00286	-0.0308
					(0.09)	(0.11)	(0.11)	(0.13)	(0.12)
AFTpc						0.0391**	0.0400***	0.0346**	0.0258*
						(0.02)	(0.02)	(0.02)	(0.02)
Openness							0.0589	0.0296	-0.0142
							(0.07)	(0.09)	(0.08)
Control of Corruption								0.218**	0.153
								(0.11)	(0.10)
Time to Import (Docum.)									-0.00232**
									(0.00)
Constant	2.366***	2.492***	1.571**	1.617**	1.176*	1.034	0.979	1.405*	1.608**
	(0.39)	(0.44)	(0.65)	(0.70)	(0.71)	(0.72)	(0.73)	(0.77)	(0.77)
ln(α)	-0.841***	-0.889***	-0.904***	-0.947***	-0.981***	-1.005***	-0.998***	-1.023***	-1.040***
	(0.14)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.17)
Observations	113	113	113	113	113	113	112	112	110
Psuedo-R^2	0.0239	0.0283	0.0297	0.0335	0.0366	0.0387	0.0389	0.0410	0.0435

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table A.2: First Stage of 2SLS Regression.

	(1) US FTA	(2) EU FTA	(3) AFTpc	(4) Openness	(5) AFTpc	(6) Openness	(7) AFTpc	(8) AFTpc	(9) AFTpc
logGDPpc	0.0751**	0.0356	0.165	0.0546	-0.0911	0.0110	0.191	0.190	-0.0954
	(0.0308)	(0.0248)	(0.158)	(0.0479)	(0.241)	(0.0385)	(0.162)	(0.167)	(0.224)
Landlocked	-0.0489	-0.0937	0.964*	0.0390	0.824	0.00691	0.966*	0.943	0.816
	(0.0515)	(0.0682)	(0.570)	(0.0747)	(0.597)	(0.0897)	(0.566)	(0.569)	(0.601)
Island	-0.143	-0.225***	0.304	-0.177	0.200	-0.274	0.383	0.459	0.189
	(0.117)	(0.0845)	(0.631)	(0.178)	(0.723)	(0.191)	(0.632)	(0.651)	(0.703)
logPop	0.0393**	0.0317*	0.0892	0.0163	0.0806	0.0271	-0.00113	-0.00235	0.0509
	(0.0179)	(0.0172)	(0.169)	(0.0595)	(0.200)	(0.0574)	(0.0992)	(0.103)	(0.108)
US FTA			-1.588	0.333	-1.600	0.291	-1.532	-1.510	-1.450
			(1.490)	(0.296)	(1.471)	(0.285)	(1.488)	(1.528)	(1.482)
EU FTA			4.468***	-0.178	4.342***	-0.209	4.481***	4.454***	4.262***
			(1.628)	(0.197)	(1.557)	(0.189)	(1.642)	(1.669)	(1.583)
Core			0.114	-0.165*	0.0922	-0.169*	0.156	0.126	0.0369
			(0.520)	(0.0894)	(0.586)	(0.0923)	(0.537)	(0.540)	(0.598)
Colorado			-0.759	-0.129	-1.069	-0.189	-0.816	-0.804	-1.175
			(1.481)	(0.265)	(1.354)	(0.250)	(1.486)	(1.478)	(1.381)
Openness								-0.0758	-0.387
								(0.506)	(0.499)
Control of Corruption					0.553	0.108			0.632
					(0.576)	(0.105)			(0.502)
Time to Import (Docum.)					-0.00534	-0.00122*			-0.00589
					(0.00387)	(0.000696)			(0.00393)
logDistance to US (IV)	-0.312***	-0.352***							
	(0.0803)	(0.0742)							
logDistance to EU (IV)	0.0556	-0.0683							
	(0.0673)	(0.0878)							
AFTpc Synthetic (IV)			0.756**	-0.00928	0.693**	-0.0277	0.690**	0.732**	0.672**
			(0.328)	(0.0371)	(0.320)	(0.0420)	(0.304)	(0.327)	(0.314)
logArea (IV)			-0.101	-0.0421	-0.0320	-0.0512			
			(0.144)	(0.0592)	(0.210)	(0.0569)			
Constant	1.300	3.248***	-1.651	0.455	0.536	0.943	-1.580	-1.526	1.017
	(0.899)	(0.957)	(2.706)	(0.680)	(3.195)	(0.593)	(2.667)	(2.718)	(3.174)
Observations	113	113	112	112	110	110	113	112	110
Partial-R^2	0.183	0.227	0.079	0.017	0.068	0.025	0.069	0.076	0.065
2SLS Model with the fol. Instrumented Variables	*US FTA, EU FTA*		*AFTpc, Openness*		*AFTpc, Openness*		*AFTpc*	*AFTpc*	*AFTpc*

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table A.3: 2SLS Regressions. Dep. Variable: Number of A commitments

	(1) *OLS* A	(2) *2SLS* A	(3) *2SLS* A	(4) *2SLS* A	(5) *2SLS* A	(6) *2SLS* A	(7) *2SLS* A
logGDPpc	25.41***	41.09***	31.57***	30.57***	37.01***	36.77***	30.54***
	(5.965)	(7.053)	(10.97)	(7.402)	(5.203)	(5.276)	(7.301)
Landlocked	-7.300	-3.501	-21.80	-19.30	-18.69	-17.68	-18.83
	(15.55)	(17.19)	(21.30)	(19.21)	(18.91)	(18.64)	(18.70)
Island	-18.30	-11.28	-13.16	-21.17	-20.46	-20.68	-23.06
	(19.39)	(21.80)	(26.74)	(27.81)	(20.67)	(20.52)	(21.64)
logPop	13.80***	8.869**	16.82***	16.84***	15.04***	15.20***	16.73***
	(3.668)	(3.494)	(5.460)	(3.976)	(3.837)	(3.907)	(3.851)
US FTA	32.58**	-49.64	32.69	57.82	61.12**	57.02**	60.54**
	(14.89)	(110.3)	(66.32)	(40.79)	(29.42)	(27.95)	(29.11)
EU FTA	-5.895	80.67	-73.84	-82.23*	-84.32*	-78.83*	-81.88*
	(19.97)	(96.70)	(54.04)	(46.21)	(43.73)	(42.08)	(46.06)
Core	-37.98***		-23.30	-36.08	-36.74**	-35.03**	-37.82**
	(14.39)		(27.66)	(22.37)	(15.82)	(15.54)	(16.09)
Colorado	6.386		45.38	30.71	32.75	32.81	27.53
	(13.88)		(45.57)	(36.33)	(31.41)	(30.16)	(31.41)
AFTpc	3.193*		21.47**	20.34**	20.36**	19.51**	19.72**
	(1.763)		(8.991)	(9.836)	(8.246)	(7.984)	(9.432)
Openness	-2.354		85.28	17.26		8.107	5.943
	(10.57)		(155.7)	(101.8)		(12.80)	(15.60)
Control of Corruption	24.26**			10.42			12.42
	(9.584)			(22.80)			(14.12)
Time to Import (Docum.)	-0.171*			-0.0465			-0.0646
	(0.0900)			(0.181)			(0.124)
Constant	-283.9***	-360.8***	-477.1***	-417.3***	-436.7***	-442.3***	-405.0***
	(82.60)	(102.3)	(131.3)	(143.9)	(89.25)	(90.22)	(107.3)
Observations	110	113	112	110	113	112	110
R^2	0.594	0.433	0.0454	0.290	0.287	0.320	0.315
Underident. K-P LM		2.115	0.582	0.913	6.713	6.982	6.528
Weak ident. K-P F		1.168	0.264	0.452	5.155	5.018	4.564
Weak ident. C-D F		2.496	0.856	0.936	7.602	8.279	6.785
Endogeneity test (p-value)		0.618	0.0185	0.0968	0.0175	0.0216	0.0364
Instrumented Variables		US FTA EU FTA	AFTpc Openness	AFTpc Openness	AFTpc	AFTpc	AFTpc

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Appendix

MDS Technical Details

We represent the commitment data as a 113x238 dimension matrix of outcomes. The rows are the 113 countries and the columns are the 238 commitments.

Commitment outcomes are binary, with Type A commitments taking the value of one, and other types of commitments taking the value of zero.

We try to reduce the 238 dimensions to k dimensions, where $k < 238$.

We start with a commitment matrix that is used to calculate a distance matrix $\boldsymbol{D}$ with pairwise distances between countries.

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Appendix

MDS Technical Details

$$\begin{array}{c} \\ AFG \\ AGO \\ ALB \\ \vdots \\ ZMB \\ ZWE \end{array} \begin{array}{c} \begin{array}{cccc} A1 & A2 & \dots & A238 \end{array} \\ \begin{pmatrix} 0 & 0 & \dots & 0 \\ 0 & 0 & \dots & 1 \\ 1 & 1 & \dots & 1 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & 1 \\ 0 & 0 & \dots & 1 \end{pmatrix} \end{array} \Rightarrow \boldsymbol{D} = \begin{array}{c} \\ AFG \\ AGO \\ ALB \\ \vdots \\ ZMB \\ ZWE \end{array} \begin{array}{c} \begin{array}{ccccc} AFG & AGO & \dots & ZMB & ZWE \end{array} \\ \begin{pmatrix} 0 & & & & \\ d_{AGO,AFG} & 0 & & & \\ d_{ALB,AFG} & d_{ALB,AGO} & & & \\ \vdots & \vdots & \ddots & & \\ d_{ZMB,AFG} & d_{ZMB,AGO} & \dots & 0 & \\ d_{ZWE,AFG} & d_{ZWE,AGO} & \dots & d_{ZWE,ZMB} & 0 \end{pmatrix} \end{array}$$

where d_{ij} is the distance between i and j within the 238 dim. space.

Then, we try to find a matrix $\hat{\boldsymbol{D}}$ that approximates $\boldsymbol{D}$ as best as possible with less dimensions.

To do so, we perform an eigenvector decomposition that is roughly

$$\boldsymbol{D}\boldsymbol{w} = \lambda \boldsymbol{w}$$

where w is an eigenvector, and λ is an eigenvalue. We keep all w with $\lambda > 1$.

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