

Trade effects of environmentally related technical measures

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This paper

NTMs and TBTs: numerous and growing; less transparent than price measures.
Heterogeneous across countries, products and type of measures (Santeramo and Lamonaca, 2019; Disdier and Fugazza, 2020; Beverelli et al., 2022). NTMs shape existing divide (Santeramo and Lamonaca, 2022), and pricing strategies (Fiankor and Santeramo, 2023)

Used to support env. protection. Little known on trade effects (Fontagné et al., 2005; Shapiro, 2021)

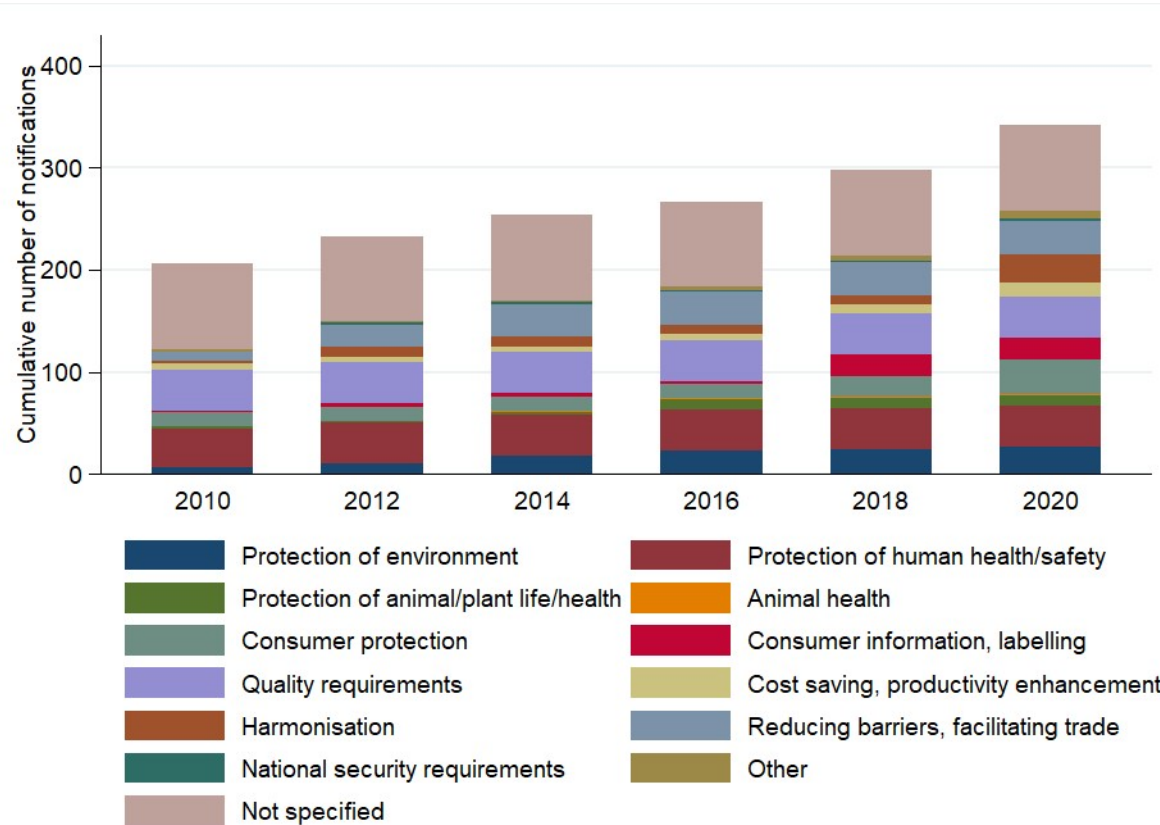
Unique/original dataset of technical measures for env. reasons

Key results:

- ✓ *Value/Volume*: Decrease unit values of smaller flows & increase unit values of larger flows
- ✓ *Econ.Dev.* : Positive for high-income, G20, notifying countries
- ✓ *Env.features* : Positive for countries w/ high env.-quality and (responsible for) emissions
- ✓ *Sectors* : Positive effects for raw products and negative for processed goods

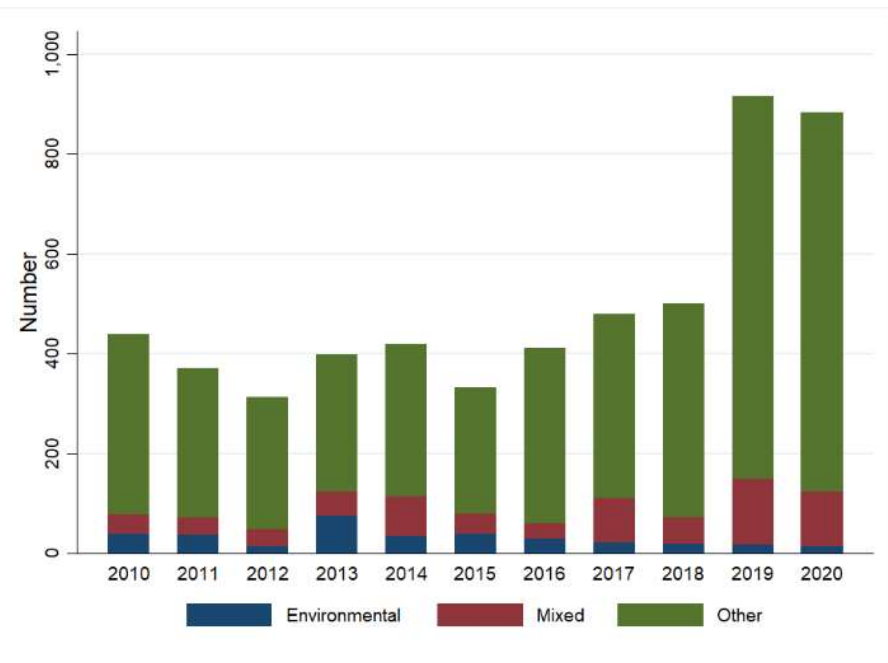
Evolution of technical measures by non-trade policy objective, 2010-2020

Stylised Fact #1: Environmental technical measures are on the rise, by number and relevance.

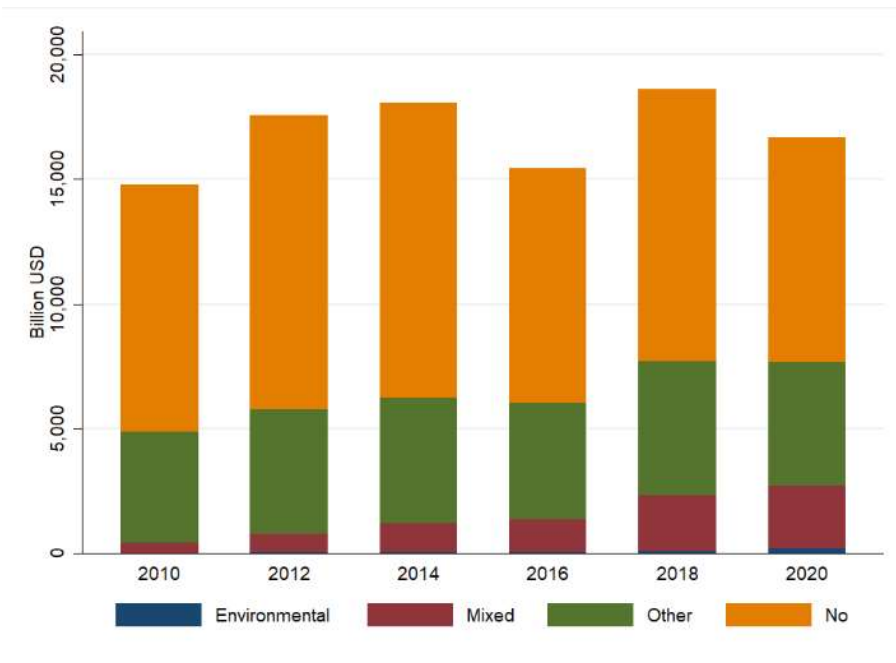


Evolution of technical measures and trade overtime, 2010-2020

Stylised Fact #1: Environmental technical measures are on the rise, by number and relevance.



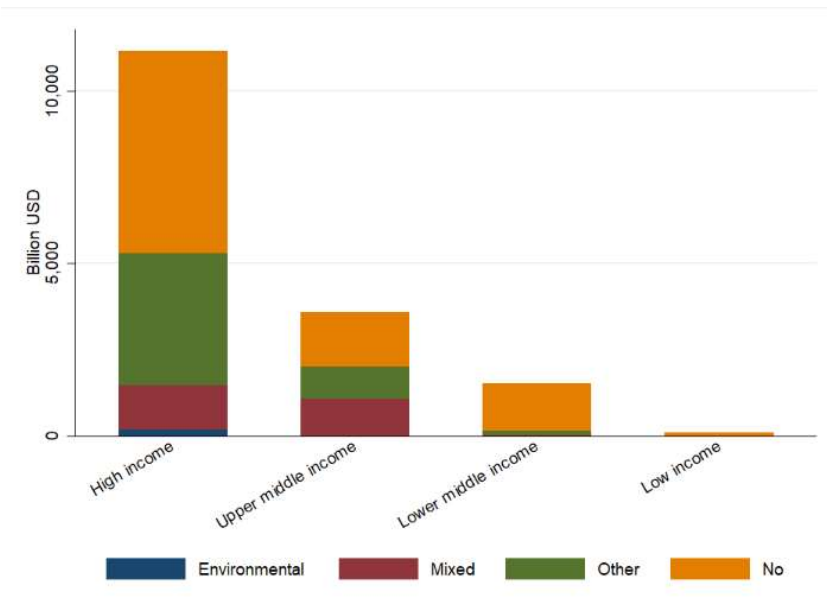
Panel A: Number of new notifications



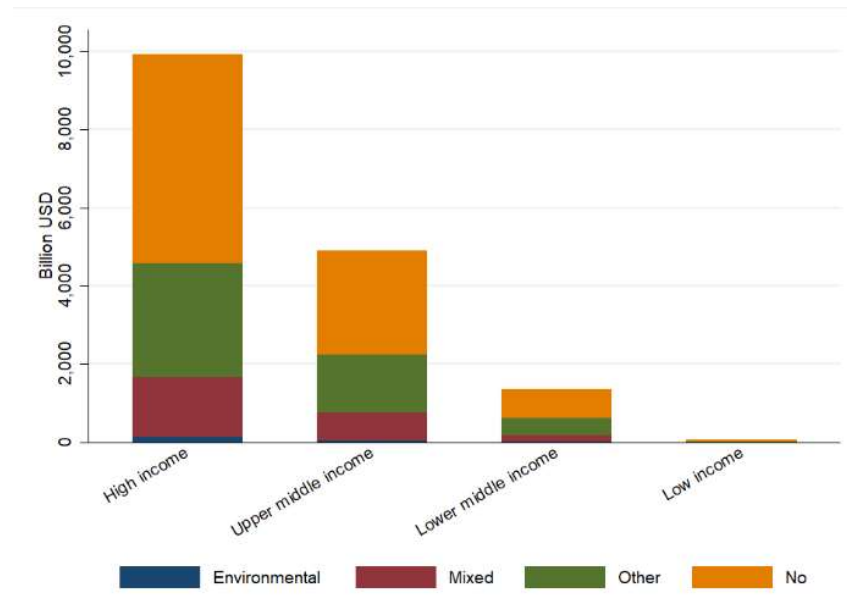
Panel B: Share of trade values

Trade values regulated by technical measures by groups of countries, 2020

Stylised Fact #2: Most of environmental technical measures come from wealthier countries



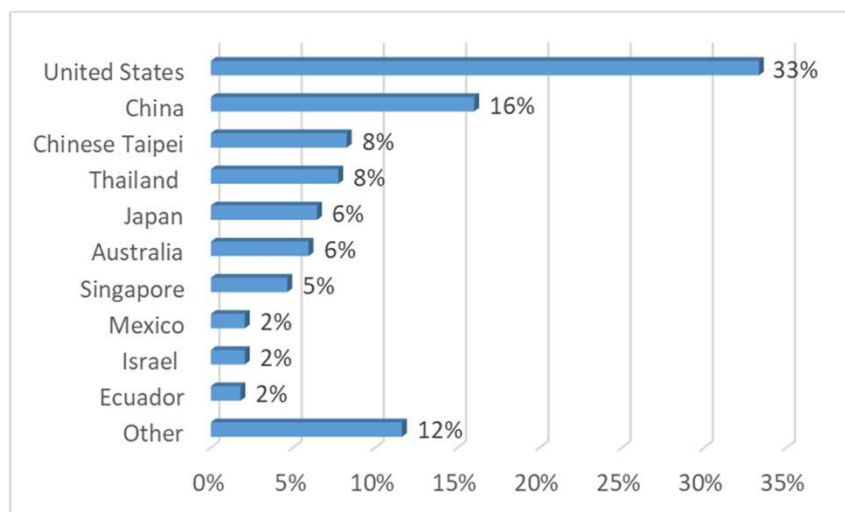
Panel A: Implementing countries



Panel B: Affected countries

Trade values regulated by technical measures by groups of countries, 2020

Stylised Fact #2: Most of environmental technical measures come from wealthier countries

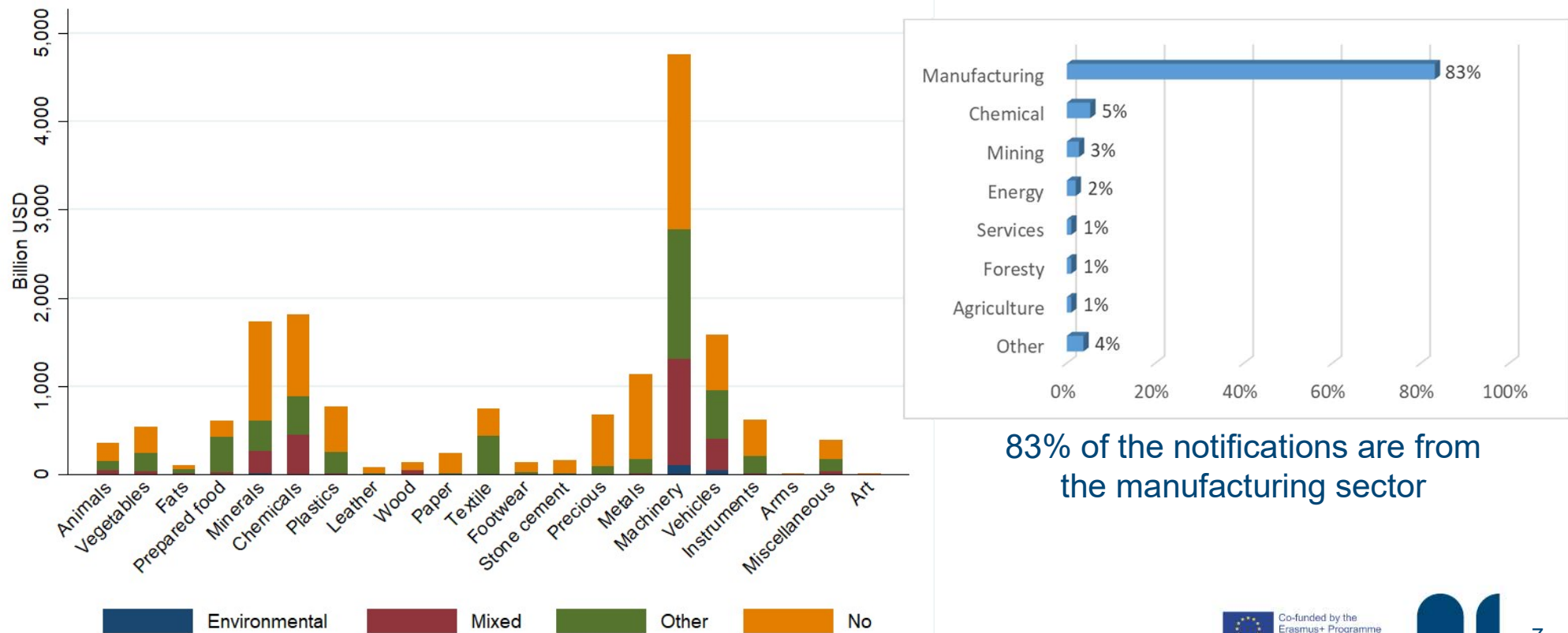


Top-5 notifying countries:

- US (33%)
- China (16%)
- Chinese Taipei (8%)
- Thailand (8%)
- Japan (6%)
- Australia (6%)

Trade values regulated by technical measures by groups of countries, 2020

Stylised Fact #3: Environmental technical measures differ substantially across sectors



Example of env-related TBT in US, 2013

Description

Conditions when a fertilising material is considered an organic input material requiring labelling and registration

Laboratory analysis to be included with a product label during registration under specified circumstances

Sampling and recordkeeping requirements

Content

The concentration limits are:

- arsenic 104 parts per million, cadmium 208 parts per million, lead 1,040 parts per million for a guaranteed available 52 percent phosphate product,
- arsenic 36 parts per million, cadmium 44 parts per million, lead 380 parts per million for a guaranteed available 3 percent phosphate product with 2 percent guaranteed zinc.

The label of each product which contains organisms, enzymes, and other biologically active by-products of organisms for which claims are made shall state the content

- name of each species and strains as part of the statement of composition and name of each by-product, if claimed,
- percentage or number of viable units of microorganisms per cubic centimetres or per gram for dry material,
- concentration in percentage of enzymes or other organism by-products claimed,
- expiration date for use,
- storage conditions.

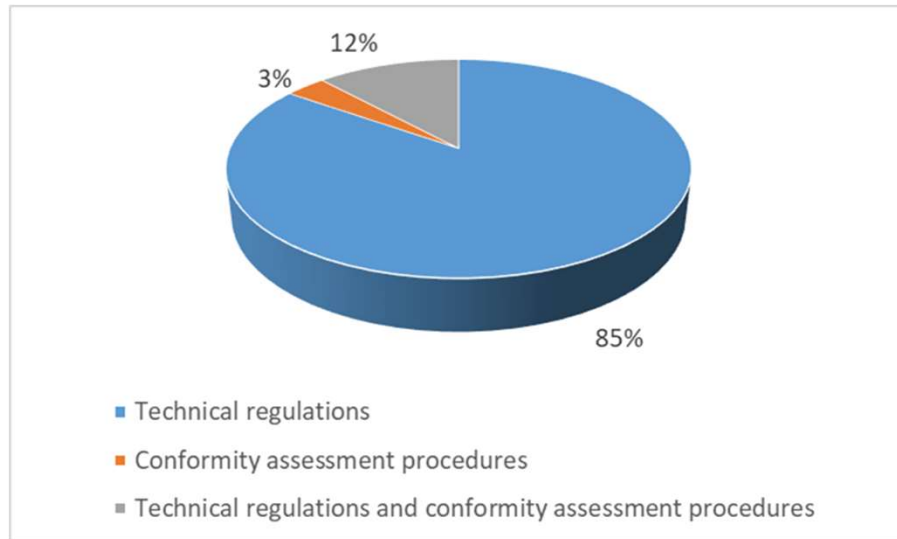
A copy of the analysis, must be submitted with the registration application.

- Authorised staff may take a sample for analysis from any lot of fertilising material which is in the possession of any producer, manufacturer, importer, agent, dealer, or user.
- Each licensee shall maintain an accurate record of all transactions subject to assessment for a period of not less than three years following the transaction.

Data: exploiting the informative content of WTO notifications

- Notifications of technical measures (WTO TBT IMS)
 - retrieved for the **period** 2010-2020 and 105 **implementing countries**
 - defined at the HS 2-, 4- or 6-digits **products**
 - ✓ conversion into HS 6-digits products to merge w/ trade (*BACI*) and tariffs data (*MAcMap*)
 - ✓ **final dataset**: ~30 mln obs. (flows b/w 155 potential partners in a decade w/ gaps, 5,000 products)
 - attributed to 13 objectives (e.g., environment, human health, animal/plant life/health, harmonisation)
 - ✓ grouping into 3 categories of objectives (**environmental, mixed, other**)

Type of measures: regulations vs. procedures

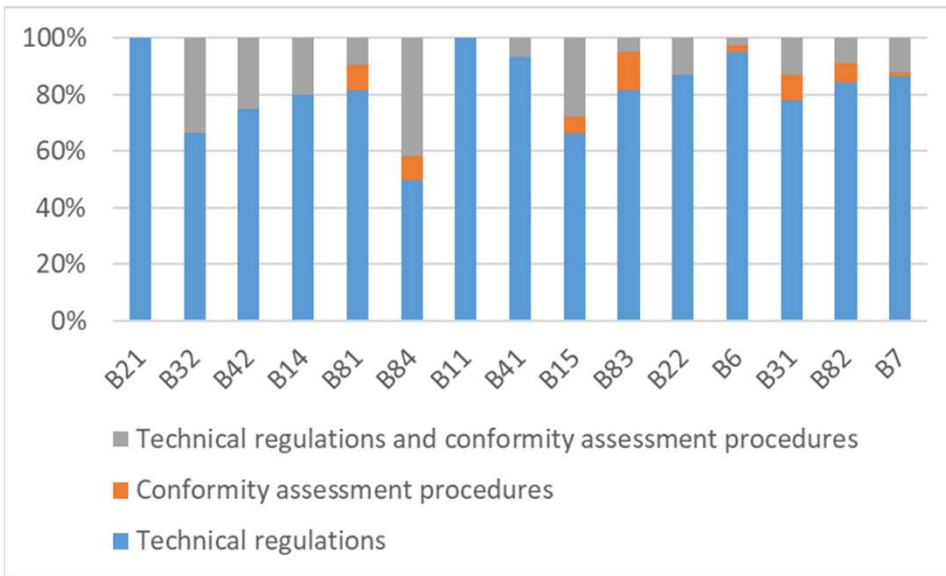


Technical regulations (85%) conformity assessment procedures (3%)

TR: mandatory, re: product characteristics, related processes and production methods

CAP: procedures to determine if requirements in TRs or standards are fulfilled

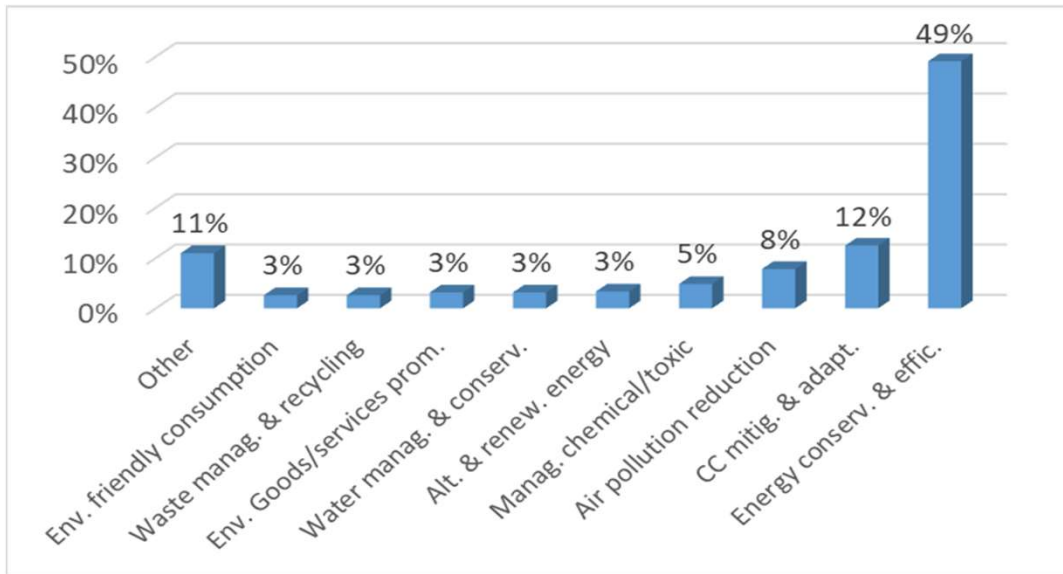
UNCTAD classification



- B14 Authorization requirements for importing certain products**
- B15 Authorization requirements for importers**
- B21 Tolerance limits for residues or contamination by substances**
- B22 Restricted use of certain substances**
- B31 Labelling requirements**
- B41 Technical barriers to trade regulations on production processes**
- B6 Product identity requirements**
- B7 Product quality, safety or performance requirements**
- B82 Testing requirements**
- B83 Certification requirements**

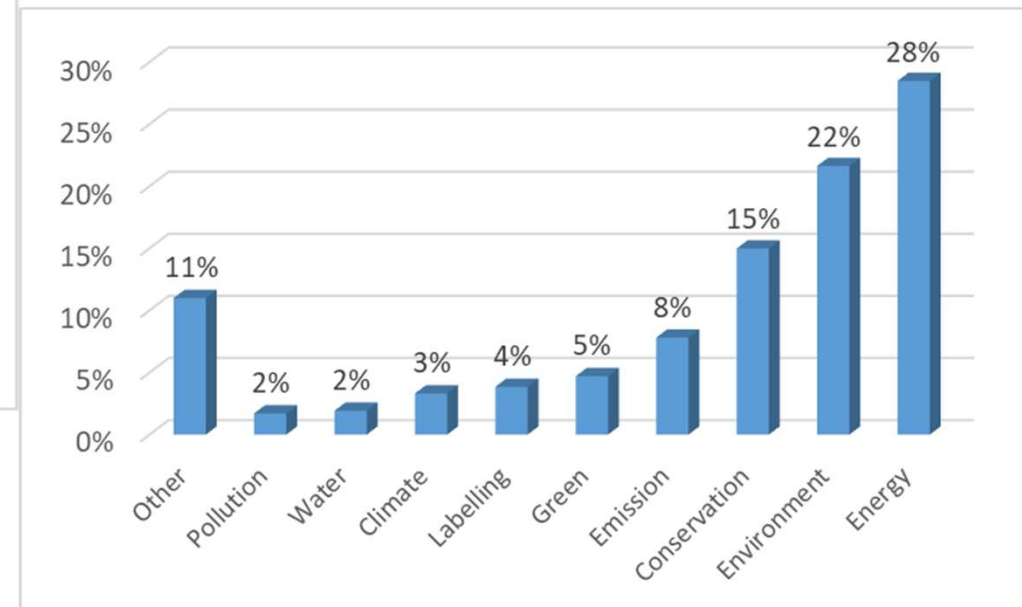


Env.-related TBTs by objectives and keywords



49% notifications for energy conservation and efficiency;
12% for climate change mitigation

28% for energy concerns;
22% for environment;
15% for conservation



Empirical model

Gravity-type approach:

$$Y_{ijkt} = \alpha_{ikt} + \alpha_{jt} + \alpha_{ij} + \beta_z TBT_{jkt}^z + \gamma AVE_{ijkt} + \delta RTA_{ijt} + \varepsilon_{ijkt}$$

i = exporter, j = importer, k = product (HS6-digit), t = year

Y_{ijkt} : annual product-specific bilateral values (i.e., v_{ijkt}), volumes (i.e., q_{ijkt}), and unit values

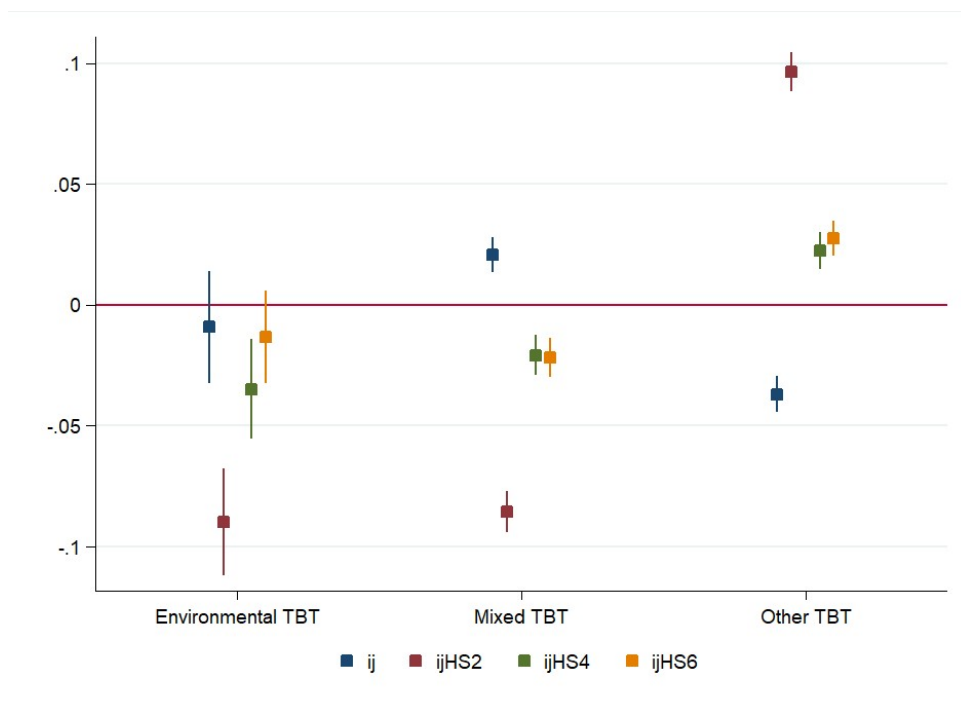
TBT_{jkt}^z : TBT \rightarrow =1 if j implements TBT on k in t (z = env., mixed, others)

Time-varying exporter-product fixed effects (i.e., α_{ikt}) for product-specific production capacity of the exporting country + time-varying product-specific value of production of the exporter.

Time-varying importer fixed effects (i.e., α_{jt}) for importing country demand-specific characteristics.

Bilateral fixed effects (i.e., α_{ij}) for unobservable time-invariant bilateral components.

Objective-specific heterogeneity



Subscripts indicate implementing/importing country (i), affected/exporting country (j), sector at the 2-digit (HS2) and 4-digit (HS4), product at the 6-digit (HS6) of the Harmonised System

Aggregation level matter

... but ...

Env.-related *stricto sensu* negatively related w/ trade

Main results: Trade volume effects (in %)

	Values	Volumes	Unit values
Flows (small flows included)	0	+2.5	-1.2

Null average trade effects on values (& whole sample); differentiated impacts on quantities and unit prices

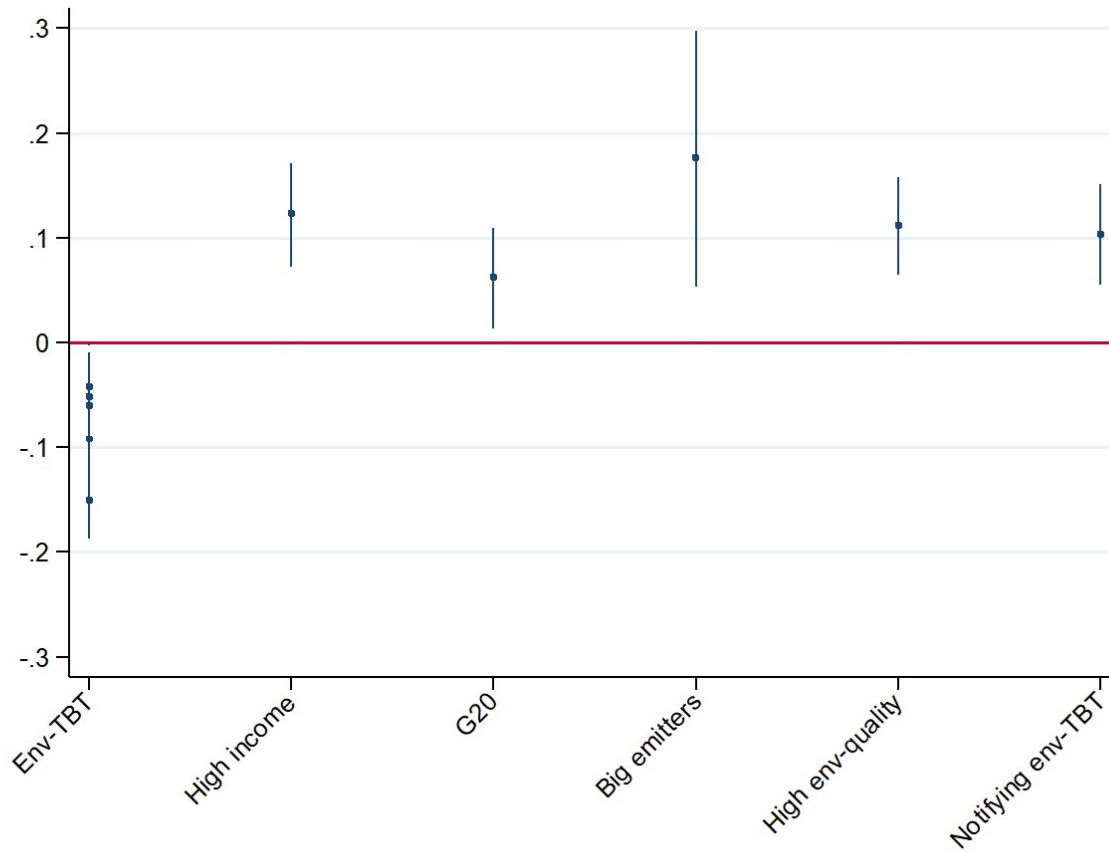
Positive values and unit price effects on large flows

	Values	Volumes	Unit values
Flows > 10,000 USD	+2.4	0	+2.2

Positive effects on values, due to a unit price increase

*E.g. Australia-Thailand. 4 mln USD in 2020, w/ avg. unit values of .5 \$ per bushel
+1 env.-related TBT implies 96 K USD, w/ +1 cent (\$) increase in unit prices of all traded goods*

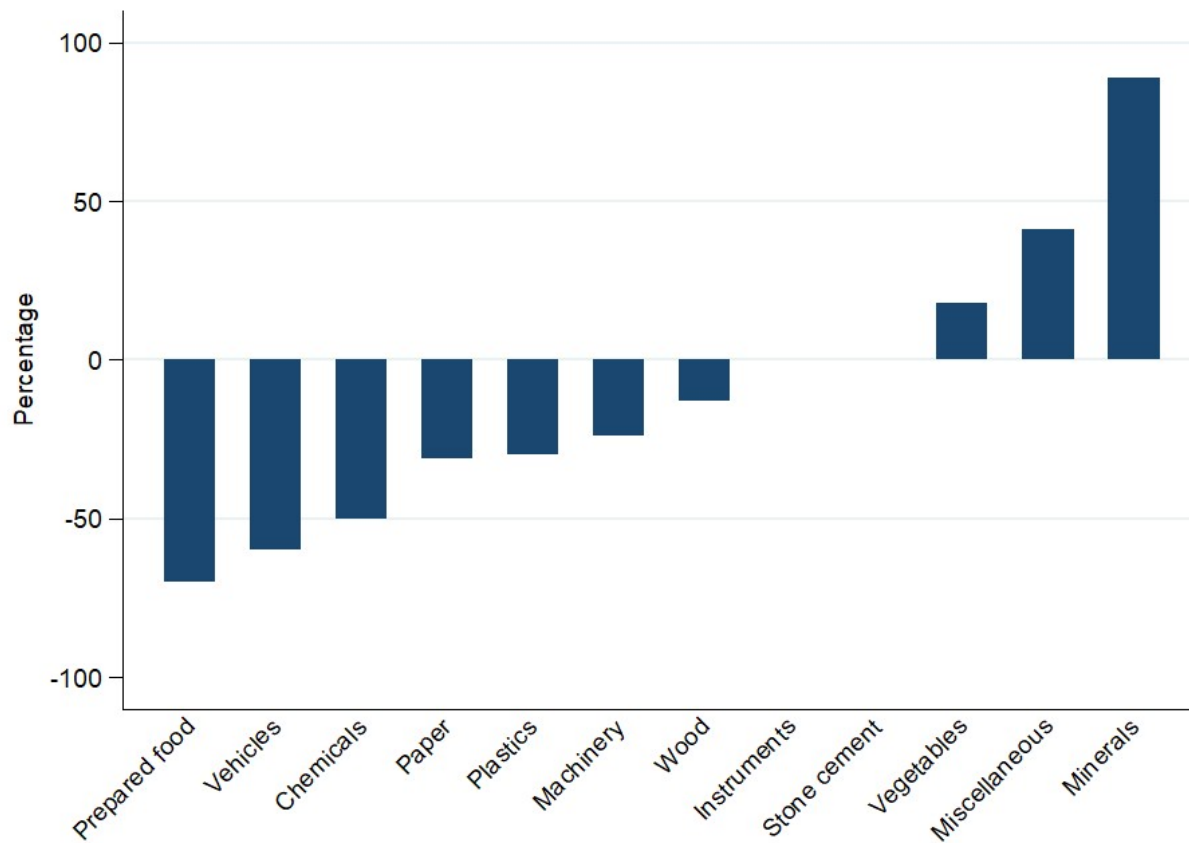
Country-specific heterogeneity



Point estimates and 9% CI

- ✓ Positive for high-income, G20, notifying countries
- ✓ Positive for countries w/ high env.-quality and (responsible for) emissions

Sector-specific heterogeneity



Raw vs processed

- ✓ Positive effects in minerals (and vegetables)
- ✓ Negative effects on prepared foods, vehicles, chemicals, paper, plastics, machinery, wood

Conclusion and implications

✓ *Value/Volume*: Decrease unit values of smaller flows & increase unit values of larger flows

✓ *Sectors* : Positive effects for raw products and negative for processed goods

❖ Environment vs Value chain effects

✓ *Econ.Dev.* : Positive for high-income, G20, notifying countries

✓ *Env.features* : Positive for countries w/ high env.-quality and (responsible for) emissions

❖ Geopolitical considerations and Club effects

Left for future:

- heterogeneity across content
- trade-environment trade-off

Comments are welcome

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