New Price-based Bilateral Ad-valorem Equivalent Estimates of Non-tariff Measures

Kravchenko, A., Strutt, A., Utoktham, C., & Duval, Y. (2022). New Price-based Bilateral Ad-valorem Equivalent Estimates of Non-tariff Measures. *Journal of Global Economic Analysis*, *7*(2).

Mr Alex Kravchenko, PhD

Economic Affairs Officer
Trade Policy and Facilitation Section
Trade, Investment and Innovation Division
UN ESCAP

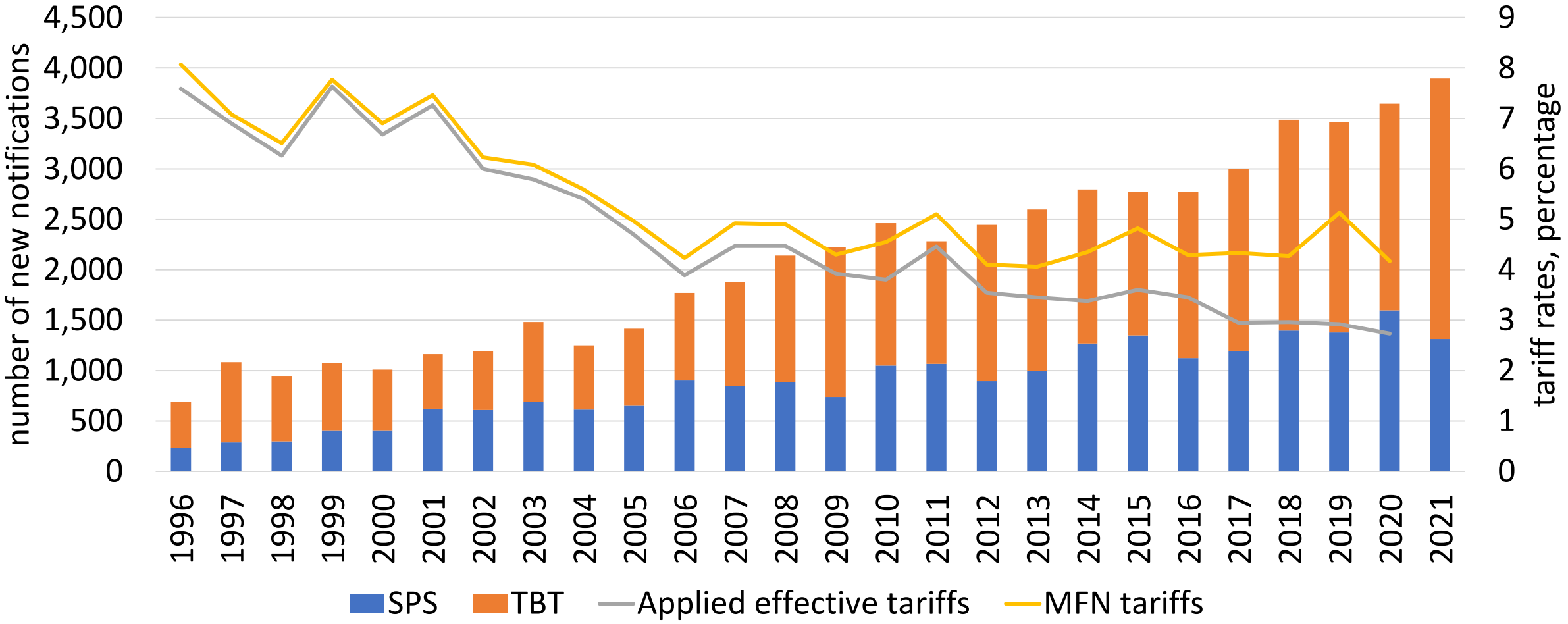
ESCAP 75
MOVING FORWARD TOGETHER

What are non-tariff measures (NTMs)

Non-tariff measures (NTMs) are policy measures other than tariffs that can potentially have an economic effect on international trade in goods.

They include technical measures (such as SPS measures), as well non-technical measures (licensing, price controls, etc).

Declining (ordinary) tariffs & increasing notifications of new NTMs



Estimation of AVEs using gravity models

- **<u>Volume approach</u> (e.g. Kee, Nicita & Olarreaga, 2009; Kee & Nicita, 2017)**
  - Allows for zero trade
  - Generally requires import elasticities for each product
  - Allows for positive effects of NTMs
- **<u>Price approach</u> (e.g. Cadot &Gourdon, 2015; Cadot et al, 2015; Ing & Cadot, 2019)**
  - Does not require import elasticities
  - Relies on price data (sometime quantities are missing)
  - Does not account for zero trade volumes (no prices)
  - Misses out on “behind-the-border” levies

Model specification

(based on Ing & Cadot, 2017)

$$\ln p_{ijk} = \beta_1 \delta_i + \beta_2 \delta_j + \beta_3 \theta_{ij} + \beta_{4m} NTM_{ijkm} + \beta_5 tarrif_{ijk} + \beta_6 \delta_k + \beta_7 (\delta_i \times NTM_{ijkm})$$

- i = importer, j = exporter, k = product, m = type of NTM
- δ is the vector of country-specific characteristics (i.e. GDP and GDP per capita, LDC, landlockedness)
- $tarrif_{ijk}$ accounts for bilateral tariffs
- θ is the vector of pair characteristics (i.e. distance, contiguity, common language and RTA)
- NTM_{ijkm} is the count of NTMs of type m affecting i's imports of k from j
- δ_k are product-fixed effects (HS 6-digit) and interact NTM count with importer-fixed effects

Model estimation

$$\ln p_{ijk} = \beta_1 \delta_i + \beta_2 \delta_j + \beta_3 \theta_{ij} + \beta_{4m} NTM_{ijkm} + \beta_5 tarrif_{ijk} + \beta_6 \delta_k + \beta_7 (\delta_i \times NTM_{ijkm})$$

- Estimated at HS chapter level
- Negative AVEs are assumed to be zero
- AVEs based on insignificant coefficients are assumed to be zero ($p > 0.1$)
- Maximum range of AVEs is restricted using hyperbolic tangent function (i.e. restrict the values to be between 0 and 1 before multiplying by 100)
- Remove 5% of highest prices – outliers
- Combine all technical measures (A-C) and all non-technical measures (D-O)
- Aggregate to GTAP sectors and regions using bilateral imports as weights

AVE derivation

$$\ln p_{ijk} = \beta_1 \delta_i + \beta_2 \delta_j + \beta_3 \theta_{ij} + \beta_{4m} NTM_{ijkm} + \beta_5 tarrif_{ijk} + \beta_6 \delta_k + \beta_7 (\delta_i \times NTM_{ijkm})$$

Impact of all NTMs of type m affecting i's imports of k from j

$$AVE_{ijkm} = \tanh\left(\left(\exp\left(\beta_4 \times NTM_{ijkm} + \beta_7 \times NTM_{ijkm}\right) - 1\right)\right) \times 100$$

DATA - 2015

Combine and fill in some missing data from

- CEPII (distances, common language, et)
- World Bank (GDP, GDP per capita)
- de Sousa (2012)+ (RTAs)
- UN Comtrade (trade/shares)
- UNCTAD (NTM data)
- WITS/WTO (applied tariffs)
- Concordance to HS4 (2012)
- Instruments for each NTM

Example: HS 010121

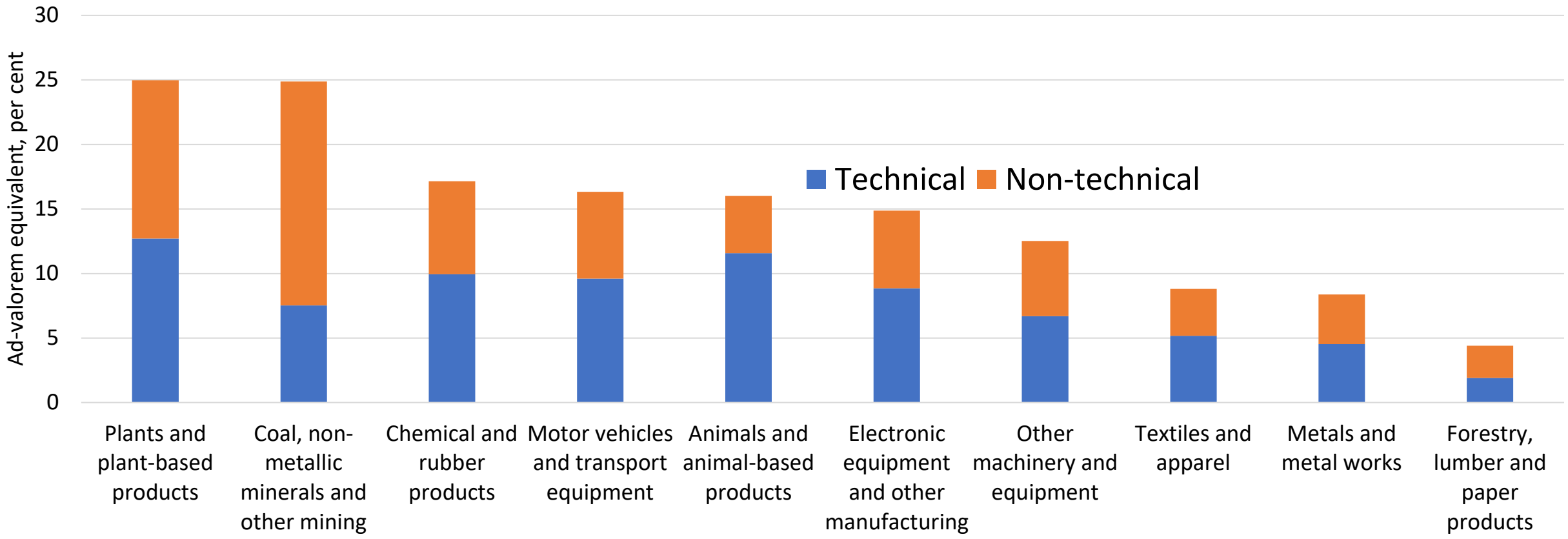
ReporterIS	PartnerISC	ProductCc	QtyToken	price	TradeValu	rta	ln_gdp_i	ln_gdp_j	ln_gdppc_	ln_gdppc_	dist	contig	comlang_	llocked	A
ARG	DEU	10121	5	10.124	70.868	0	27.09438	28.8476	9.508005	10.6292	11512.14	0	0	0	10
ARG	GBR	10121	5	9.758	19.516	0	27.09438	28.69074	9.508005	10.69887	11147.48	0	0	0	10
ARG	CHL	10121	5	14.41	28.82	1	27.09438	26.21434	9.508005	9.521731	1128.317	1	1	0	10
ARG	URY	10121	5	4.545	4.545	1	27.09438	24.69872	9.508005	9.650197	215.0746	1	1	0	14
ARG	USA	10121	5	98.3091	983.091	0	27.09438	30.52808	9.508005	10.94145	8542.694	0	0	0	10
ARG	FRA	10121	5	9.045	9.045	0	27.09438	28.52038	9.508005	10.5058	11072.25	0	0	0	10
ARG	NLD	10121	5	8.62	77.58	0	27.09438	27.35395	9.508005	10.70876	11466.75	0	0	0	10
ARG	BEL	10121	5	8.487333	25.462	0	27.09438	26.844	9.508005	10.60598	11326.76	0	0	0	10
ARG	BRA	10121	5	6.126	91.89	1	27.09438	28.22083	9.508005	9.077632	1691.067	1	0	0	14
ARG	PER	10121	5	9.5354	95.354	0	27.09438	25.96613	9.508005	8.704559	3133.925	0	1	0	10
ARG	IRL	10121	5	9.79875	39.195	0	27.09438	26.39527	9.508005	11.03714	11012.97	0	0	0	10
AUS	IRL	10121	5	250.7303	2507.303	0	27.9277	26.39527	10.94295	11.03714	17230.5	0	1	0	0
AUS	NLD	10121	5	63.24807	948.721	0	27.9277	27.35395	10.94295	10.70876	16658.11	0	0	0	0
AUS	USA	10121	5	114.7641	918.113	1	27.9277	30.52808	10.94295	10.94145	16008.79	0	1	0	0
AUS	JPN	10121	5	257.974	1289.87	0	27.9277	29.10877	10.94295	10.44796	7831.446	0	0	0	0
AUS	GBR	10121	5	72.44554	8258.792	0	27.9277	28.69074	10.94295	10.69887	17011.27	0	1	0	0

The results

reporter	partner	sector	ave_t	ave_nt	TradeValue
are	alb	crp	0	0	1.40
are	alb	lea	0	0	553.95
are	alb	lum	0	0	0.64
are	alb	mvh	76.7	25.7	2.20
are	alb	ocr	0	0	15.88
are	alb	ome	0	0	0.10

- Available R scripts based on underlying data allow researchers to modify model/assumptions and re-estimate AVEs, aggregate them to GTAP regions and sectors at https://r.tiid.org/AVEs/

Global average import-weighted AVEs of NTMs, by aggregate sector



Resources:

Kravchenko, A., Strutt, A., Utoktham, C., & Duval, Y. (2022). New Price-based Bilateral Ad-valorem Equivalent Estimates of Non-tariff Measures. *Journal of Global Economic Analysis*, *7*(2).

- **Code and data for estimation:**
- https://r.tiid.org/AVEs/

- **GTAP aggregation:**
- https://jgea.org/ojs/index.php/jgea/article/view/159 (supplementary material)

New Price-based Bilateral Ad-valorem Equivalent Estimates of Non-tariff Measures

Kravchenko, A., Strutt, A., Utoktham, C., & Duval, Y. (2022). New Price-based Bilateral Ad-valorem Equivalent Estimates of Non-tariff Measures. *Journal of Global Economic Analysis*, *7*(2).

Mr Alex Kravchenko, PhD

Economic Affairs Officer
Trade Policy and Facilitation Section
Trade, Investment and Innovation Division
UN ESCAP

ESCAP 75
MOVING FORWARD TOGETHER