



*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*



**Global Trade Analysis Project**

<https://www.gtap.agecon.purdue.edu/>

This paper is from the  
GTAP Annual Conference on Global Economic Analysis  
<https://www.gtap.agecon.purdue.edu/events/conferences/default.asp>

## **Which tariff aggregator for trade modelers?**

*Mohamed Hedi Bchir (UNECA – Addis Abbaba)*

*Antoine Bouet (IFPRI -Washington DC)*

*Very preliminary draft*

*Not to be quoted*

### **1. Introduction**

For many years the aggregation of tariffs is a hotly debated issue. From relatively simple aggregation schemes (national imports, world imports, imports of a reference group) to complex schemes (aggregation systems based on Trade Restrictiveness Index, on Mercantilist Trade Restrictiveness Index – MTRI-) the economic literature has been prolific and innovative, but has not yet provided satisfactory and operational conclusions. The objective of this paper is to examine the virtues and drawbacks of different weighing schemes and draw some clear-cut conclusions for trade modelers.

We first proceed to a review of the literature and an exposition of theoretical foundations and empirical difficulties in implementing various aggregators. This part of the debate does not provide clear-cut conclusions: for example the MTRI approach is more theoretically founded, but its implementation poses several major difficulties.

This is the reason why we adopt in this paper a purely empirical point of view. In particular we calculate numerous tariff averages according to different schemes and evaluate empirically their (lack of) robustness without taking any *a priori* position. An implementation of different weighing schemes (national imports, world imports, imports of a reference group, MTRI -based scheme) is carried out in the MAcMAP\_HS6 database which describes world protection in 2001. The differentiated measurement of protection at various levels is examined (by reporter, by partner, by product, by reporter and partner...). Then we utilize a standard geographic and product decomposition and model full trade liberalization with the MIRAGE model, with measurement of protection based

on alternative weighing scheme. Comparisons are done in terms of welfare and trade impact.

Section 2 proceeds to a review of the literature. Section 3 develops the theoretical foundations of each aggregation system. Thanks to the MacMAP-HS6 database section 4 provides a measurement of protection throughout the world based on various aggregating systems. In section 5 these different measures of protection are implemented in the MIRAGE model of the world economy to evaluate the welfare consequences of full trade liberalization coming from these different aggregation approaches.

## **2. Review of literature**

In order to calculate tariff protection in Industrial Countries Balassa (1965) examines the different methodological options and concludes, like Viner (1950), that *“there is no way in which the ‘height’ of a tariff as an index of its restrictive effect can be even approximately measured”*. For Balassa (1965), when weighing tariffs by the imports of the country in consideration, *“low duties associated with high level of imports are given large weights, whereas high duties that restrict imports have small weight and prohibitive duties zero weight”*: this constitutes an endogeneity bias. Unweighted averages may not reflect the composition of trade. Domestic production or consumption can be used as weights but the free trade composition of imports may considerably differ from the composition of consumption or production under protection, due to intercommodity differences in “tradeability” and the effects of import duties on consumption and production. Balassa stresses that weighing tariffs by world trade could allow to escape idiosyncracies of national tariff structures. Nevertheless he adopts a different methodology in his evaluation of industrial protection for OECD countries: due to a lack of data on world trade he uses trade of the whole set of OECD countries, that is to say trade of countries which are similar.

Leamer

Feenstra

Development of indirect indicators

Anderson, Neary and equivalent indexes

Bach and Martin

Bouet et alii

### 3. Theoretical Foundation and practical implementation

Let us suppose  $K$  commodities ( $k=1,2,\dots,K$ ) and  $n$  countries. Countries' index is either  $i$  or  $j$ . Let us call  $M_{k,i,j}$  imports by country  $j$  of commodity  $k$  coming from country  $i$  and  $t_{k,i,j}$  is the ad valorem tariff applied by country  $j$  on product  $k$  coming from  $i$ . Finally  $\bar{t}_x^y$  a tariff average on dimension  $x$  ( $x=k,i,j$ ) and calculated through weighting schemes  $y$ .

Let us define 6 weighting schemes:  $y = MTRI, OT, RG, TRI, UW, WT$ .

MTRI is a Mercantilist Trade Restrictiveness Index method as defined by Feenstra (1995) in a simplification of Anderson and Neary's (1992, 1994, 2003) mercantilist trade restrictiveness index (MTRI); BT is bilateral-trade weighted, that is to say the weights are defined as national imports of the products coming from the partner ; RG is the Reference group's method (see Bouet et alii, 2007) ; TRI is a Trade Restrictiveness Index method as defined by Feenstra (1995) in a simplification of Anderson and Neary's (1992, 1994, 2003) trade restrictiveness index (TRI) ; UW is simple average (for unweighted) ; WT is world trade method.

Let us call  $\varepsilon_{k,j}$  import demand elasticity of country  $j$  for good  $k$ . For example if the objective is to develop average applied tariff on imports ( $x=j$ ) we have:

$$\bar{t}_j^{MTRI} = \frac{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j} \varepsilon_{k,j} t_{k,i,j}}{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j} \varepsilon_{k,j}} \quad (1)$$

$$\bar{t}_j^{BT} = \frac{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j} t_{k,i,j}}{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j}} \quad (2)$$

$$\bar{t}_j^{RG} = \frac{\sum_{k=1}^K \sum_{i=1}^n M_{k,i, RG(j)} t_{k,i,j}}{\sum_{k=1}^K \sum_{i=1}^n M_{k,i, RG(j)}} \quad (3)$$

$$\bar{t}_j^{TRI} = \left[ \frac{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j} \mathcal{E}_{k,j} t_{k,i,j}^2}{\sum_{k=1}^K \sum_{i=1}^n M_{k,i,j} \mathcal{E}_{k,j}} \right]^{1/2} \quad (4)$$

$$\bar{t}_j^{UW} = \frac{\sum_{k=1}^K \sum_{i=1}^n t_{k,i,j}}{K(n-1)} \quad (5)$$

$$\bar{t}_j^{WT} = \frac{\sum_{k=1}^K \sum_{i=1}^n M_{k,...} t_{k,i,j}}{\sum_{i=1}^n \sum_{k=1}^K M_{k,...}} \quad (6)$$

TRI will be no more considered in this study as the metric is welfare and not trade.

The RG and WT systems are justified by the Loveday's assessment according to which *'theoretically perfect weighting system would be the one under which each commodity were given a coefficient equivalent to the value which it would have in international trade of a free trade world'* (Loveday, 1931, cited by Leamer, 196?). The RG and WT systems are two alternative schemes of estimating the level of free trade imports of the trade flow under consideration.

The idea grounding the MTRI system is slightly different: an evaluation of the uniform tariff applied to each commodity (and each partner) that would imply the same volume of trade. The equation (1) defined weighs as import variations implied by elimination of tariffs.

In order to gauge the virtues and drawbacks of every method, we enumerate the properties that we ask to a tariff aggregator.

- The first quality is simplicity and tractability. Tariffs have to be aggregated across at least three different dimensions: importing country, exporting country and product. Considering that the world comprises 250 countries, that all trading pairs have to be considered and that a HS6 level (5,011 lines) is a satisfying level of product disaggregation, a tariff database contains 311,934,750 observations (=250\*249\*5011). From this big database, tariff information can be synthesized according to each dimension (average duty applied by each importing country, average duty faced by each

exporting country, average duty imposed on each product), to every couple of dimension (reporter\*partner, reporter\*product, partner\*reporter), to the three dimensions (the world level of protection). Furthermore each dimension can be decomposed: a tariff average can be calculated for groups of countries (continent, high income/middle income/low income countries...) or groups of products (HS2, HS4, agriculture/industry/services...). In a nutshell calculation of tariff average has to be replicated repeatedly to understand the economic implications of a real tariff structure. So an aggregation system has to be simple and tractable.

- A second property demanded to a weighing system is that it should have theoretical foundations. It could reflect potential trade structure under free trade, or it could be the uniform tariff that generates the same welfare or the same volume of imports.

- Since the objective of a weighting system is also to implement average tariffs in Computable General Equilibrium Models, this system has to be consistent in terms of public receipts provided by the tariff structure; given the tariff  $t_{k,i,j}$  representing the duty levied by country/zone j on imports  $M_{k,i,j}$  of product k coming from country / zone i,

total tariff revenue of country j is  $\sum_{k=1}^K \sum_{i=1}^n t_{k,i,j} M_{k,i,j} = \bar{t}_j^x \sum_{k=1}^K \sum_{i=1}^n M_{k,i,j}$  if  $\bar{t}_j^x$  is the tariff

evaluated through this aggregating system. It leads to the utilization of own – trade weighted system.

- The weighting system should be robust to measurement errors. Macroeconomic variables are obviously subject to measurement errors. The risk is much higher with behavioral parameters.

We can now study the qualities and drawbacks of every aggregating system.

- Weighing by own trade is very simple and consistent in terms of public receipts but this system is exposed to an endogeneity bias which should lead to systematic underestimation of protection; it is subject to measurement errors of bilateral trade.

- Weighing by world trade is less simple, and not consistent in terms of public revenues. It is less open to measurement errors as each tariff is weighted by the sum of numerous trade flows and that measurement errors can compensate each other. As compared to own

trade system endogeneity bias should be reduced. The issue is whether world trade differs or not from potential countries trade structure. Measurement of protection is important at the level of protection applied on imports, but also as far as average duty faced on exports is concerned. On export structure national idiosyncrasies are large, as there are numerous countries which export few products.

- Weighing by a Reference Group's trade is less simple, not consistent in terms of public revenues but it can better reflect potential countries' trade structure: this could be particularly the case when evaluating average duty faced on exports. It is less open to measurement errors than own trade weighing system but more than the world trade system. Endogeneity bias should be reduced, more or less when changing the number of countries inside each group. Anyway it reduces less the endogeneity bias as compared to the world trade system.

- The MTRI weighing system is a much more complex methodology; it is not consistent in terms of public receipts; it has good theoretical foundations even if equation (1) results from numerous simplifying assumptions in respect of initial methodology. Anyway it can reflect potential trade structure; but it is highly open to measurement errors (trade elasticities).

- Finally the un-weighted system is very simple ; it is not open to measurement errors (except of tariffs) ; it is not consistent in terms of public receipts; it may be very far from potential trade structure ; it may overestimate protection as it accounts for "water-in-the-tariff" as much as it accounts for import-reducing part of the tariff.

**Table1: Qualitative comparisons between the aggregating schemes**

	Simplicity and Tractability	Robust to measurement errors	Consistent in terms of public receipts	Theoretical foundations
BT	****	**	*****	**
MTRI	*	*	***	*****
RG	**	***	***	*****
UW	*****	*****	***	*
WT	***	****	***	***



Table 1 synthesizes all these aspects by ranking each weighing system as far as each criterion is concerned. In terms of robustness to measurements errors the best system is clearly the un-weighted one, followed by the world trade system, then the reference group system, then the own trade system, and finally the MTRI system.

From Table 1 it clearly appears that reference group and world trade systems are compromises while other systems reflect extreme position on one criterion.

#### **4 Alternative weighing schemes: impact on protection measurement**

We first compare the different schemes of aggregation by calculating average duties, either applied on imports at the national level, or faced on national exports, or by products.

In each case five schemes are compared: the MTRI scheme for a Mercantilist Trade Restrictiveness Index based aggregation scheme according to the formula given by equation (1), the own trade method defined by equation (2), the reference group based aggregation scheme according to equation (3) where reference groups are the one used by Bouet et al. (2007), the unweighted average defined by equation (5) and the world trade method defined by (6).

For calculating MTRI indexes we utilize import demand elasticities from Kee, Nicita and Olarreaga (2004). Import demand elasticities are only available at the European level and only for some member. Aggregating MacMAP data would require the selection of aggregating method so we suppose that import demand elasticities are the same for each European country and calculate MTRI indexes for the 15 European members.

The object of these assessments is to give statistical regularities of these different methods: the theoretical section tends to conclude on underestimation of average duties by the own trade method, while unweighted averages could account too much for “water-in-the-tariff” leading to systematically high average duties. Finally we test for robustness of other methods, in particular the MTRI method founded on numerous estimations.

##### *4.1 Measuring applied average duty on imports:*

Annex 1 gives average applied duties on imports for 87 countries under 5 different methodologies. Table 2 gives a synthetic snapshot of these indicators, with simple averages and standard deviations, numbers of outliers, frequency under which this

method provides the minimum estimation and the maximum estimation. For the number of outliers we first estimate in each country\*method case the method's contribution to the variance of estimated protection for each country  $C(\bar{t}_j^y)$ , according to the formula:

$$C(\bar{t}_j^y) = 5 \frac{\left[ \bar{t}_j^y - \frac{1}{5} \sum_{y'} \bar{t}_j^{y'} \right]^2}{\sum_{y''} \left[ \bar{t}_j^{y''} - \frac{1}{5} \sum_{y'} \bar{t}_j^{y'} \right]^2} \quad (7)$$

As by construction  $\sum_{y'} C(\bar{t}_j^{y'}) = 4$  and as we compare 5 methods, we define at 0.8 (=4/5)

the threshold above which a method gives an outlying estimation given the whole distribution of estimations. The following example could be more explicit: on Table 1, in the case of Tanzania and Mali, four methods give very convergent estimations of protection while the unweighted method clearly gives an outlier. In the case of Nigeria and China, three methods provide relatively convergent estimations while two diverge. In order to systematically identify the methods providing outliers we calculate the contribution-to-dispersion indicator according to the previous formula. These methods are outlined in red in Annex 1

**Table 2: Average tariff on imports, countries examples**

	Average tariff on imports (%)					Coef. Variation	Contribution to total variance (%)				
	Reference Group	World trade	Trade weighted	Un- weighted	mtri weighted		Reference Group	World trade	Trade weighted	Un- weighted	mtri weighted
Tanzania	14.2	14.0	14.6	16.8	14.5	7.8	31.9	53.9	3.1	303.9	7.2
Mali	10.1	10.0	9.6	11.7	9.9	8.2	2.9	7.7	68.4	300.1	21.0
Nigeria	25.6	22.3	23.9	29.1	26.8	10.3	0.1	155.9	37.3	185.3	21.4
China	14.1	18.3	12.7	15.8	13.6	14.7	14.2	234.2	98.1	18.4	35.1

Source: Author's compute using MACMap

**Table 3: Average tariff on imports**

	BT	MTRI	RG	UW	WT
Average	7.7	8.2	8.8	11.0	9.3
Standard Dev.	6.3	7.2	6.2	10.2	8.2
# outliers	38	30	26	49	25
%Min	43.7	20.7	12.6	4.6	23.0
%Max	2.3	10.3	26.4	55.2	10.3

Source: Author's compute using MACMap

From Table 3, it appears that the Own – Trade (OT) system tends to provide relatively low levels of assessed protection as the average of OT averages is the smallest one and in 43.7% of cases, this method gives the minimum estimation. On the other side the un-weighted (UW) scheme tends to give the highest estimation as the average of UW averages is the highest average and in more than 55% of the cases this method leads to the highest assessment. This confirms that the OT methodology could lead to underestimation of protection while the UW could imply overestimation of protection.

Calculating how much each method contributes to the variance of estimated protection by country shows that the Un-Weighted method, and in a lesser extent the Own-Trade scheme, methods give outlying estimations. Finally reference group (RG) and world trade (WT) methods provide less outlying estimations of average protections.

Figure 1 illustrates the correlation between each pair of methods. While correlation between the Reference Group method (RG), the World Trade (WT) method, the Own-Trade (OT) method and the MTRI method are high, the Un-Weighed scheme gives significantly less correlated measure of protection, except when compared to the World Trade method.

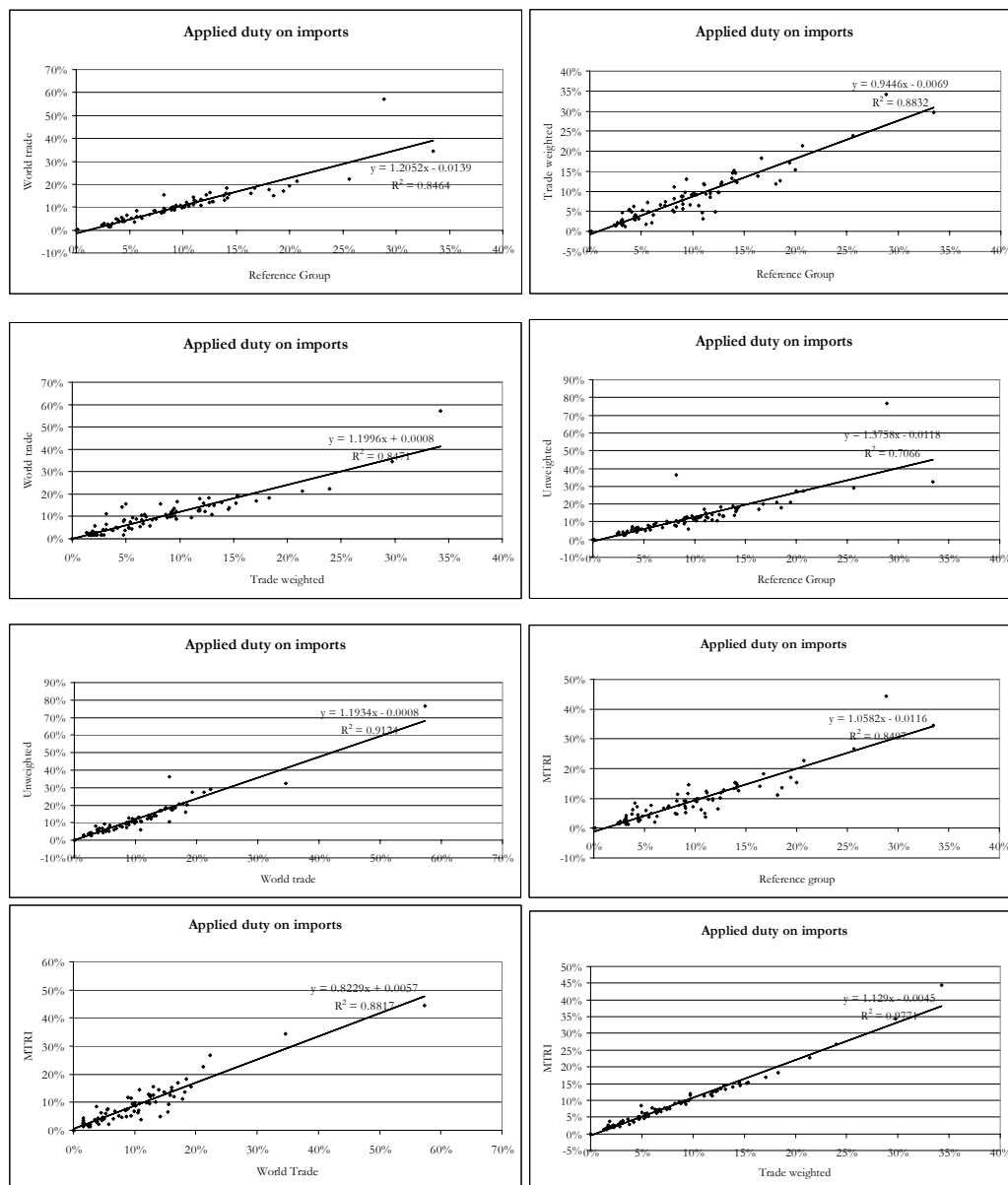
It could be also informative to know if different methods of aggregation provide different international ranking as far as applied protection is concerned. This is not the case as it appears from Table 4 that Spearman's rank correlation coefficients are high between each pair of aggregating schemes.

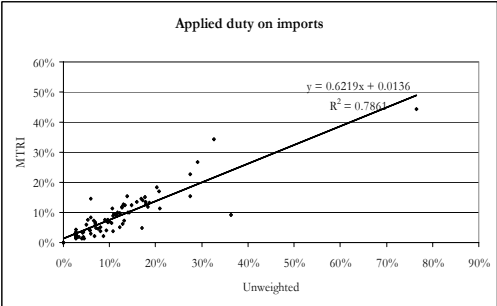
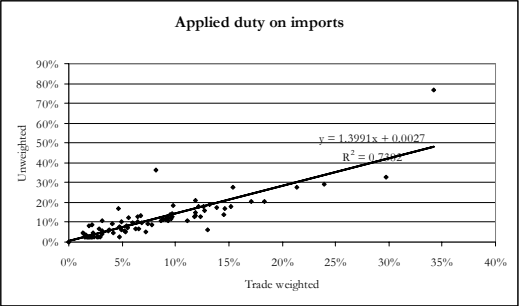
**Table 4: Spearman's rank correlation coefficient - Average tariff on imports**

	RG	WT	BT	UW	MTRI
RG		96.9	90.9	94.7	90.6
WT			89.3	96.8	89.0
BT				87.0	98.9
UW					86.9
MTRI					

Note: figures are expressed in %

**Figure 1: correlation of evaluated protections – applied duty on imports**





#### 4.2 Measuring average duty faced on exports

As previously mentioned, there is more variability on countries' geographic structure of exports than of imports: some countries' exports are very concentrated on a few products such that average duties faced on exports vary much more than applied duties on imports. Annex 2 gives average duties faced on exports for 207 countries under the same 5 different methodologies. Table 5 gives a synthetic snapshot of these indicators.

**Table 5: Average duty faced on exports\_**

	BT	MTRI	RG	UW	WT
Average	5.7	5.5	6.7	9.2	8.6
Stand deviation	5.9	5.3	4.8	2.6	2.1
# of outliers	73	72	18	107	103
% of min.	40.1	36.7	11.6	1.4	10.1
% of max.	7.7	5.3	13.5	44.4	29.0

Source: Author's compute using MACMap

The Trade-weighted and MTRI averages provide relatively low estimates of protection as these methods give the lowest averages of averages and the highest frequency of minimum faced protection. On the contrary, and once again, the highest evaluation of protection is given by the un-weighted scheme, both in terms of average of averages and of frequency of maximum. The really new element comes from the fact that the reference group provides much less outlying estimations of faced protection than the four other methods.

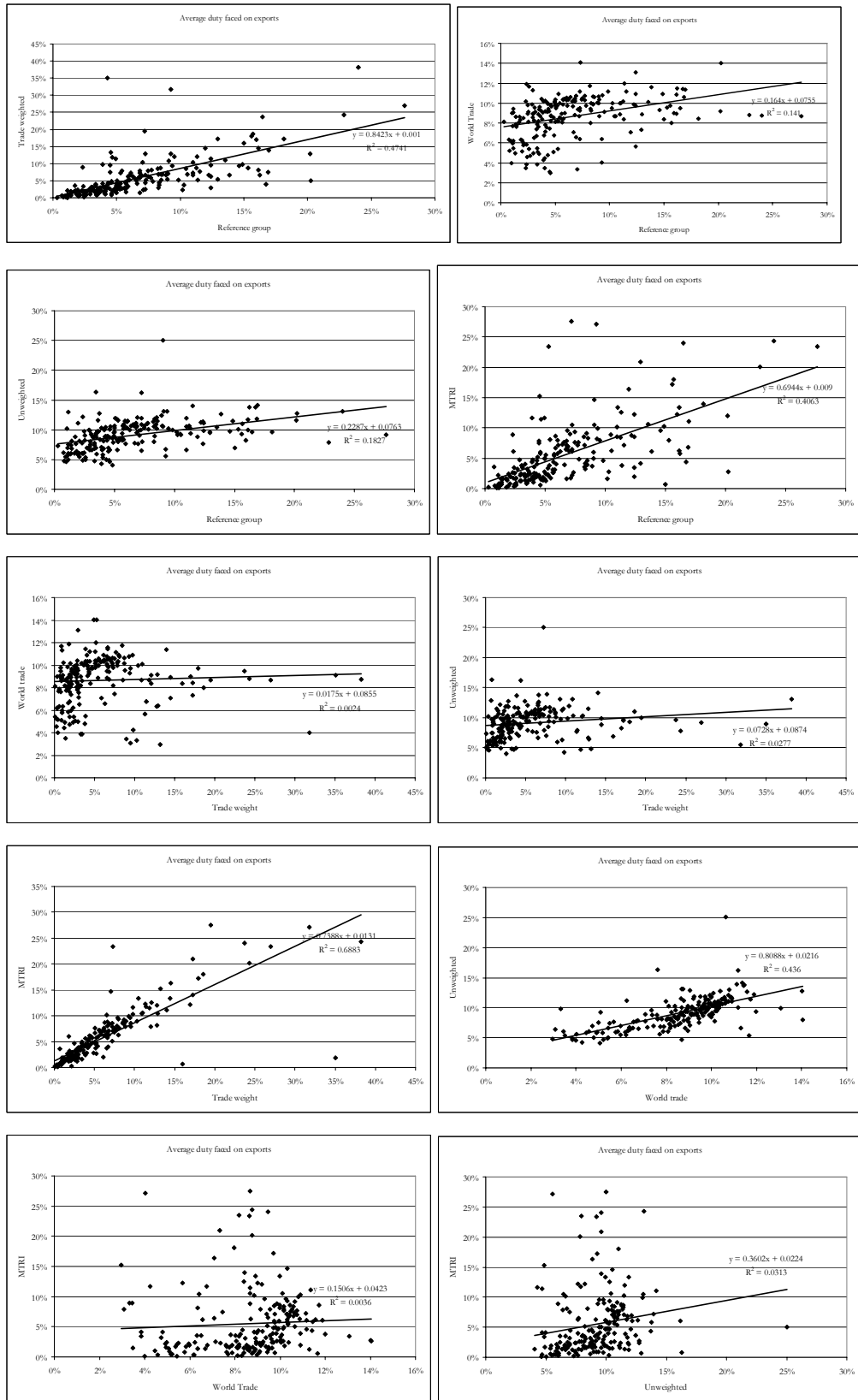
Correlation between each pair of rates of faced protection is very low as pointed out by Figure 2, except between the MTRI methodology and the OT method. Even international rankings of countries in terms of average duty faced on exports are substantially modified: this clearly appears from Table 6.

**Table 6: Spearman's rank correlation coefficient - Average duty faced on exports**

	RG	WT	BT	UW	MTRI
RG		80.8	47.6	55.8	71.8
WT			28.5	36.6	90.8
BT				73.9	29.4
UW					37.0
MTRI					

Note: figures are expressed in %

**Figure 2: correlation of evaluated protections – average duty faced on exports**





#### *4.3 Measuring average world duty imposed by product*

Let us turn now our attention on measuring average world duty by product. The sector decomposition that we choose is the HS2 level of disaggregation, corresponding to 93 chapters. Annex 3 gives average duties by hs2 chapter evaluated through the same 5 different methodologies, while Table 7 gives a summary of these calculations.

**Table 7: World average applied by HS2**

	BT	RG	MTRI	UW	WT
Average	6.9	8.2	7.0	11.6	11.7
Stand deviation	6.73	7.48	7.35	9.50	8.34
# of outliers	37	13	22	66	62
% of min.	52	7	27	5	2
% of max.	2	11	1	40	39

Source: Author's compute using MACMap

Once again the own-trade weighted average system provides lower estimations. In terms of average of averages the MTRI method is very close but the OT method gives more than 50% of the minimal assessments. Once again, the un-weighted system provides high estimations, but the performance of the world trade weighing scheme is similar.

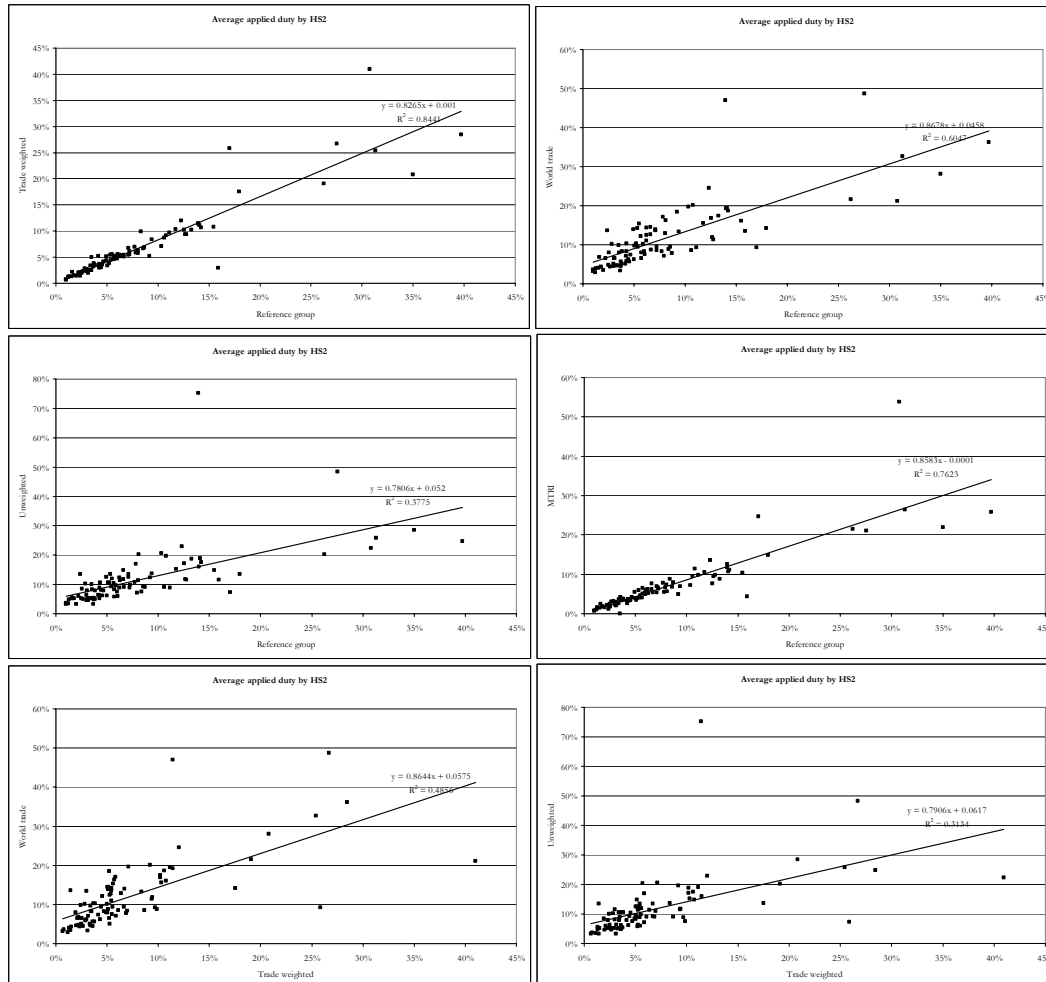
The Reference Group scheme appears again as an intermediate system while providing few outliers. Correlation between the different methods of assessments is higher than in the case of average duty faced on exports but lower than for applied duty on imports. The un-weighted average gives assessments uncorrelated with averages coming from other methods except for the world trade scheme. As pointed out by Table 8, the ranking of chapters in terms of world protection is not substantially modified when changing method of calculation.

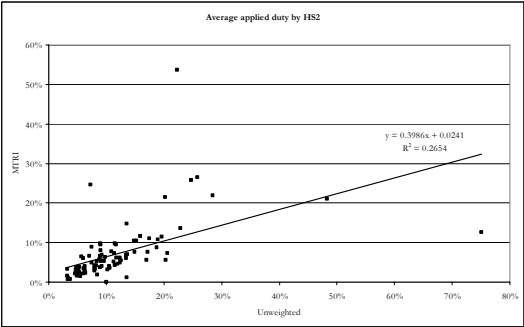
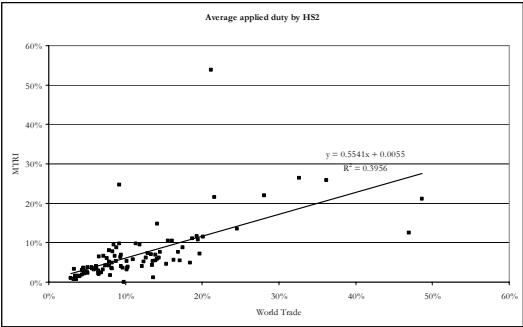
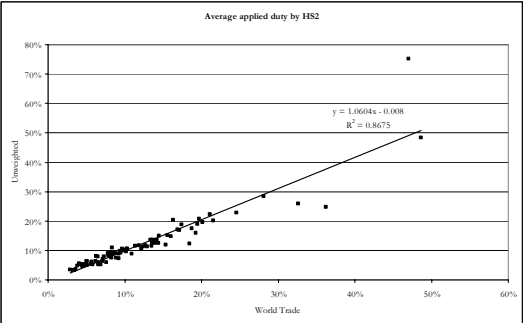
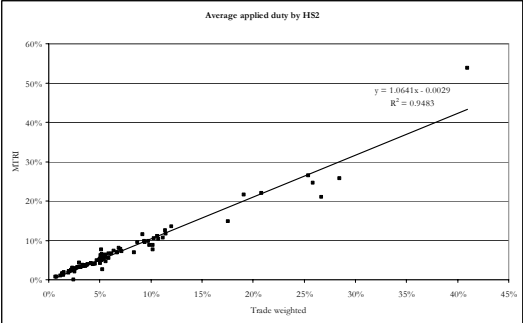
**Table 8: Spearman's rank correlation coefficient - Average duty faced on exports**

	RG	WT	BT	UW	MTRI
RG		81.3	96.8	79.2	95.1
WT			78.2	97.6	77.3
BT				76.5	97.2
UW					75.2
MTRI					

Note: figures are expressed in %

**Figure 3: correlation of evaluated protections – average applied duty by HS2**





## **5 Alternative weighing schemes: impact on trade and welfare gains from liberalization**

In order to illustrate the effects of the aggregation methodologies on CGE results we assess the effects of the creation of a worldwide free trade using the same CGE model, with different aggregation methods. The Model used for this exercise is a static version and perfect competition of the Mirage model (Bchir et al, 2002). 5 aggregation methods are chosen for this exercise: The Standard GTAP Aggregation, the MacMAP reference groups aggregation, the Simple Average aggregation, the Trade Weighted Aggregation and the World Exports Aggregation. The use of simplified version of Mirage allows a large sectoral and regional desegregation; annex 3 describes the sectoral and regional mapping between the GTAP database and the study.

Table 9 and 10 shows that different method of aggregation leads to different results, the difference can be very significant and especially for little developing countries. Table 9 shows that the important difference are obtained for the exports effects. The GTAP desegregation leads to the lowest increase for the world exports (a 10.87% increase) where the Simple Average Aggregation method gives the highest exports increase (13.61% of increase). This is a non-surprising result as the simple average method is the method that gives the greatest estimation of protection as it gives the most important weight tariff picks. Table 10 gives an idea of the welfare effects of the different simulations. Here results are less straightforward. There is not apparent direct relationship between the level of initial protection and the level of the welfare variation. Meanwhile some conclusions could be drawn from the results analysis.

The first one is that differences in results are very significant for aggregated regions such as Oceanic countries, Rest of Former Soviet Union, Rest of South African Customs Union. This is due to the fact that when computing aggregated tariffs to aggregated regions we have to double aggregate as we aggregate sectors and regions. This implies that the differences between methods are doubled.

The second important conclusion is that the simple average aggregation method leads to higher welfare gains for LDC countries and for the Sub-Saharan African countries. This

fact is simply explained by the fact that this aggregation method is the one that gives the greatest weight to the tariffs peaks.

Table 9: Total exports impacts

	Standard GTAP Aggregation	MacMAP Aggregation	Simple Average Aggregation	Trade Weighted Aggregation	World Exports Aggregation
World	10.87	11.7	13.61	11.07	13.54
Developed countries:	6.95	7.46	9.35	7.41	9.41
TRIAD countries	5.92	6.63	8.6	6.86	8.7
EU27	3.9	4.71	6.64	5.37	7.03
USA	7.33	8.13	10.25	7.24	9.91
Japan	15.2	15.16	17.08	14.97	16.32
Rest of developed countries:	10.66	10.15	11.17	9.14	10.69
Korea	29.68	26.59	27.89	25.01	25.95
EFTA countries	4.87	5	6.58	4.43	7.25
Hong Kong and Taiwan	8.67	8.83	11.51	7.3	10.1
Oceanic countries	17.55	18.38	24.64	15.45	28
Canada	3.48	3.66	2.69	3.22	3.27
Developing Countries	20.89	22.57	24.48	20.43	24.04
Developing American Countries	20.48	23.67	21.43	20.31	21.93
Mexico	11.94	13.86	13.55	11.31	12.59
Rest of North America	174.06	132.13	125.42	176.34	127.4
Argentina	23.13	24.45	23.44	23.24	23.93
Brazil	39.88	44.56	34.27	40.01	37.48
Chile	9.6	8.24	10.59	8.67	10.12
Rest of Latin America	21.55	27.14	25.67	21.86	26.8
European Developing countries	14.07	14.7	13.74	12.62	13.1
Russian Federation	11.39	12.45	12.66	11.01	12.74
Turkey	18.9	16	10.51	13.97	12.26
Rest of Europe	23.08	25.92	20.53	20.48	24.93
Rest of Former Soviet Union	14.25	16.93	18.29	13.85	13.02
Asian developing countries	21.96	23.03	27.35	21.51	26.25
China	34.89	35.38	37.49	34.57	36.17
India	61.54	64.56	69.31	60.9	69.42
Pakistan	32.15	32.57	34.71	30.85	37.78
Southeast Asia	12.2	12.82	20.11	11.51	18.21
Rest of East Asia	24.4	26.8	43.76	23.14	46.91
Rest of South Asia	42.46	44.19	44.47	38.76	50.32
Middle East Countries	7.14	9.63	11.38	7.07	11.69
African Developing countries	23.18	26.66	25.84	23.21	27.9
Tunisia	41.48	44.2	43.75	40.91	41.23
Morocco	54.26	51.54	55.12	56.19	60.4
Egypt	52.9	67.17	65.05	54.91	87.23
Rest of North Africa	10.82	12.1	13.45	11.32	13.53
Mauritius	17.96	31.97	28.58	18.22	38.01
South Africa	12.81	14.74	13.99	12.07	15.72
Zimbabwe	36.46	46.4	85.07	37.53	56.83
Rest of South African Customs Union	18.72	12.37	17.42	18.17	12.54
Rest of Sub-Saharan Africa	18.43	23.24	17.67	17.9	16.86
LDC Countries	31.69	32.28	27.75	29.12	30.2
Asian LDC	42.46	44.19	44.47	38.76	50.32
African LDC	17.43	16.51	26.38	16.36	21.19
Senegal	14.21	17.48	19.92	13.21	28.25
Malawi	28.16	38.35	147.23	24.13	33.56
Rest of South African Dev Community	17.13	15.15	20.02	16.23	19.78

Source: Authors compute using MACMap, GTAP and a modified version of MIRAGE

**Table 10: Welfare equivalent variation impacts**

	Standard GTAP Aggregation	MacMAP Aggregation	Simple Average Aggregation	Trade Weighted Aggregation	World Exports Aggregation
World	0.77	0.94	0.7	0.93	0.81
Developed countries:	0.78	0.89	0.69	0.91	0.78
TRIAD countries	0.62	0.65	0.61	0.65	0.68
EU27	0.37	0.44	0.3	0.49	0.47
USA	0.12	0.13	0.1	0.12	0.15
Japan	2.54	2.58	2.71	2.46	2.61
Rest of developed countries:	2.74	3.85	1.6	4.25	1.98
Korea	6.89	6.36	5.05	6.9	6.02
EFTA countries	4.59	10.42	1.07	11.77	1.73
Hong Kong and Taiwan	1.33	1.28	1.35	1.33	1.36
Oceanic countries	0.72	0.89	0.84	0.65	1.13
Canada	0.33	0.33	0.22	0.32	0.37
Developing Countries	0.75	1.16	0.75	1.03	0.94
Developing American Countries	0.2	0.36	0.1	0.2	0.25
Mexico	-0.07	0.13	0.09	-0.11	0.14
Rest of North America	2.55	2.75	2.78	3.04	3.64
Argentina	0.26	0.28	0.18	0.29	0.27
Brazil	0.63	0.79	-0.04	0.65	0.28
Chili	0.53	0.23	0.76	0.41	0.75
Rest of Latin America	0	0.26	0.09	0.04	0.25
European Developing countries	0.78	1.00	1.35	0.70	0.76
Russian Federation	0.52	0.68	0.72	0.53	0.69
Turkey	1.64	1.4	0.73	1.24	0.97
Rest of Europe	0.94	1.86	0.69	0.92	1.06
Rest of Former Soviet Union	0.09	0.87	4.11	0.26	0.51
Asian developing countries	0.49	0.49	0.05	0.51	0.25
China	0.6	0.52	-0.12	0.55	0.17
India	-0.18	-0.23	-0.36	-0.14	-0.23
Pakistan	0.15	0.11	0.1	0.17	0.31
Southeast Asia	1.5	1.55	0.87	1.57	1.09
Rest of East Asia	2.14	2.24	2.77	2.12	2.91
Rest of South Asia	0.44	0.67	0.35	0.53	0.59
Middle East Countries	-0.03	0.09	-0.22	0.02	-0.12
African Developing countries	4.08	7.57	5.94	7	7.03
Tunisia	4.9	5.46	4.24	4.95	2.15
Morocco	1.06	0.9	1.03	1.42	1.56
Egypt	17.12	32.16	24.74	30.02	29.99
Rest of North Africa	-0.69	-0.66	-0.75	-0.68	-0.78
Mauritius	4.25	4.54	3.59	4.61	4.9
South Africa	0.2	0.21	0.39	0.09	0.37
Zimbabwe	2.52	3.75	8.73	2.65	4.87
Rest of South African Customs Union	6.03	3.91	5.78	6.12	3.9
Rest of Sub-Saharan Africa	-0.18	0.24	-0.24	-0.1	-0.18
LDC Countries	0.43	0.49	5.13	0.41	6.1
Asian LDC	0.44	0.67	0.35	0.53	0.59
African LDC	0.42	0.08	0.93	0.13	0.16
Senegal	-0.23	-0.02	-0.04	-0.29	0.33
Malawi	2.32	4.32	23.73	1.7	3.42
Rest of South African Dev Community	0.43	-0.16	-0.27	0.11	-0.07

Source: Authors compute using MACMap, GTAP and a modified version of MIRAGE

## 6 Conclusion

- ❑ This paper was aimed at finding empirical regularities in the calculation of tariff averages.
- ❑ Tariff aggregator is a key methodological issue; through different aggregators,
  - The estimated level of applied protection on imports varies from 1 to 1.43
  - The estimated level of average duty faced on exports varies from 1 to 1.67
  - The estimated level of applied protection by HS chapters varies from 1 to 1.70
  - The estimated impact on world trade varies from 1 to 1.25
  - The estimated impact on world welfare varies from 1 to 1.34
- ❑ The choice of the methodology is particularly a key issue when measuring average duty faced on exports
- ❑ Bilateral Trade aggregator (BT) provides low estimations of protection
- ❑ UnWeighted aggregator (UW) provides high estimations of protection
- ❑ Reference Group aggregator (RG) provides less outlying estimations
- ❑ This study:
  - Has to be confirmed on the MAcMAP 2004 database
  - Has to incorporate new technical indicators
  - Has to study new aggregators

## 7 References



## 8 Annexes

### Annex1 Average duty applied on imports

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Hongkong	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Chile	6.9	6.8	6.6	6.9	6.7	2.0	69.2	17.0	215.9	64.5	33.4
Saudiarabi	12.8	12.2	12.4	13.0	12.8	2.7	30.4	148.2	76.4	128.6	16.5
Peru	12.8	12.5	11.9	13.4	12.4	4.3	9.2	1.2	180.6	201.7	7.3
Venezuela	11.2	12.5	11.7	12.7	11.9	5.2	179.9	67.0	16.6	131.7	4.7
India	33.5	34.6	29.8	32.6	34.4	5.9	6.8	69.1	265.8	4.0	54.4
Ghana	13.9	13.0	14.5	13.8	15.4	6.4	5.8	149.4	18.6	17.1	209.1
Bangladesh	16.7	18.4	18.3	20.2	18.3	6.7	180.5	0.0	0.1	218.3	1.1
Australia	5.1	5.2	5.3	5.0	6.0	7.2	20.2	6.7	1.4	78.7	293.1
Russian fed	10.2	10.1	9.3	10.7	8.9	7.5	18.0	17.4	48.1	139.5	176.9
Tanzania	14.2	14.0	14.6	16.8	14.5	7.8	31.9	53.9	3.1	303.9	7.2
Mali	10.1	10.0	9.6	11.7	9.9	8.2	2.9	7.7	68.4	300.1	21.0
Bolivia	9.0	8.9	7.8	8.9	7.6	8.3	59.0	49.7	90.5	49.9	150.9
Gabon	14.1	16.0	15.2	17.7	15.1	8.6	136.6	7.9	8.4	234.5	12.6
Burkina Faso	9.9	9.7	9.1	11.5	9.5	9.1	0.1	7.2	75.5	289.0	28.1
Cameroon	16.4	16.1	13.9	17.1	14.1	9.3	34.3	15.4	125.0	127.5	97.8
Sudan	19.4	17.1	17.1	20.7	17.0	9.4	48.1	48.1	44.7	202.2	56.8
New Zealand	2.6	2.7	2.2	2.7	2.3	10.2	26.4	63.7	152.1	71.9	85.9
Nigeria	25.6	22.3	23.9	29.1	26.8	10.3	0.1	155.9	37.3	185.3	21.4
Madagascar	4.4	4.7	4.2	4.4	3.5	10.4	13.5	98.5	0.5	13.5	274.0
Côte d'Ivoire	8.9	9.6	8.9	11.4	9.2	10.8	42.0	0.1	51.6	292.7	13.6
Jordan	11.1	13.1	11.8	14.7	12.4	11.0	127.5	9.7	31.5	229.4	1.9
Rwanda	7.4	8.4	7.4	9.3	7.3	11.0	50.0	26.3	37.2	233.9	52.6
Senegal	9.1	9.9	8.8	11.5	9.1	11.5	32.0	5.1	60.6	273.5	28.8
Zambia	11.7	10.8	8.7	10.9	9.5	11.8	132.3	15.2	183.4	23.8	45.3
Morocco	20.7	21.1	21.4	27.5	22.7	12.2	50.6	31.2	21.7	296.5	0.0
Colombia	10.4	12.0	9.2	12.2	9.9	12.3	7.0	91.0	133.9	125.5	42.6
Albania	8.2	9.3	11.1	10.5	11.3	12.9	208.2	34.3	57.9	10.5	89.1
Malawi	11.3	12.5	9.3	12.2	9.7	13.1	4.6	104.9	133.4	71.2	85.9
Nicaragua	4.3	3.9	3.2	4.1	3.3	13.6	118.7	10.1	131.5	48.3	91.4
Lebanon	3.8	4.7	5.2	5.6	4.7	14.0	228.7	1.4	40.9	127.2	1.9

China	14.1	18.3	12.7	15.8	13.6	14.7	14.2	234.2	98.1	18.4	35.1
Algeria	13.8	14.9	13.2	18.7	13.3	15.5	18.4	0.3	49.8	291.8	39.7
	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Korea	9.2	8.9	9.7	12.7	11.7	15.7	52.6	86.3	20.3	186.0	54.9
Argentina	12.5	12.2	9.7	14.2	10.1	15.8	16.0	5.2	122.9	181.1	74.8
Ethiopia	14.3	15.8	12.2	17.9	12.7	16.0	1.4	29.3	103.6	199.3	66.4
Kenya	18.5	14.9	12.7	17.9	13.5	16.8	134.3	6.0	116.8	85.4	57.4
South Africa	8.4	8.8	6.0	9.7	7.7	17.0	4.4	25.5	235.1	125.9	9.1
Costa Rica	4.4	4.0	3.7	5.6	4.4	17.1	0.4	35.5	96.3	267.8	0.0
Honduras	5.6	5.7	7.3	5.2	7.6	17.1	36.1	32.3	80.3	95.3	156.0
Brazil	11.7	13.4	9.5	14.0	10.0	17.1	0.0	72.7	123.0	128.1	76.2
Trinidad and	9.1	9.9	6.9	9.7	6.7	18.1	16.5	86.9	104.4	65.5	126.7
Srilanka	7.3	8.5	6.5	10.0	7.0	18.1	16.6	20.2	94.9	232.9	35.3
Guatemala	4.3	5.6	6.3	6.7	7.3	19.1	228.0	14.9	5.6	32.4	119.1
Uganda	8.0	7.4	5.4	8.0	5.1	21.0	78.6	19.5	97.9	68.3	135.7
United king	3.1	1.6	2.7	2.6	2.9	22.3	72.6	293.0	6.1	0.8	27.5
Denmark	3.2	1.6	2.6	2.7	2.6	22.6	114.0	273.5	3.0	7.5	1.9
El Salvador	3.9	4.5	5.5	7.0	6.2	23.0	155.7	50.0	0.6	152.3	41.4
Spain	3.2	1.6	2.3	2.7	2.4	23.5	156.4	218.7	4.2	20.6	0.0
Netherland	3.2	1.6	2.2	2.7	2.6	23.9	144.4	215.0	16.5	17.9	6.2
Tunisia	20.0	19.3	15.4	27.4	15.4	25.2	1.2	0.3	69.9	259.5	69.2
Thailand	12.6	16.5	9.7	18.4	11.9	25.5	12.8	57.3	133.9	167.3	28.7
Indonesia	5.7	8.6	4.8	7.1	5.0	25.6	13.0	220.2	77.7	28.7	60.3
Oman	8.2	7.9	4.8	7.6	4.7	26.3	82.0	51.8	110.5	30.0	125.7
Sweden	3.2	1.6	2.0	2.7	2.1	26.3	186.6	142.8	22.3	38.3	10.1
Mauritius	18.1	17.8	11.9	20.9	11.2	26.5	24.9	18.1	94.6	136.7	125.7
Switzerland	4.5	3.8	3.8	5.9	2.9	26.7	9.7	12.9	11.4	234.5	131.5
Belgium	3.2	1.6	3.0	2.7	3.6	26.8	22.9	258.7	3.9	1.7	112.8
Philippine	4.8	6.5	3.2	5.8	4.0	27.6	0.3	155.0	158.0	47.5	39.2
Romania	9.8	10.7	6.7	13.2	7.2	27.7	1.0	18.9	111.6	193.0	75.4
Ireland	3.2	1.6	1.7	2.7	2.5	28.2	154.3	127.5	82.0	30.3	5.9
Greece	3.2	1.6	2.1	2.7	1.9	28.3	190.2	111.1	12.1	44.8	41.9
Finland	3.2	1.6	1.9	2.7	1.9	29.0	193.1	100.8	33.2	47.8	25.0
United stat	2.4	2.3	1.7	3.4	1.9	29.7	0.7	0.6	94.0	262.1	42.6
France	3.2	1.6	1.8	2.7	1.9	29.8	192.2	93.0	45.7	49.1	19.9

Italy	3.2	1.6	1.9	2.7	1.8	29.9	193.5	90.5	32.0	50.1	33.8
Uruguay	10.6	10.5	6.4	12.9	6.2	31.0	18.4	16.2	99.5	152.0	113.9
	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Brunei	9.4	10.8	13.0	5.9	14.5	31.2	16.2	0.1	46.2	208.5	129.0
Germany	3.2	1.6	1.7	2.7	1.9	31.3	191.7	77.6	54.5	52.3	23.9
Moldova.	3.0	2.6	2.3	4.4	2.0	32.1	1.3	5.0	41.6	271.8	80.3
Paraguay	9.0	9.5	5.6	12.2	5.3	34.8	6.3	15.5	86.3	180.1	111.9
Austria	3.2	1.6	1.6	2.7	1.7	35.0	188.8	52.1	60.0	58.1	40.9
Japan	4.1	3.8	4.9	6.0	8.5	35.0	51.9	78.3	7.6	8.3	253.9
Portugal	3.2	1.6	4.7	2.7	4.3	38.1	1.2	183.3	131.0	22.2	62.3
Papua newgu	6.2	5.0	4.0	9.3	4.0	38.4	4.9	11.0	57.9	267.7	58.5
Luxembourg	3.2	1.6	1.5	2.7	1.3	39.2	181.5	34.0	42.4	61.5	80.6
Egypt	28.9	57.3	34.2	76.5	44.4	39.7	102.6	22.3	53.7	217.3	4.0
Malaysia	12.2	15.5	5.0	10.4	6.5	42.9	29.0	170.7	134.5	1.4	64.4
Kazakhstan	4.4	4.1	2.9	6.8	2.2	43.2	3.9	0.0	45.8	236.7	113.6
Iceland	2.5	2.5	1.4	4.0	1.4	44.9	1.9	0.6	77.6	241.6	78.4
Canada	3.4	2.8	1.3	4.5	1.3	51.4	30.3	1.1	99.8	173.9	94.9
Belarus	11.0	11.0	3.2	10.8	3.8	51.5	56.5	55.5	136.1	47.7	104.2
Norway	5.4	3.5	1.9	8.0	3.7	51.6	16.9	19.9	127.3	224.6	11.2
Mexico	11.0	14.2	4.6	17.0	5.0	53.0	1.2	49.6	108.1	145.3	95.8
Turkey	6.0	5.8	2.1	8.7	2.1	56.5	14.3	9.5	101.1	174.8	100.4
Singapore	0.1	0.1	0.0	0.1	0.0	75.6	113.8	101.4	98.3	2.8	83.8
Ukraine	8.2	15.5	8.2	36.3	9.2	77.8	36.5	0.0	36.6	299.5	27.5

Average	8.8	9.3	7.7	11.0	8.2	# Outliers	26	25	38	49	30
Standard Dev.	6.2	8.2	6.3	10.2	7.2						
Coeff of var	0.55	0.76	0.48	1.12	0.59						

## Annex 2 Average duty faced on exports

	Reference Group	World trade	Trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Somalia	6.9	6.3	6.6	7.6	6.2	8.5	12.6	51.5	9.3	245.6	81.0
Jordan	10.5	8.6	8.7	9.3	8.9	8.5	278.1	60.7	42.4	2.7	16.1
Bahrain	6.7	5.8	7.1	7.7	6.5	10.4	0.8	168.5	19.8	191.6	19.3
Faroeislan	4.3	3.8	4.8	5.0	4.1	11.4	2.8	156.4	63.8	143.5	33.5
Myanmar	11.0	10.5	10.0	11.9	13.4	11.8	6.4	44.6	102.5	17.6	228.9
Hongkong	8.5	8.7	10.7	10.9	9.2	11.9	97.2	60.5	89.9	139.1	13.2
Argentina	13.6	11.0	10.1	10.4	10.6	12.6	303.6	1.2	53.4	27.6	14.2
Brazil	11.3	8.7	10.2	10.7	8.4	12.8	127.4	85.8	7.2	46.6	133.0
Greenland	3.4	3.5	3.8	4.7	4.1	13.7	102.3	57.9	0.8	226.5	12.6
Spain	7.5	8.0	10.3	10.3	9.3	14.5	148.2	71.9	93.5	82.8	3.5
Srilanka	9.4	9.3	10.8	13.1	9.9	14.8	51.6	57.5	4.0	272.8	14.0
Ecuador	12.4	9.5	9.8	11.3	8.5	15.0	184.1	25.0	12.5	43.4	135.0
Macau	11.3	12.1	8.4	10.3	12.5	15.1	5.1	51.6	235.2	14.3	93.7
Jamaica	9.5	12.0	9.1	10.2	7.9	15.6	2.5	225.6	16.7	7.9	147.3
Denmark	6.8	7.9	10.2	9.4	9.6	15.9	197.5	42.8	106.5	21.3	32.0
Greece	11.0	7.2	10.0	10.5	8.6	16.3	98.4	209.1	12.2	46.8	33.6
Maldives	9.1	10.9	8.7	13.1	10.5	16.6	61.4	6.2	102.0	230.3	0.1
Korea.dem.	14.9	9.8	10.9	11.5	10.3	17.6	287.0	71.3	7.6	0.0	34.1
Panama	16.9	14.0	11.4	14.2	11.1	17.8	205.4	4.2	80.2	7.4	102.8
Benin	8.2	8.5	11.7	11.4	8.6	17.8	72.0	48.7	142.3	97.1	40.0
Pakistan	8.3	6.8	9.4	10.5	7.1	18.5	1.0	107.3	40.1	180.9	70.7
Honduras	7.8	8.1	10.7	11.1	7.6	18.9	58.1	32.8	98.1	140.3	70.7
Sudan	4.5	7.5	7.4	7.0	7.5	19.3	310.1	33.8	25.9	1.9	28.3
Bulgaria	6.8	7.3	10.2	10.5	7.9	19.8	102.4	55.8	96.2	131.9	13.7
Thailand	8.6	6.9	10.6	11.4	8.4	20.1	10.0	157.6	60.7	152.3	19.4
Cambodia	5.4	7.8	10.0	8.5	8.1	20.7	237.3	0.5	152.2	9.4	0.5
Senegal	10.5	6.8	8.7	9.1	6.3	21.1	165.5	73.5	5.9	22.8	132.3
Zimbabwe	14.6	9.4	9.3	9.7	9.6	21.7	318.2	24.1	28.8	11.8	17.0
Togo	12.2	6.6	9.9	11.3	8.8	22.5	126.4	205.5	0.3	48.1	19.6
India	7.5	6.2	10.5	10.6	7.6	23.3	24.7	134.8	102.3	118.7	19.6
Dominica	11.0	6.6	8.8	6.7	10.2	23.3	134.2	107.9	1.0	97.6	59.3
Vietnam	7.2	6.6	9.5	10.9	6.5	24.1	20.7	62.5	45.2	200.5	71.0
Cuba	16.1	14.5	8.9	9.9	13.3	24.2	137.9	38.7	142.2	74.5	6.7

	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted
Solomonisl	2.4	3.3	3.8	4.9	3.5	25.2	172.8	9.8	9.6	206.3	1.4
Korea	6.8	6.3	10.4	10.6	7.0	25.3	45.6	85.2	107.9	128.4	32.8
Italy	6.8	6.0	10.3	10.5	7.1	25.9	43.2	99.6	104.3	128.1	24.8
Turkey	7.7	5.8	10.3	11.0	7.1	26.3	9.2	139.0	75.5	142.6	33.7
Dominicanr	6.1	7.3	9.8	11.5	7.1	26.5	102.8	23.3	40.7	201.7	31.6
Australia	9.1	7.1	10.3	10.5	14.7	26.9	21.1	136.7	0.0	0.6	241.7
Elsalvador	11.5	7.7	11.1	14.0	7.2	27.5	18.9	84.6	8.6	166.9	121.0
China	6.1	6.6	10.5	11.4	8.0	27.7	108.0	64.7	74.2	147.7	5.4
Belgium	6.3	6.2	10.3	9.9	6.1	27.8	49.3	52.3	141.6	99.0	57.7
Newzealand	15.3	8.8	9.6	10.1	7.9	28.0	294.4	28.3	7.4	0.6	69.3
France	6.8	5.7	10.4	10.7	6.8	28.3	30.7	107.0	102.0	129.2	31.2
Costarica	9.0	5.5	10.0	10.7	6.0	28.7	10.8	134.6	53.6	110.5	90.5
Indonesia	5.9	6.2	10.4	11.4	8.6	29.0	114.4	86.3	61.0	138.1	0.2
Portugal	6.4	5.5	10.6	10.7	7.3	29.6	49.6	114.2	109.3	115.0	11.9
Mongolia	6.9	6.6	10.8	12.1	7.0	29.7	46.1	66.1	66.6	177.9	43.3
Afghanista	15.6	17.9	9.7	9.3	17.2	29.8	15.5	92.9	103.6	126.4	61.6
Saintkitts	9.3	12.8	6.4	6.7	8.2	29.9	5.7	254.9	79.1	56.4	3.8
Southafric	6.6	5.1	10.2	10.9	7.6	30.3	37.6	150.5	73.7	135.0	3.3
Djibouti	12.4	11.3	5.7	7.6	12.3	30.8	69.6	23.7	191.2	53.1	62.5
Malawi	20.2	12.8	9.2	11.5	12.0	31.6	286.6	0.6	90.1	14.8	7.9
Mauritius	16.0	16.9	9.0	8.2	12.2	31.7	78.0	128.6	77.2	115.8	0.4
Northernma	15.7	18.6	8.0	11.0	18.1	32.3	9.4	87.8	186.1	49.1	67.6
Egypt	5.7	4.5	8.3	8.6	4.4	32.4	9.6	78.8	100.6	125.3	85.6
Barbados	18.2	17.2	8.4	9.6	14.0	32.5	114.3	73.3	132.8	78.4	1.3
Saintlucia	11.9	14.5	7.1	8.8	16.3	32.6	0.3	51.3	147.7	57.0	143.7
Tanzania	8.5	6.7	9.8	10.2	3.9	32.7	6.4	18.5	60.7	83.9	230.5
Vanuatu	7.2	12.9	6.4	6.4	10.5	33.1	25.1	212.5	63.1	60.9	38.3
Japan	6.0	5.2	10.3	10.3	5.8	33.8	34.7	81.4	118.5	118.4	47.0
Netherland	5.8	5.0	10.4	10.7	6.7	34.1	51.3	103.5	102.8	126.1	16.3
Yugoslavia	7.8	4.8	9.7	10.1	4.8	34.6	2.1	109.6	76.9	108.2	103.2
Lesotho	4.9	11.4	6.8	7.9	11.7	34.7	149.0	95.7	36.3	5.0	114.1
Nicaragua	13.9	6.7	11.6	12.6	6.2	34.8	107.9	99.2	15.5	48.8	128.7
Uruguay	16.1	8.0	10.9	11.7	6.3	35.7	212.9	46.5	0.5	8.8	131.2
Westernsah	7.0	10.3	3.3	9.8	9.0	35.9	8.9	71.1	258.5	47.3	14.2
Ukraine	8.3	4.3	9.2	8.9	4.2	36.2	28.2	114.3	77.7	57.8	122.0

	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Bangladesh	5.0	5.1	9.8	9.6	5.0	37.2	53.3	50.3	128.8	111.2	56.3
Burkinafas	9.9	5.1	11.2	10.0	4.6	37.5	31.1	100.4	98.0	37.1	133.4
Moldova.re	16.9	7.5	10.6	11.8	6.8	37.7	234.7	64.6	0.1	7.1	93.6
Finland	4.4	4.3	9.4	8.2	5.2	37.8	66.2	70.3	173.7	66.6	23.2
Germany	5.7	4.4	10.3	10.2	5.6	38.6	29.7	105.3	120.9	110.5	33.6
Lebanon	8.5	5.2	9.9	12.0	4.7	38.7	1.9	82.4	35.2	161.3	119.3
Unitedking	4.6	4.8	9.8	10.1	5.8	38.8	77.9	68.1	105.1	128.6	20.3
Taiwan	4.6	4.5	9.7	10.1	6.0	39.1	75.3	80.6	102.2	127.7	14.1
Luxembourg	3.9	4.2	9.1	7.0	4.4	39.5	64.6	47.3	220.9	33.9	33.3
Mali	3.1	3.1	6.5	6.6	3.6	40.0	66.4	67.4	113.1	123.9	29.2
Macedonia	8.9	6.5	10.1	12.4	3.7	40.3	2.9	28.7	27.1	150.6	190.8
Lithuania	5.9	3.3	9.0	7.7	4.0	40.4	0.1	126.4	156.8	50.5	66.2
Nepal	12.9	17.2	7.3	9.6	20.9	40.6	1.4	42.7	129.0	51.9	175.0
Palau	4.5	9.5	3.1	6.4	7.9	41.0	47.6	158.3	153.9	0.2	40.0
Guatemala	16.2	6.6	11.5	13.8	5.8	41.8	146.4	84.9	2.3	44.2	122.3
Unitedstat	5.8	4.1	10.3	10.9	5.4	42.3	24.9	104.9	96.9	134.6	38.6
Haiti	4.6	11.9	8.7	4.7	11.5	42.5	107.2	104.6	1.4	103.7	83.0
Kenya	13.0	5.4	8.8	9.5	4.2	42.7	188.5	61.8	3.8	13.6	132.3
Ethiopia	8.3	3.0	8.0	8.0	3.6	42.9	62.7	145.5	48.6	48.0	95.2
Bhutan	16.5	23.7	9.5	9.6	24.1	43.1	0.1	96.6	100.6	96.8	105.9
Seychelles	3.5	2.3	4.9	5.9	2.2	43.1	1.8	82.1	51.1	169.6	95.4
Wallisandf	4.8	2.6	5.1	4.1	1.4	43.2	64.9	41.6	88.3	9.0	196.2
Morocco	5.2	3.2	8.2	8.2	3.4	43.5	3.0	96.3	106.3	109.4	85.0
Sweden	4.3	4.1	9.9	8.8	4.6	43.8	52.7	64.3	164.9	77.5	40.5
Côted'ivoi	6.6	4.2	9.7	10.7	3.9	43.9	1.7	83.2	74.2	140.3	100.7
Bermuda	3.4	3.9	5.5	7.4	2.3	44.3	32.7	9.8	24.9	215.5	117.0
Anguilla	11.4	5.2	12.0	9.3	3.8	44.4	67.8	72.7	98.6	7.5	153.4
Singapore	5.0	3.9	10.4	10.7	5.6	44.9	42.2	102.7	104.9	126.6	23.6
Madagascar	4.1	3.0	7.2	6.8	2.6	45.4	8.9	64.3	130.6	93.9	102.2
Austria	5.0	3.4	10.2	9.4	5.0	45.6	29.5	110.2	141.2	89.7	29.4
Turksandca	5.3	2.4	5.4	6.6	2.1	45.6	21.0	95.3	29.1	124.8	129.8
Virginisla	4.1	2.9	7.8	8.1	3.6	46.6	24.5	97.5	104.5	128.2	45.2
Belize	22.9	24.3	8.8	7.8	20.1	47.0	59.5	91.1	102.7	128.8	17.8
Cyprus	5.8	2.8	8.4	8.3	3.1	47.8	0.1	111.5	103.1	92.9	92.3
Guyana	27.6	26.9	8.7	9.2	23.4	49.5	79.7	67.3	122.5	110.7	19.8

	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted
Tunisia	5.6	2.8	8.1	8.2	2.6	49.7	0.5	95.9	91.6	101.3	110.7
Gambia	10.3	3.7	10.0	9.2	2.8	50.7	72.0	91.4	60.5	29.3	146.8
Nauru	3.0	2.9	5.0	7.5	2.4	51.0	30.3	35.0	15.9	249.1	69.7
Cookisland	2.7	1.9	4.7	7.0	3.2	51.1	35.4	102.0	16.9	234.4	11.3
Kyrgyzstan	12.4	6.1	10.9	11.1	2.0	51.2	81.2	29.9	30.3	35.0	223.7
Colombia	8.3	3.6	10.0	11.8	3.3	51.3	5.8	97.6	46.7	131.9	117.9
Samoa	2.3	9.0	3.4	6.0	8.9	51.4	139.6	100.0	66.2	0.1	94.2
Zambia	5.0	4.1	10.1	8.9	2.7	51.5	13.8	43.4	153.4	74.6	114.8
Croatia	5.6	2.8	8.9	9.4	3.1	52.0	1.3	104.6	89.6	121.3	83.1
Namibia	7.2	4.4	11.2	16.2	6.1	52.2	14.2	95.7	21.0	230.5	38.6
Malaysia	3.9	3.4	10.1	10.3	4.7	52.8	55.6	81.8	113.0	122.5	27.1
Fiji	24.0	38.2	8.8	13.1	24.3	52.9	4.0	207.9	127.1	55.6	5.3
Chile	5.3	4.1	10.9	11.6	3.9	52.9	23.3	65.7	97.9	137.6	75.5
Andorra	2.6	1.9	5.4	4.9	1.7	52.9	16.8	64.3	144.7	87.9	86.3
Eritrea	4.1	1.4	3.5	5.4	1.5	53.4	27.2	107.6	3.7	167.5	94.1
Marshallis	3.9	9.8	4.3	4.3	11.6	54.0	60.9	69.0	47.4	47.1	175.6
Cameroon	3.1	3.0	8.2	9.3	3.8	55.1	64.3	65.3	83.2	156.5	30.6
Suriname	4.0	1.9	6.8	6.5	1.9	56.2	1.1	94.6	115.1	95.1	94.0
Tonga	7.3	5.3	14.0	7.9	2.7	56.6	0.1	26.8	243.8	1.3	128.0
Paraguay	16.7	3.9	11.4	13.7	4.4	57.0	137.9	115.9	6.0	41.9	98.2
Mauritania	4.2	3.0	7.6	8.8	1.9	57.8	9.1	49.3	69.7	155.6	116.2
Laopeople'	12.4	2.9	13.1	9.9	3.5	58.1	70.1	125.0	94.5	9.7	100.6
Mozambique	5.4	2.7	8.5	8.3	1.7	58.5	0.1	68.9	104.9	89.4	136.7
Romania	5.1	2.6	9.6	8.7	2.4	59.3	3.4	84.5	138.3	80.1	93.7
Georgia	7.2	19.5	8.7	10.0	27.5	59.6	72.1	31.8	46.0	27.8	222.3
Switzerlan	3.1	2.9	9.6	9.1	3.5	60.0	55.9	64.7	135.6	103.9	39.9
Ireland	3.5	2.6	9.4	8.7	3.2	60.1	35.4	78.1	142.8	95.6	48.2
Oman	4.5	2.7	9.2	9.0	2.2	61.1	9.6	68.5	119.7	105.5	96.8
Uganda	7.1	2.4	9.4	9.1	1.8	61.5	10.2	96.0	88.2	74.7	130.8
Philippine	2.9	2.5	9.9	10.0	4.7	61.8	70.4	89.3	112.0	116.0	12.4
Iceland	2.4	1.7	5.8	6.0	1.7	62.7	27.9	69.1	109.7	126.9	66.5
Saotomeand	4.0	1.2	4.4	5.8	1.0	63.3	12.2	98.9	29.3	141.7	118.0
Unitedarab	3.7	2.8	9.2	9.7	2.5	63.8	28.8	59.7	104.3	132.7	74.6
Slovenia	4.8	2.1	8.5	8.6	1.8	64.0	1.0	87.3	103.7	105.8	102.2
Tajikistan	7.3	2.5	9.2	11.9	2.2	64.0	2.4	94.4	38.1	155.6	109.6

	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Estonia	3.5	1.9	8.2	7.0	2.1	64.1	13.2	82.0	161.5	71.5	71.9
Swaziland	20.2	4.9	14.0	12.8	2.8	65.0	170.8	71.5	18.6	6.6	132.4
Belarus	10.2	2.2	9.5	9.6	1.6	65.4	68.6	104.7	44.7	47.2	134.8
Peru	4.2	2.8	10.0	10.4	2.5	65.6	19.7	66.4	106.5	126.6	80.7
Yemen	3.3	2.0	7.4	8.8	2.3	65.8	22.4	75.4	71.3	167.5	63.5
Latvia	3.3	1.7	7.9	6.8	1.9	65.9	11.9	85.8	156.4	74.7	71.3
Armenia	5.2	2.8	9.7	11.9	2.4	66.0	8.0	71.1	62.2	167.2	91.5
Russianfed	3.6	2.2	9.6	9.8	2.9	66.5	29.6	82.7	113.8	122.3	51.7
Guinea-bis	15.0	16.0	8.4	6.9	0.7	66.8	80.3	109.3	2.6	15.6	192.2
Rwanda	4.6	1.3	8.2	6.6	1.7	67.2	0.2	111.7	153.0	49.4	85.7
Bolivia	5.7	1.6	9.9	10.7	2.6	67.3	0.9	118.6	84.0	124.5	71.9
Poland	3.8	2.1	8.4	8.4	1.5	69.1	9.9	67.7	113.6	111.7	97.1
Kiribati	4.5	13.2	3.0	4.8	15.3	69.1	41.4	79.8	85.1	34.7	159.1
Saintvince	9.0	7.2	10.6	25.0	5.0	69.6	9.0	27.9	0.9	297.5	64.8
Sierraleon	2.1	0.9	6.0	5.4	1.9	69.7	26.5	106.3	142.2	89.7	35.3
Capeverde	3.3	1.7	6.7	7.7	1.3	69.9	8.2	70.4	76.0	150.6	94.7
Gibraltar	2.5	1.8	9.0	6.2	2.5	70.2	38.5	70.6	220.6	33.7	36.6
Niger	5.3	7.3	8.2	7.9	23.4	70.5	48.5	18.3	9.3	11.5	312.5
Hungary	3.2	2.0	9.1	8.7	2.3	70.5	27.2	74.7	129.6	106.7	61.8
Papuanewgu	1.1	2.1	6.0	7.0	2.2	71.2	95.6	37.0	76.6	160.0	30.8
Aruba	4.1	1.9	9.2	9.9	1.9	72.0	10.9	81.7	93.3	134.5	79.6
Uzbekistan	6.8	1.5	8.8	11.2	1.6	72.4	3.8	105.7	42.6	144.1	103.8
Botswana	2.3	1.8	11.9	12.2	6.1	72.7	81.9	101.2	101.7	112.7	2.5
Trinidadan	4.7	2.2	9.7	10.5	1.5	73.3	6.1	71.3	89.1	132.6	101.0
Newcaledon	1.4	1.3	4.9	5.9	1.6	73.7	56.7	58.4	73.0	170.6	41.3
Slovakia	2.9	2.0	8.5	7.2	1.3	73.7	20.3	52.7	161.9	73.9	91.3
Turkmenist	5.1	2.8	9.5	11.9	1.2	73.8	5.1	53.9	57.2	166.1	117.6
Saudiarabi	1.8	3.4	8.6	8.9	1.6	74.4	73.6	15.8	109.2	121.7	79.7
Ghana	3.0	2.0	8.9	9.8	2.2	74.5	33.4	66.3	95.1	143.9	61.3
Iran	3.7	2.8	10.4	12.8	2.4	74.9	31.1	55.6	68.3	174.0	71.0
Albania	5.0	1.4	8.1	10.3	1.5	75.1	0.4	95.3	52.4	161.2	90.7
Guinea	2.3	2.0	10.1	7.8	2.7	75.2	51.6	63.2	190.6	56.4	38.3
Bruneidaru	1.7	2.0	8.1	6.0	1.6	77.2	53.0	40.6	199.0	50.4	57.0
Nigeria	2.5	1.7	8.1	8.2	1.6	77.2	30.3	65.8	115.5	121.7	66.7
Czechrepub	3.0	1.8	8.9	8.0	1.3	78.0	19.9	59.7	145.8	88.3	86.3



	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	Trade weighted	Un weighted	mtri weighted
Israel	2.1	1.7	8.5	8.1	2.0	78.0	47.2	61.2	132.3	107.7	51.6
Centralafr	0.7	0.6	6.3	6.2	3.6	79.7	98.5	104.7	103.2	93.5	0.1
Malta	1.9	1.0	6.3	6.3	1.4	79.7	32.4	76.9	118.6	118.6	53.6
Canada	4.1	1.1	10.2	10.1	1.9	80.3	9.5	97.9	116.1	108.7	67.8
Kuwait	1.4	1.9	7.6	8.2	1.7	82.3	63.6	44.1	103.1	136.9	52.4
Congo	2.0	2.3	6.2	11.2	2.4	82.3	52.1	40.0	12.9	257.8	37.2
Micronesia	9.3	31.8	4.0	5.6	27.1	83.2	23.6	157.6	79.3	59.6	79.9
Bahamas	2.1	0.9	5.8	6.0	0.8	83.5	15.3	71.9	106.5	124.1	82.2
Qatar	1.5	1.5	7.8	6.8	1.6	83.6	54.6	53.5	152.7	88.9	50.2
Bosniaandh	4.6	0.9	8.8	8.7	0.5	85.3	0.1	90.0	103.2	98.9	107.8
Syrianarab	3.6	1.4	8.7	11.5	1.4	85.9	13.5	75.3	53.0	185.3	73.0
Azerbaijan	3.5	1.0	8.9	9.4	0.9	87.8	8.9	81.6	99.6	125.8	84.1
Easttimor	3.4	0.9	5.1	9.2	0.9	88.3	1.9	75.7	12.0	234.7	75.7
Caymanisla	1.8	2.1	8.3	7.7	0.3	91.4	37.3	27.1	134.6	97.6	103.4
Chad	2.0	0.5	5.2	5.8	0.5	91.6	10.1	82.3	85.9	142.0	79.6
Venezuela	2.6	1.1	9.1	9.0	0.9	92.2	22.2	69.0	119.8	114.5	74.4
Falklandis	2.4	0.2	4.6	6.1	0.3	94.2	1.3	94.0	51.4	167.4	85.8
Burundi	2.9	1.0	11.3	6.7	1.2	94.8	14.6	69.9	233.4	21.8	60.2
Norway	1.4	0.9	8.6	7.4	1.1	98.5	42.3	62.5	155.3	86.1	53.7
Mexico	2.5	0.8	9.8	9.7	0.7	99.1	23.3	69.6	118.1	116.7	72.2
Gabon	1.4	0.6	7.9	6.1	0.6	102.7	31.7	63.0	178.1	65.4	61.8
Comoros	1.0	0.5	4.0	4.6	0.1	103.8	26.1	55.9	87.1	150.0	80.9
Frenchpoly	0.8	0.2	5.2	4.7	0.5	106.8	37.5	69.7	142.8	96.6	53.4
Liberia	1.1	0.8	9.4	7.5	0.8	106.8	44.6	57.1	172.2	71.8	54.2
Algeria	1.1	0.3	6.2	6.0	0.4	107.6	30.6	66.2	125.6	111.8	65.8
Libyanarab	1.1	0.5	7.7	5.6	0.5	108.4	35.0	59.2	188.8	57.5	59.5
St.pierrea	2.6	0.9	11.7	5.4	0.5	109.3	12.4	52.9	264.6	6.3	63.8
Angola	0.9	0.3	6.2	5.5	0.3	110.5	34.8	63.9	146.5	93.0	61.8
Kazakstan	4.3	35.1	9.1	9.0	1.9	112.2	32.4	302.8	4.2	4.7	55.8
Grenada	3.5	0.7	7.6	16.3	0.8	112.8	12.5	59.9	8.1	260.3	59.4
Equatorial	1.2	0.1	5.4	5.0	0.1	113.0	20.4	72.6	133.5	100.6	72.9
Antiguaand	1.1	0.7	9.1	12.9	0.7	117.0	43.1	54.6	52.8	196.1	53.4
Iraq	1.0	0.3	9.0	10.2	0.3	119.7	39.7	60.0	92.7	147.8	59.8
Congo (demo)	0.3	0.1	8.1	7.3	0.2	128.3	49.5	57.6	142.1	98.6	52.2

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Average	6.7	5.7	8.6	9.2	5.5	# outliers	18	73	103	107	72
Stand deviation	4.8	5.9	2.1	2.6	5.3						
Coeff of variation	0.3	0.3	0.2	0.2	0.3						

### Annex 3 Average applied duty by HS2 Chapters

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Live animals	15.9	3.0	13.5	11.5	4.3	59.3	120.9	135.1	45.1	10.9	88.0
Meat and edible meat offal	31.3	25.4	32.6	25.9	26.4	11.9	77.5	74.4	162.9	53.8	31.4
Fish and crustaceans, molluscs and other aquatic invertebrates	6.2	5.2	12.4	11.3	5.2	43.1	27.8	66.1	154.7	84.1	67.3
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	35.0	20.8	28.1	28.4	22.0	21.3	202.5	111.4	4.6	7.6	73.8
Products of animal origin, not elsewhere specified or included	4.2	3.1	7.1	6.3	3.2	37.8	9.9	83.0	160.0	70.2	76.9
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	5.5	5.6	15.4	12.0	4.6	55.5	42.8	39.8	199.4	49.3	68.7
Edible vegetables and certain roots and tubers	14.2	10.6	18.7	17.5	11.1	25.3	0.3	108.4	137.7	70.3	83.3
Edible fruit and nuts; peel of citrus fruit or melons	14.0	11.5	19.3	15.9	11.6	22.6	2.1	84.4	218.5	20.3	74.7
Coffee, tea, maté and spices	5.1	3.4	9.6	10.5	3.5	53.1	15.8	79.3	88.2	144.1	72.6
Cereals	30.8	41.0	21.1	22.3	53.8	40.6	4.8	27.5	85.1	70.4	212.2
Products of the milling industry; malt; starches; inulin; wheat gluten	26.2	19.1	21.6	20.2	21.5	12.5	274.8	93.5	0.3	30.8	0.6
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	17.0	25.9	9.2	7.3	24.6	50.8	0.1	112.5	78.5	124.7	84.2
Lac; gums, resins and other vegetable saps and extracts	3.7	3.8	5.6	5.3	3.8	21.1	61.9	49.3	150.4	90.8	47.7
Vegetable plaiting materials; vegetable products not elsewhere specified or included	5.7	5.2	6.5	5.7	6.4	9.4	15.3	167.7	121.3	11.2	84.5
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	18.0	17.5	14.2	13.6	14.8	12.9	137.6	91.7	51.5	103.5	15.7

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	13.3	10.2	17.5	18.8	8.8	31.9	0.9	63.7	73.8	134.9	126.7
Sugars and sugar confectionery	39.7	28.5	36.2	24.7	25.8	21.4	173.9	14.6	61.9	88.3	61.5
Cocoa and cocoa preparations	9.4	8.4	13.3	13.7	7.0	29.1	10.2	43.5	98.7	122.2	125.5
Preparations of cereals, flour, starch or milk; pastry-cooks' products	12.5	10.2	16.9	17.2	7.6	32.4	0.6	41.1	91.9	105.7	160.8
Preparations of vegetables, fruit, nuts or other parts of plants	14.1	11.2	19.5	19.0	10.7	28.0	3.4	79.3	120.8	96.0	100.5
Miscellaneous edible preparations	15.5	10.7	16.0	14.8	10.4	20.0	53.8	103.9	88.3	23.8	130.3
Beverages, spirits and vinegar	13.9	11.4	47.0	75.1	12.5	88.6	40.6	52.8	27.9	231.5	47.2
Residues and waste from the food industries; prepared animal fodder	7.7	7.0	8.3	10.9	7.7	18.0	16.5	78.7	0.0	289.1	15.7
Tobacco and manufactured tobacco substitutes	27.5	26.7	48.7	48.3	21.1	37.9	28.1	35.3	118.6	112.7	105.4
Salt; sulphur; earths and stone; plastering materials, lime and cement	3.1	2.6	6.5	5.3	2.0	49.3	16.1	48.2	188.5	50.1	97.1
Ores, slag and ash	1.0	0.7	3.2	3.3	0.7	76.4	32.9	64.5	108.5	129.6	64.6
Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	1.6	2.2	6.9	5.3	2.5	61.8	84.1	42.2	196.9	48.5	28.4
Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes	3.8	3.3	5.1	5.0	3.8	18.9	25.0	120.7	117.6	108.7	28.0
Organic chemicals	3.7	3.6	4.5	4.8	3.6	13.8	35.6	69.4	74.6	167.4	53.0
Pharmaceutical products	2.0	1.5	3.5	3.3	1.6	40.0	13.7	91.8	136.7	93.0	64.9
Fertilisers	3.7	3.1	3.3	3.2	3.2	6.4	279.8	87.3	0.3	22.3	10.4
Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks	6.0	4.7	8.3	7.5	4.8	25.3	2.9	96.1	161.3	59.9	79.9

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Essential oils and resinoids; perfumery, cosmetic or toilet preparations	7.1	5.4	13.6	12.5	5.4	44.9	18.1	73.1	147.5	86.6	74.7
Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, 'dental waxes' and dental preparations with a basis	6.6	5.4	12.7	11.7	6.2	40.1	31.4	83.5	148.8	88.9	47.3
Albuminoidal substances; modified starches; glues; enzymes	7.2	6.1	8.6	9.0	6.7	16.3	6.1	127.0	79.5	138.8	48.6
Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	8.1	5.7	16.3	20.3	5.6	59.8	21.8	67.0	57.4	184.7	69.1
Photographic or cinematographic goods	5.7	5.0	7.9	8.4	5.1	25.2	18.2	81.9	86.6	147.3	66.0
Miscellaneous chemical products	4.6	3.6	5.7	6.1	3.5	25.5	1.1	81.1	68.8	144.1	104.9
Plastics and articles thereof	6.7	5.1	8.8	9.0	5.3	26.6	2.4	103.4	93.3	120.9	80.0
Rubber and articles thereof	6.2	5.4	11.0	8.8	5.7	32.1	26.0	70.9	219.0	33.8	50.3
Raw hides and skins (other than furskins) and leather	4.3	2.9	5.9	5.2	3.2	29.9	0.0	115.3	152.0	54.0	78.7
Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	7.1	6.7	14.0	13.4	6.9	38.8	45.6	61.3	134.8	105.2	53.2
Furskins and artificial fur; manufactures thereof	5.6	4.6	12.2	10.5	4.0	50.0	21.9	58.1	167.7	70.5	81.9
Wood and articles of wood; wood charcoal	2.6	1.9	8.0	8.4	1.8	74.1	34.9	59.6	105.6	133.0	66.9
Cork and articles of cork	2.2	2.1	6.5	6.0	2.2	59.2	49.5	56.3	143.6	97.3	53.3
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	2.9	2.8	10.2	10.2	3.1	68.2	56.2	57.1	118.6	121.2	46.9
Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	1.0	0.8	3.6	3.7	0.7	79.8	38.5	57.1	111.8	127.2	65.4
Paper and paperboard; articles of paper pulp, of paper or of paperboard	4.3	3.5	8.2	8.9	3.7	46.3	30.6	70.0	89.1	149.8	60.6

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans	1.5	1.4	4.0	5.5	1.5	67.9	43.7	57.3	42.6	209.8	46.6
Silk	8.4	9.9	8.8	7.5	8.8	10.0	12.2	188.7	3.9	192.5	2.7
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	7.9	5.9	7.1	7.1	6.6	11.0	176.3	189.4	7.8	5.3	21.2
Cotton	8.7	6.9	7.9	9.0	8.0	10.5	52.8	212.7	7.5	125.6	1.3
Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	6.1	5.5	7.6	5.9	6.0	12.6	4.4	82.7	294.3	13.1	5.5
Man-made filaments	11.1	9.7	9.2	8.9	9.7	8.7	264.8	0.1	34.8	100.3	0.0
Man-made staple fibres	10.6	8.7	8.5	9.0	9.5	9.1	253.2	48.9	81.9	7.7	8.4
Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof	7.2	5.5	9.4	9.8	6.3	24.4	4.6	126.4	87.3	128.5	53.2
Carpets and other textile floor coverings	7.8	5.9	17.1	16.9	5.5	55.3	23.0	66.3	120.7	114.0	76.0
Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	12.7	9.4	11.9	11.7	9.5	13.4	122.1	118.2	33.9	18.9	107.0
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use	8.6	6.7	9.4	9.2	6.8	16.1	9.7	125.4	96.2	68.6	100.1
Knitted or crocheted fabrics	12.8	9.4	11.4	11.5	9.8	12.7	170.9	133.1	8.1	16.5	71.4
Articles of apparel and clothing accessories, knitted or crocheted	12.3	12.0	24.5	22.9	13.5	35.9	59.9	67.6	149.1	90.4	33.1
Articles of apparel and clothing accessories, not knitted or crocheted	10.8	9.2	20.1	19.6	11.5	36.6	44.0	93.3	127.4	106.9	28.4
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	10.3	7.1	19.7	20.6	7.2	51.3	16.0	77.8	100.4	131.0	74.7
Footwear, gaiters and the like; parts of such articles	11.8	10.3	15.6	15.2	10.5	20.2	12.6	85.5	128.6	100.2	73.2
Headgear and parts thereof	4.9	5.1	13.9	12.5	5.5	53.0	60.5	54.0	155.1	86.5	43.9

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof	6.2	5.1	14.4	12.4	6.2	47.9	39.0	79.5	171.0	70.6	39.9
Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair	5.3	5.4	14.2	13.4	6.0	51.1	61.1	57.8	138.0	101.8	41.3
Articles of stone, plaster, cement, asbestos, mica or similar materials	4.3	3.7	10.3	10.6	3.6	55.8	36.2	60.6	108.9	129.8	64.4
Ceramic products	8.1	6.4	12.9	11.4	7.3	30.4	17.1	103.3	174.5	60.4	44.6
Glass and glassware	5.9	5.0	10.2	9.6	5.3	34.4	27.5	77.9	142.2	94.8	57.5
Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coins	3.5	5.1	7.9	8.3	4.2	37.5	108.3	11.3	94.9	130.7	54.9
Iron and steel	5.0	4.3	6.2	6.2	4.0	20.6	2.5	60.7	102.0	109.5	125.4
Articles of iron or steel	5.4	4.4	9.4	9.2	4.0	40.5	16.9	61.0	125.1	105.8	91.3
Copper and articles thereof	3.0	2.5	5.1	6.4	2.4	45.9	24.2	57.4	46.2	200.5	71.7
Nickel and articles thereof	1.3	1.3	3.8	4.9	1.5	65.2	60.3	54.5	58.8	187.7	38.7
Aluminium and articles thereof	4.5	3.0	6.3	8.0	3.3	42.1	7.0	91.1	35.0	203.2	63.6
Lead and articles thereof	3.4	3.4	4.6	5.2	3.5	20.3	59.9	58.1	52.1	195.8	34.2
Zinc and articles thereof	3.4	2.5	4.7	5.2	2.5	33.3	5.7	84.4	68.9	156.0	85.1
Tin and articles thereof	1.8	1.5	4.3	5.2	1.9	57.6	48.3	69.6	68.4	175.1	38.6
Other base metals; cermets; articles thereof	3.0	2.7	4.5	4.7	2.9	26.7	34.8	85.3	101.4	135.4	43.2
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	4.7	4.1	7.3	7.9	4.2	32.5	28.6	67.7	85.8	152.9	64.9
Miscellaneous articles of base metal	5.2	3.8	10.3	10.5	3.9	50.4	20.0	74.4	110.1	123.3	72.2
Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	2.6	2.3	4.4	5.1	3.0	34.1	50.8	95.5	55.9	181.4	16.4

	Reference Group	World trade	trade weighted	un weighted	mtri weighted	Coef. Variation	Reference Group	World trade	trade weighted	un weighted	mtri weighted
Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	3.0	2.3	6.5	7.9	2.9	55.3	35.6	76.7	59.9	184.4	43.5
Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electromechanical) traffic signalling equipment of all kinds	3.2	2.0	4.6	4.6	2.2	37.8	1.2	112.1	107.4	102.1	77.3
Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	9.2	5.2	18.5	12.4	4.9	56.1	2.2	73.0	224.8	17.1	82.9
Aircraft, spacecraft, and parts thereof	1.2	1.2	2.9	3.5	1.0	58.7	38.2	46.2	67.4	176.0	72.2
Ships, boats and floating structures	4.2	5.3	5.0	6.3	2.6	29.7	12.4	18.9	5.6	138.9	224.2
Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	2.5	2.2	4.7	5.2	2.4	42.2	41.2	68.9	84.3	156.8	48.7
Clocks and watches and parts thereof	3.5	2.5	9.8	10.0	0.0	87.6	13.2	35.6	105.6	115.3	130.3
Musical instruments; parts and accessories of such articles	3.8	3.5	8.3	7.9	3.5	45.9	40.2	61.8	136.6	103.1	58.3
Arms and ammunition; parts and accessories thereof	6.6	5.2	14.5	14.9	7.6	47.1	46.9	100.5	106.3	125.0	21.3
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated name-plates and the like; prefabricated buildings	2.4	1.4	13.6	13.5	1.2	101.7	38.6	58.6	120.8	118.1	63.9
Average	8.2	6.9	11.7	11.6	7.0		13	37	62	66	22
Standard Deviation	0.07	0.07	0.08	0.09	0.07						
Coefficient of variation	0.91	0.98	0.71	0.82	1.05						



## **Annex 4: Sectoral and regional disaggregation**