EU preferential margins: measurement and aggregation issues

Maria Cipollina

Luca Salvatici

(*University of Molise*)

What are we going to talk about: trade preferences

- Since 1979 (GATT *enabling clause*) they have been intended to be instruments of development encouraging export-led growth (though SDT also encompasses import-substitution)

Debate:

- Trade creation, but also trade diversion
- EU preferences bay be (in)efficient, but are they effective at all?

L. De Benedictis and L. Salvatici (eds.), **THE TRADE IMPACT OF EUROPEAN UNION PREFERENTIAL POLICIES: AN ANALYSIS THROUGH GRAVITY MODELS, Springer, 2011**

Foreword – Bureau / Anania

1. **Introduction** – De Benedictis and Salvatici
2. **EU preferential trading arrangements: evolution, content and use** – Nilsson
3. **EU preferential margins: measurement and aggregation issues** –Cipollina and Salvatici
4. **The Gravity model and international trade policy evaluation** – De Benedictis and Taglioni
5. **Trade impact of EU preferential policies: a meta-analysis of the literature** – Cipollina and Pietrovito
6. **Trade impact of EU preferences** – Maria Cipollina and Luca Salvatici
7. **Agricultural trade impact of EU Generalized System of Preferences** – Aiello and Demaria
8. **Trade impact of Everything But Arms** – Aiello and Cardamone
9. **Trade impact of EU preferences: an analysis with monthly data** – Cardamone
10. **Impact of preference erosion in the EU rice sector** – Olper, Raimondi and Scoppola
11. **Trade impact of EU preferences: the role of compliance costs** – Agostino, Demaria and Trivieri

Introduction

Trade impact depends (among other things) on the "intensity" of the (tariff) preference margins: this is the focus of this paper.

1. Margin definition(s): sevaral different options
2. Any definition can be measured either in absolute or relative terms: different information
3. No matter what is the margin definition and how it is expressed, there is the ubiquitous (in the case of trade policies) aggregation problem (Cipollina and Salvatici, 2008): we build on the work of Anderson and Neary (2003) defining an index (MTPI) that is computed using a partial equilibrium model as in Bureau and Salvatici (2004 and 2005)

Preference margins: definition

- Any margin is the result of a subtraction where both operand needs to be expressed in the same metric, i.e., either ad valorem or specific duties.
- If it is not the case, one usually needs to compute some ad valorem equivalents: well-known methodological problems (Cipollina and Salvatici, 2008)
- Tariff rate quotas: marginal or average duties (fixed costs)?

Absolute preference margins

Considering *K* possible goods (denoted by *k* where *k=1, 2 …. K*), the absolute preference margin (Pa_{ik}) granted by the EU to the imports of commodity *k* from country *i* is equal to:

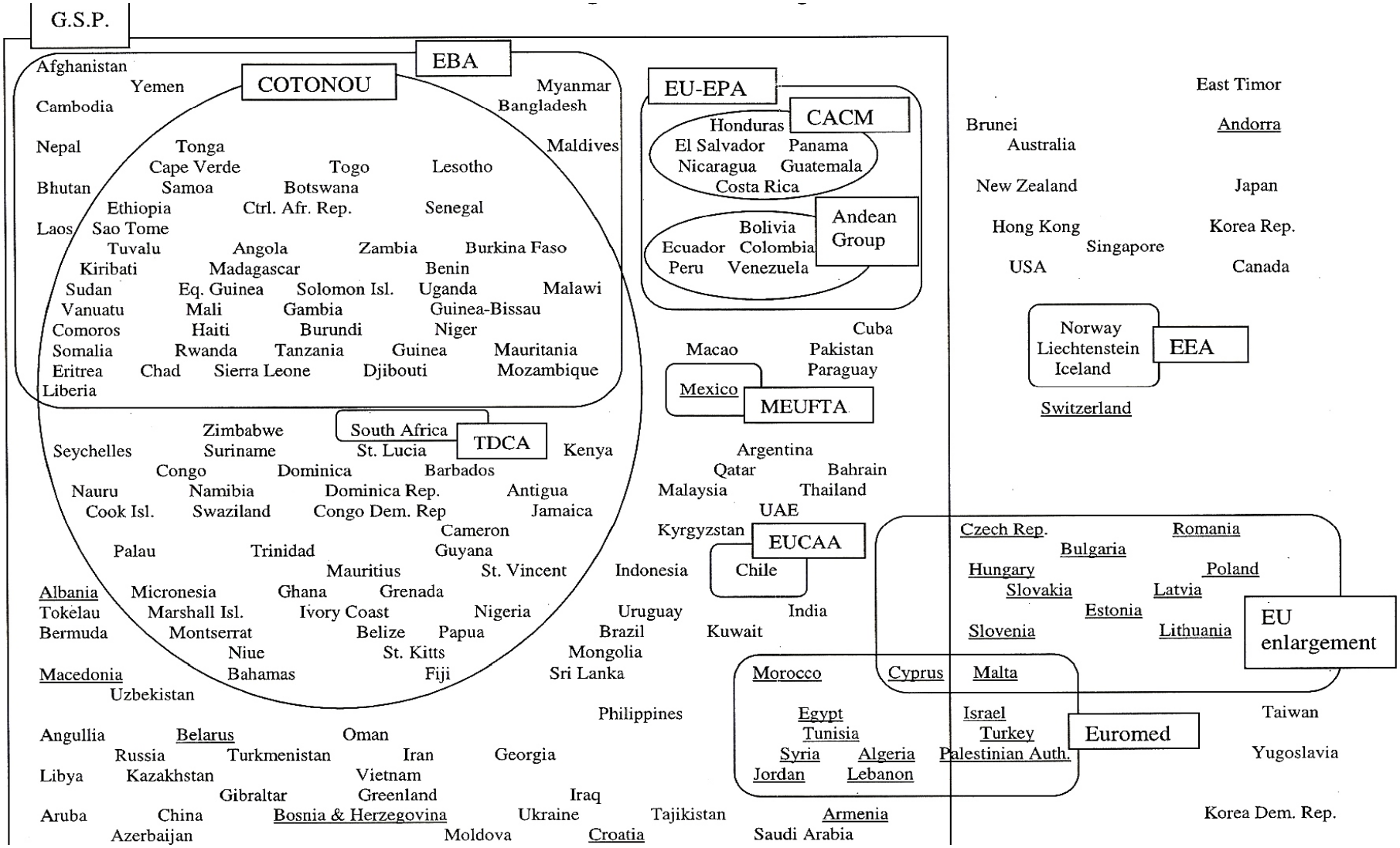
$$Pa_{ik} = \left(Tr_{ik} - Ta_{ik}^{v}\right)$$

Tr_{ik} = reference tariff

Ta_{ik}^{v} = preferential duty

The superscript *v* refers to the preferential schemes available for the ith exporter, since it is quite common the case of overlapping preferences where each tariff line may be eligible for several different duties.

EU's trade agreements in 2004
(Pishbahar and Huchet-Bourdon, 2008)



Preferential margins: which reference level?

- **Bound MFN duty =** overestimation ("water" in the margin computation) of the competitive advantages enjoyed by exporting countries if the applied MFN tariff is lower than the bound one.
- **Applied MFN duty** = overestimation in case of prohibitive duties
- **Applied Bilateral duties** = which one?
  - Highest duty actually paid
  - Duty paid by the largest exporter

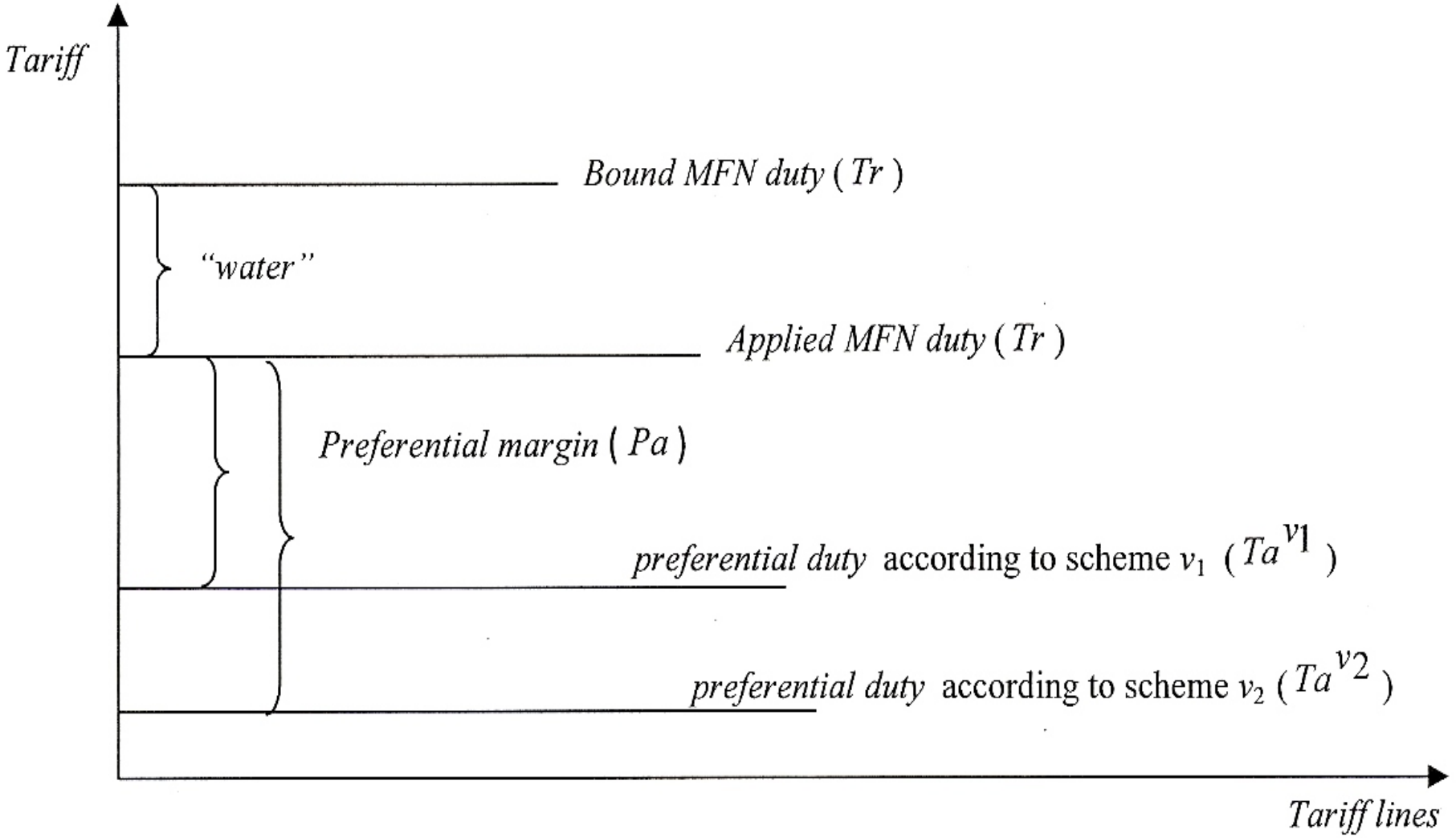
  Underestimation taking into account actual rather than potential exporters (prohibitive tariffs)

Multilateral preference term: $$Pa_{ik} = \left(\sum_{i=1}^{I-1} w_{ik} Tr_{ik} - Ta_{ik}^{v} \right)$$

I-1 = set of exporters excluding the exporter under consideration *i*

w_{ik} = (possible) weights related to applied bilateral tariffs (bilateral or world export shares? Endogeneity problem)

Tariff structure



Absolute or relative margins?

The same *Pa* can be obtained starting from (very) different *Tr*. The ratio between these values provides the **relative margin** (Pr_{ik}) :

$$\Pr_{ik} = \frac{Tr_{ik} - Ta^{v}_{ik}}{Tr_{ik}}$$

An index that allows to combine information about the relative and absolute components is the **preference discount rate** (Pdr_{ik}) embedded in the **preference factor** ($1+Pdr_{ik}$) defined as :

$$1 + Pdr_{ik} = \frac{1 + Tr_{ik}}{1 + Ta^{v}_{ik}}$$

For any given Pa_{ik} , Pdr_{ik} tends to 0 as *Tr* increases.

Preference margins: aggregation

- Countries have tariff schedules with thousands of tariff lines (5212 HS-6), and any preferential trade policy agreement does vary a lot across products and exporters (167 exporters to the EU): the analysis should be carried out using the most disaggregated available data.
- If we want to carry out sensible comparisons across products, countries and over time we need to construct measures that summarize the levels of trade preferences implied by the various schemes available for different commodities and/or countries.

Several forms of trade policy aggregation are without theoretical foundations:

- The simplest is the **simple average**, with the same weight on all margins, regardless of the importance of the products to which they are granted.
- Clearly, trade policies should be **weighted** by their relative importance in some sense. The simplest and most commonly-used method of doing so is to use actual trade volumes as weights, but trade-weighted averages have major deficiencies in the case of tariffs (*endogeneity*).

Preferential margins do not seem to be affected by the *endogeneity* problem, since higher margins are typically associated with higher trade values. However, import volumes could be much larger than under an MFN regime because preferences are high or because they are imposed on highly elastic goods.

Mercantilistic trade preference index (MTPI): intuition

- What is needed is a conceptual framework within which the *level* and the *effects* of preferential policy can be combined, and this is what new approaches with rigorous theoretical foundations for the aggregation problem have provided. Since foreign exporters are concerned with domestic market access, it makes sense to aggregate preferences in a way which holds the volume of imports as the reference standard.
- Taking import flows as the standpoint, the appropriate way of answering the question "How do we measure trade preferences?" is to ask: what is the uniform preference margin which, if applied to all goods, would be equivalent to the actual tariffs, in the sense of yielding a constant volume of imports?

Accordingly, our policy index is strictly related to the **Mercantilistic trade restrictiveness index** introduced by Anderson and Neary (2003).

Mercantilistic trade preference index (MTPI): definition

- Starting point: Mercantilistic trade restrictiveness index (Anderson and Neary, 2003).
- Taking import flows as the standpoint, the appropriate way of answering the question "How do we measure trade preferences?" is computing the uniform tariff reduction which, if applied to all goods and/or partners, would be equivalent to the actual preferential policies, in the sense of yielding the same volume of imports.
- MTPI is defined as the uniform relative margin which yields the same volume (at world prices) of tariff-restricted imports as the initial vector of (non-uniform) relative preferential margins.

Starting from:

$$\Pr_{ik} = \frac{Tr_{ik} - Ta_{ik}}{Tr_{ik}} = 1 - \frac{Ta_{ik}}{Tr_{ik}} = 1 - \frac{t_{ik}}{\tau_{ik}^{\max}} = 1 - \alpha_{ik}^{i}$$

The uniform reduction factor (α) applied to the maximum applied rate (τ^{max}) generates a counterfactual preferential tariff vector ($\tau = \alpha\,\tau^{max}$) that yields the same volume (at world prices) of tariff-restricted imports as the initial vector of bilateral applied duties (t).

MTPI: computation

Define the scalar import demand summing over exporters and products:

$$M(p, \quad p^{*}, B) \equiv \sum_{i} \sum_{k} p_{ik} I_{ik}^{m}$$

B = balance of trade function

p^* = international prices vector

I^m = ncompensated (Marshallian) import demand function

p = domestic price vector.

Accordingly, the MTPI can be computed by solving the following equation for α:

$$\sum_i \sum_k p_{ik}^* I_{ik}^m \left[p_{ik}^* (1+\alpha \tau_k^{\max}), B^0 \right] = \sum_i \sum_k p_{ik}^* I_{ik}^m \left[p_{ik}^* (1+\alpha_k \tau_k^{\max}), B^0 \right]$$

MTPI: implementation

- We follow Bureau and Salvatici (2005) modelling demand through a constant elasticity of substitution (CES) functional form (notwithstanding shortcomings and restrictive assumptions)
- We define the reference tariff as the maximum applied rate and the bilateral applied duties as the lowest available for each product.

The MTPI for each sector *j* is found by setting the value of the import volume function with the uniform preferential margin equal to the initial value of imports (evaluated at world prices):

$$\sum_k p^*_{kj} \beta_{kj} \left(\frac{P^{\tau}_j}{p^*_{kj}(1+\alpha_j \tau^{\max}_j)} \right)^{\sigma_j} e^0_j = \sum_k p^*_{kj} I^0_{kj}$$

- the parameter β is calibrated to the initial values of the expenditure shares in the base data, when all domestic prices are set to 1;
- σ denotes the elasticity of substitution within the *j* group;
- e^0 is the initial total expenditure (expenditures on both domestic and imports in *j*);
- I^0 is the volume of imports in the initial period (i.e., 2004 in our application),
- and the price index is:

$$P^{\tau}_j = \left(\beta_{dj} (p_{dj})^{1-\sigma_j} + \sum_k \beta_{kj} (p^*_{kj}(1+\alpha_j \tau^{\max}_j))^{1-\sigma_j} \right)^{-\sigma_j}$$

Data

All data refer to 2004:

- Information on the elasticities of substitution and the domestic expenditures is from the Version 7 of the GTAP dataset (Naranyanan and Walmsey, 2008).
- Tariffs are taken from the most recent version of MAcMap-HS6 database providing AVEs of applied bilateral tariff duties at HS-6

Exports to the EU (25 countries) are from the Eurostat database (Comext). The database distinguishes EU imports by tariff regimes. Accordingly, the bilateral applied tariff (*t*) is equal to the "MFN (applied) tariff" if the preference is not used and to the "preferential (bilateral) tariff" otherwise. Accordingly, our MTPI calculation takes into account the volume of trade that actually benefits from the preference (due to *coverage* and *utilization* rates)

Share of EU tariff lines by type of tariff regime (2004)

	Obs.	% of MFN duty-free tariff lines	% of MFN duty tariff lines (no preference)	% of Preferential duty-free tariff lines		% of Preferential duty tariff lines	
				Potential	(Used)[a]	Potential	(Used)[a]
All products	187,560	18	14	54	(38)	14	(38)

Data refer to tariff lines with positive trade flows;.[a]The numbers in parenthesis indicate the percentage of preferential tariff lines that enter in EU under a preferential scheme.

- We aggregate the 187,560 EU tariff lines associated with positive trade flows (out of 4,879x167 = 814,793) up to the 42 commodity sectors included in the GTAP database.
- Some GTAP sectors do not include any positive duties: since in these sectors all preferential margins are (obviously) equal to zero, they are not reported in the tables presenting the results.
- 70% of EU tariff lines with positive trade flows enjoy preferential access (mostly duty-free) => 80% are actually used
- More than half of the 'non-preferred' tariff lines' are MFN-duty free.

EU tariff structure in 2004

- In several instances (e.g., grains, dairy products and meat) the average paid rates are closer to the MFN rather than to the preferential ones: we may suspect that traders do not take advantage of the right to sell into a partner market at a reduced duty because of restrictions on rules of origin or high administrative costs involved in securing preferential treatment relative to the cost of paying the MFN tariff.
- In order to shed some light on the relevance of the utilization issue, we compare the MTPI with the *potential-MTPI* computed under the assumption that all eligible imports paid the preferential duty: this represents an upper-bound estimate of the possible value of the granted preference margins if they were fully utilized.

Simple average preferential margins (2004)

GTAP sector	Benchmark: MFN duty		Benchmark: the highest paid duty	
	absolute	relative	absolute	relative
All products	**3.9**	**72.9**	**1.9**	**28.3**
Beverages and tobacco products	11.9	61.4	6.3	35.1
Cereal grains nec	18.7	39.7	14.5	29.8
Food products nec	12.3	57.0	8.4	33.5
Meat products nec	14.6	43.5	10.4	21.1
Paddy rice	21.3	22.8	19.9	20.9
Vegetable oils and fats	10.3	56.5	8.0	30.0
Vegetables, fruit, nuts	11.4	62.4	7.6	34.0
Wheat	5.7	34.8	3.0	15.4
Chemical, rubber, plastic products	3.1	76.0	1.3	28.0
Electronic equipment	1.4	72.1	0.3	14.5
Leather products	5.7	77.2	2.6	34.2
Machinery and equipment nec	1.6	82.4	0.5	23.9
Motor vehicles and parts	4.4	81.9	1.3	26.6
Paper products, publishing	0.1	76.1	0.0	27.1
Textiles	4.4	58.1	2.1	28.3
Wearing apparel	7.1	65.3	3.2	29.9

- The use of the MFN duty always implies larger margins than those obtained considering the actual duties paid
- The two measures appear to be inversely related (MFN benchmark) or do not show any correlation (highest duty benchmark).
- The margin in (absolute) percentage points terms is much higher for the agricultural sectors
- In relative terms the opposite is true

MTPI margins: agricultural products

GTAP sector	MTPI (1-α), %	Potential MTPI (1-α), %	Weighted mean margin, %
All products	**25.8**	**38.7**	**31.7**
Animal products nec	21.6	39.8	27.0
Beverages and tobacco products	54.5	56.6	55.7
Bovine cattle, sheep and goats, horses	37.3	63.5	54.7
Cereal grains nec	10	13.4	11.9
Crops nec	37.5	-	43.9
Fishing	40	45.1	41.5
Food products nec	40.7	57.0	43.0
Forestry	30.3	45.1	31.2
Meat products nec	33.2	36.7	40.8
Paddy rice	10.9	15.7	12.5
Vegetable oils and fats	13.2	16.1	13.3
Vegetables, fruit, nuts	39.4	49.8	42.1
Wheat	16	16.1	16.8

- The overall MTPI margin granted by the EU is around 26%, but in the agricultural sector it ranges between 10%, in the case of cereal grains and 54% in the case of beverages and tobacco.
- The largest differences with the potential-MTPI regard sectors, such as animal or food products – that are likely to present quite demanding standards (e.g., sanitary and phyto-sanitary measures).
- The trade-weighted average margins always overpredicts the MTPI value, with differences ranging from 0.1 (in the case of vegetable oils and fats) to 7.4 (in the case of bovine cattle, sheep and goats, horses) percentage points.

MTPI margins: industrial products

GTAP sector	MTPI (1-α), %	Potential MTPI (1-α), %	Weighted mean margin, %
All products	**25.8**	**45.9**	**31.7**
Chemical, rubber, plastic products	25	45.9	27.5
Electronic equipment	7.4	-	10.0
Ferrous metals	61.3	78.1	63.0
Leather products	17.2	24.8	19.7
Machinery and equipment nec	23.8	36.2	25.5
Manufactures nec	19.9	30.1	21.3
Metal products	27	34.7	29.3
Metals nec	51.8	70.4	56.3
Mineral products nec	30.1	-	32.7
Minerals nec	52.1		52.7
Motor vehicles and parts	18.4	30.6	20.7
Paper products, publishing	67.1	74.5	68.9
Petroleum, coal products	44.4	82.2	45.0
Textiles	34.8	53.3	41.0
Transport equipment nec	6.8	17.5	7.9
Wearing apparel	27.3	43.8	33.4
Wood products	31.5	55.8	33.9

- Industrial sectors' MTPIs present a larger variabilit with a minimum equal to around 7% in the cases of electronic and transport equipments and a maximum of 70% for paper products.
- As far as the potential-MTPI is concerned, the sectors presenting large differences are some traditional manufactures (e.g., textiles and apparels) or more advanced sectors such as chemical, rubber and plastic products: this may be due to quantitative restrictions and/or rules of origin requirements.
- Larger underpredictions of the MTPI by the trade-weighted average relative margins emerge when the number of tariff lines is higher (e.g., textiles).

Conclusions

Methodology:

- trade-weighted aggregators outperform the simple averages since they represent a linear approximation to the tariff aggregator based on the expenditure function rather than being a pure statistical construct
- MTPI uniform percentage reductions (α_j) always exceed the trade-weighted ones
- MTPI and trade-weighted averages are closer when the number of tariff lines in the aggregate is small, or when there is little dispersion in margins within an aggregate
- even though the ranking of different sectors does not change, the MTPIs are obviously quite sensitive to the degree of substitution between products

Policy:

- The overall margin granted by the EU is around 26%, with large differences across sectors:
- looking at the agricultural sector, the highest percentages is in the cases of beverages and tobacco, and livestock (54 and 47%, respectively)
- industrial sectors present higher variability with a minimum equal to around 7% in the cases of electronic and transport equipments and a maximum of 67.1% for paper products.
- The comparison with the potential-MTPI shows that the largest differences regards sectors that are likely to feature stringent standards (e.g., animal and food products), be affected by quantitative restrictions (e.g., textiles) and/or rules of origin requirements (e.g., chemical).

Agenda: more MTPIs to be computed…

- At different levels of aggregation (no *numeraire* is actually needed: the counterfactual experiment doesn't imply a uniform price change)
- Bilateral MTPIs: correlation with exporters' characteristics
- Comparison across importers