

**MARKET ACCESS MAPS:
A BILATERAL AND
DISAGGREGATED MEASURE OF
MARKET ACCESS**

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INTRODUCTION

Do significant barriers to trade still exist? What are the protected sectors and countries? What are the instruments of protection? It is difficult to give precise answers to these questions. Regional groups and trade preferences have been multiplied in a general context of multilateral tariff dismantling. Thus policies of industrialised countries appear to be often discriminating, e.g. MFN (Most Favoured Nation) system, Free Trade Areas, Customs Unions, as well as Generalised Systems of Preferences (GSP) for developing countries. While tariffs are keeping on decreasing for forty years, other trade barriers, as tariffs quotas, technical and sanitary norms are increasingly enforced. Lastly, protectionism is often opaque : lack of information and/or adoption of arbitrary and not transparent procedures such as anti-dumping measures.

A full understanding of the different mechanisms of market access is a fundamental yet extremely difficult task.

(i) At first, it is essential to take into account all the instruments that create artificial obstacles to international trade : e.g. customs duties, quotas, prohibitions, norms...

(ii) These heterogeneous instruments then need to be homogenised: 'ad valorem' duties, specific duties... Besides quotas and bans in the textile and clothing sector, tariff quotas were introduced in agriculture in 1995. These are combination of quantitative restrictions and ad valorem duties. Finally, the protectionist aspect of some interventions is uncertain, such as those related to food security. These problems are partly solved by the calculation of 'ad valorem' equivalents.

(iii) Then the issue of aggregation of these measures remains. Economic literature in this regard (Balassa, 1965; Laird, 1996; Bouët, 2000) points out this difficult issue. Some methods fail to take into account the importance of products in international trade, while others have endogeneity bias. It is nevertheless possible to establish an aggregation method that minimises these biases and at the same time acknowledges the importance of products in international trade.

(iv) The integration of technical, sanitary and phyto-sanitary norms also need to be addressed. According to 'Beghin et Bureau', 2001, it is impossible to estimate ad valorem equivalents for these barriers. Hence alternatives options need to be considered.

While dealing with the problems cited above, this study aims to find a satisfactory solution to two fundamental elements:

- Trade regimes of countries engaged in international trade are usually very ***discriminatory***. Amongst the different systems of customs duties, we have the most common one, the MFN reference, which applies to products originating in WTO- members, others are duties with respect to the Generalised System of Preferences, other are determined by regional trade agreements, other are subject to specific measures such as the anti-dumping measures which are bilateral duties by nature.

European Union countries, for example, levy a MFN tariff (for non European WTO-members), a GSP tariff (Generalised System of Preferences), an ACP tariff (Africa – Caribbean - Pacific) until the Cotonou 2001 agreements, a LDC tariff (Least Developed Countries), recently lowered to 0 per cent, a tariff for countries fighting against drug traffic, a tariff for Euro-Mediterranean agreements; on the other hand, they impose anti-dumping measures on a bilateral basis.

Consequently, it is impossible to estimate a level of protection for a particular product from a particular country or geographic zone vis-à-vis the rest of the world. For each importing zone, supplying countries have often specific trade barriers. If the multiplicity of instruments of protection is considered, the problem is not two-dimensional (products*importing country), as it is referred to in several databases - see for example, OECD 1997 or Messerlin 2001, or even Francois, McDonald and Nordström, 1995-. **It is therefore a four-dimensional issue: products * importing countries *exporting countries* instruments of protection.**

- It is also important to record the data at as *disaggregated* a level as possible (HS 10, HS 8 or HS 6). Take the example of a World Trade Computable General Equilibrium Model, with ten countries and ten sectors: a liberalisation shock should be applied to the detailed information source and not to the final aggregate protection data of the ten zones vis-à-vis the nine suppliers of the ten products. Liberalisation often concerns MFN tariffs and not other instruments (anti-dumping, prohibitions...) or other trade regimes (GSP, ACP...). Another reason to work with disaggregated data is that the liberalisation shock may be stronger when it applies to tariff peaks, since these peaks have disappeared in the final aggregate protection matrix. Thus a simulated liberalisation shock on the final tariff matrix is a significantly biased method.

MAC Maps (for Market ACcess Maps) has thus been constructed to integrate the major instruments of protection at the most detailed level: HS 10 and with all discriminatory regimes. It results from working on TRAINS source files, from combining these files with data from COMTRADE and AMAD databases, and from integrating notifications obtained from member countries of the WTO regarding their anti-dumping regimes. MAC Maps measures the market access into 137 countries for 223 exporting countries at the HS 10 (or HS8 or HS6) level for the year 1999. It can be applied to any geographic or sectoral classification using a procedure that minimises the endogeneity bias while accounting for the importance of products in international trade ⁽⁵⁾.

I METHODOLOGICAL ISSUES

The two underlying elements in the construction of the MAC Maps are to record market access data at a bilateral level and for a very disaggregated nomenclature.

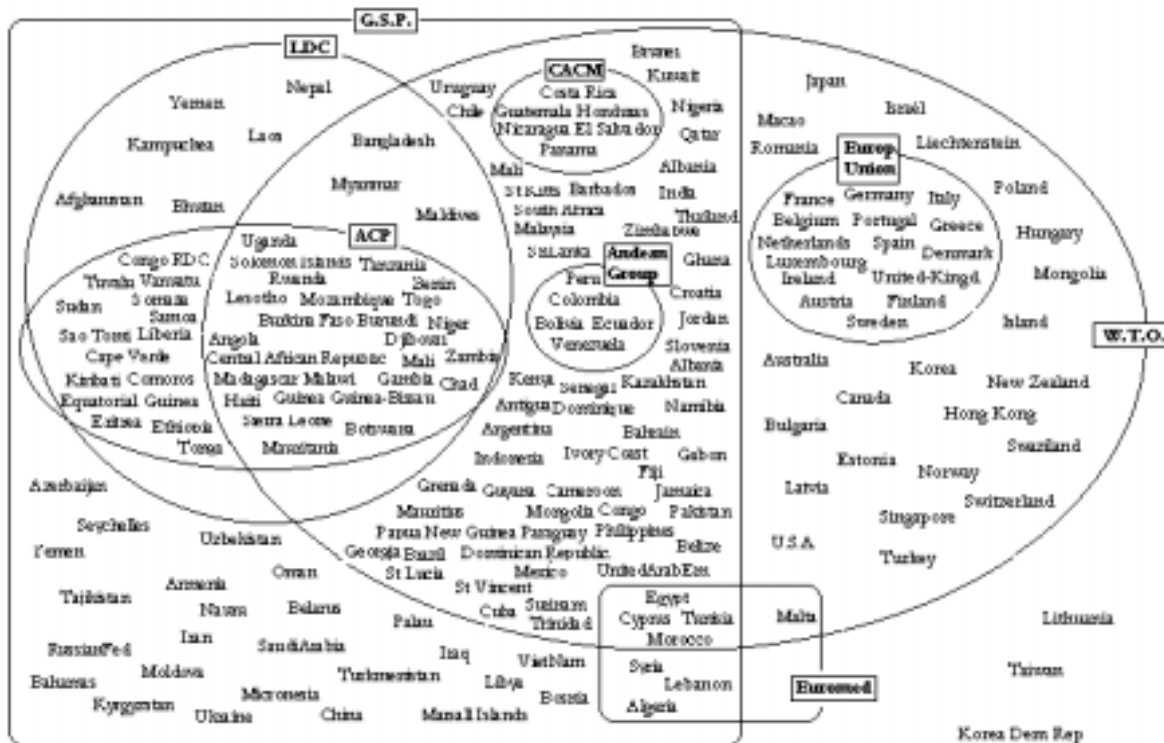
A –DISCRIMINATION AND DISAGGREGATED INFORMATION

1 Bilateral data on protection

We measure the protection applied by each country against every supplier, not only with respect to WTO membership, but also with respect to all other discriminatory trade regimes, regional agreements notably.

⁵ The construction of MAC MAPS is the result of a cooperating agreement between the International Trade Centre (ITC – Geneva) and the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII, Paris). CATT (University of Pau) has been actively taking part in this work.

Figure 1: Discriminatory regimes of the EU – 1999



Source: Authors' construction

Note: It is still a simplified version of the reality

Is it possible to characterise a country trade policy vis-à-vis all its suppliers by a single tariff? Take the case of the European Union: it sets different custom regimes; figure 1 attempts to highlight the complexity of its trade policy by drawing a simplified map of EU discriminatory regimes. The EU is a member of the WTO and applies an MFN tariff to all other member states. It has also negotiated the GSP (Generalised System of Preferences) agreement that gives a lower tariff rate than the MFN status to member countries of the WTO (Albania, India, Zimbabwe) and non-members such as China, Iran or Iraq.

But on the other hand, the European Union has signed agreements with LDCs (Least Developed Countries in figure 1) and has granted them an even lower tariff than GSP. Some of them are members of the WTO (Myanmar, Tanzania); others are not (Nepal, Vanuatu). Amongst these LDCs, some are benefiting until the end of 2001 from the lowest tariff rates, being countries having already signed the ACP agreement. The Cotonou agreements in 2001 suspended the ACP scheme and replaced it with bilateral agreements. In the case of ACP countries, some are WTO members (Tanzania, Sierra Leone) and others are not (Tuvalu, Kiribati).

Then European Union has for many years negotiated asymmetric agreements with some Mediterranean countries. These agreements are going to be progressively transformed into free trade areas agreements. Among these Mediterranean countries, some are WTO members and have also signed the GSP agreement (Egypt, Tunisia...), others are not WTO members, but are GSP countries (Syria, Algeria...), and others are WTO members but not GSP country (Malt).

Some countries negotiated with the EU a free trade agreement on industry and agriculture because they are fighting against drug traffic (countries from the Andean Pact). For the same reasons, European Union signed the same kind of agreement, but only for agriculture with countries from CACM (Central America Common Market). All are WTO members and also signed the GSP accord.

Some countries such as North Korea are neither members of the WTO, nor have they entered into any agreement with Europe.

This classification of supplier countries is not the same for all products. In fact, a Harmonised System (HS) position may be characterised by a unique tariff for all WTO members, or by a WTO tariff and a GSP tariff, or by five different trade regimes... It is necessary to create as many partitions as of supplier countries (infra). Lastly the list of GSP countries changes from one nation to the other: Poland has signed GSP agreements with 41 countries, New Zealand with 85 countries and Japan with 120 countries...

The European case is not representative of all situations. Amongst 137 countries studied, the vast majority (between 90 et 100 countries) conduct a single trade regime. These are generally the smaller countries. But Europe is not an isolated case either. USA, Japan, Switzerland as well as Romania and other nations have extremely complex trade policy regimes. All the big trading nations have very discriminatory regimes: it represents a large share of world imports. To sum up the argument, it is not consistent to summarise the trade policy of these countries by one single tariff .

2 Disaggregated information

MAC Maps contains a very disaggregated information. For each importing country, MAC Maps records all the groups of countries which enforce the same trade policy and for every trade regimes, the existence or absence of various barriers to trade (ad valorem tax, special tariffs, quotas...). It therefore acts as a four-dimensional matrix (products*importing countries*exporting countries*instruments of protection). For the time being, there is no time-based dimension, but 2000 data will be set up in July 2002.

Table 1 illustrates the tariff structure of imports of white chocolate (HS10 code: 1704903000) in the European Union. 12 trade regimes are set according to the product origins: Israel (ISR), Algeria (DZA), Tunisia (TUN), Syria (SYR), Morocco (MAR), Jordan (JOR), Egypt (EGY), Poland (POL), Hungary (HUN), ACP countries (ACP group in the partner column), other signatory countries of the GSP (GS3) and finally other members of the WTO (WT5).

Four ad valorem taxes (0, 10.4%, 7.2% et 2% in the column « Tarif ad val ») and five specific tariffs (0, 0.515, 0.36, 0.205 et 0.338 USD thousands per ton of white chocolate in the column « tarif1 ») are imposed depending on the supplier. No prohibition or anti-dumping duty is levied. To estimate the ad valorem equivalent (AVE) of specific tariffs, bilateral trade statistics in value (column « trade value » in USD thousands) and quantity (column « Trade quantity» in tons) have been extracted from the COMTRADE database. They allow for the estimation of a unit value of imports. The column « Global ad valorem equivalent» adds all the AVEs of the various instruments of protection recorded. Here the specific tariff and international trade statistics are defined in the same physical unit (W for ton). On this HS position, discrimination is very strong, with protection rates ranging from 0 % to 30.1 %.

Table 1: Extracted from MAC Maps - European protection of white chocolate (HS10 position 1704903000) in 1999

Reporting country	Tariff value	HS6	HS10	Partner	Prohibition	Antidumping	Specific tariff unit	Specific tariff	Trade flow	Trade value	Trade quantity	Ad valorem Equivalent	Global ad valorem equivalent
EU	0.104	170490	1704903000	WT5	0	0	W	0.515	W	150308	43158	14.79%	25.2%
EU	0.072	170490	1704903000	GS3	0	0	W	0.515	W	25601	7262	14.61%	21.8%
EU		170490	1704903000	ACP	0	0	W	0	W	162	37	0.00%	0.0%
EU	0.02	170490	1704903000	HUN	0	0	W	0.36	W	2686	938	12.57%	14.5%
EU		170490	1704903000	POL	0	0	W	0.205	W	11078	5252	9.72%	9.72%
EU		170490	1704903000	EGY	0	0	W	0.515	W	89	50	28.93%	28.9%
EU		170490	1704903000	JOR	0	0	W	0.515	W	4	1	12.88%	12.9%
EU		170490	1704903000	MAR	0	0	W	0.515	W	81	47	29.88%	29.9%
EU		170490	1704903000	SYR	0	0	W	0.515	W	149	87	30.07%	30.1%
EU		170490	1704903000	TUN	0	0	W	0.515	W	264	97	18.92%	18.9%
EU		170490	1704903000	DZA	0	0	W	0.515	W	35	7	10.30%	10.3%
EU		170490	1704903000	ISR	0	0	W	0.338	W	865	187	7.31%	7.3%

(Source: MAC Maps)

In the definition of tariff structures for white chocolate in the European Union, there is a need to group countries that will benefit from these different regimes: remove GSP countries from the list of WTO members, along with ACP nations and those benefiting from bilateral agreements; remove ACP nations and countries benefiting from bilateral regimes from the list of GSP countries. Just as GSP agreements and bilateral treaties vary from one country to the other, this partition varies from one country to the other and from one HS position to the other.

Table 2: Classification according to discriminatory trade regimes

Trade regimes	Classification of countries
WTO	WTO = {USA, Japan, Australia, Tunisia, Argentina, Albania, Afghanistan, Angola, Benin}
WTO and GSP	WTO = {USA, Japan, Australia} GSP={Tunisia, Argentina, Albania, Afghanistan, Angola, Benin}
WTO and LDC	WTO = {USA, Japan, Australia, Tunisia, Argentina, Albania} LDC = {Afghanistan, Angola, Benin}
WTO, GSP and LDC	WTO={USA, Japan, Australia} GSP={Tunisia, Argentina, Albania} LDC={Afghanistan, Angola, Benin}

To illustrate this point and the underlying difficulties, let us assume that there are ten countries in the world viz: European Union, USA, Japan, Australia, Tunisia, Argentina, Albania, Afghanistan,

Angola and Benin. We study the trade policy of the European Union. For simplicity we further assume that all countries in the group are WTO members, and that the EU only has two discriminatory regimes: GSP towards Tunisia, Argentina, Albania, Afghanistan, Angola, Benin and an LDC policy for Afghanistan, Angola, and Benin. Assuming that there exists only one WTO regime for all HS positions, each HS position can be characterised according to four different clustering as illustrated in table 2.

Hence, if for a HS position there is a WTO and a LDC tax, the three least advanced countries will support the LDC tariff and not the WTO tariff and we therefore remove these three LDCs from the WTO tariff group. If on the contrary, only the WTO tariff exists, all supplier countries would be taxed accordingly.

If the European Union signs a bilateral treaty with a country such as Tunisia, the number of possibilities exceeds 8 in this illustrative example: (WTO), (WTO; Tunisia), (WTO; GSP), (WTO ; GSP ; Tunisia)

Starting from these data, an aggregation method will permit the setting up of an information base in accordance with the four options:

- (i) Integration or no integration of all the trade barriers
- (ii) Sectoral aggregation
- (iii) Geographical aggregation of exporting countries
- (iv) Geographical aggregation of importing countries

The database is maintained in its detailed version, i.e. 10000 products (HS10)*137 importing countries* 220 supplier countries*5 instruments of protection. Why is it essential to maintain the data in such detail?

The key feature here is to apply shocks at the source of the information and not at the final level. The price to pay is to work with a mega-database (about 33 Gigabytes).

To illustrate the necessity of this approach let's take an example. We assume that according to a World Trade Computable General Equilibrium Model, the world is divided in 5 zones and 10 products. We aim at simulating a liberalisation shock (MFN tariffs higher than 15 per cent are reduced by 50 per cent – tariffs lower than 15 per cent, specific tariffs, inside and outside quotas tariff rates are reduced by 25 per cent, quotas having a growth of 25 per cent – other instruments are not modified).

Traditionally, the shock is applied to an information level that is not greatly disaggregated; in the worst case, it is applied to the final protection matrix: 5 importing countries*4 supplier countries*10 products. It results in some considerable bias.

- If the only information about protection is a 5*4*10 matrix, tariff peaks (duties greater than 15%) have disappeared for a major part. Thus it is impossible to simulate the progressive aspect of liberalisation.

- A liberalisation shock may be applied to an aggregated measure of all instruments, but a part of protection instruments are not concerned by liberalisation: anti-dumping measures, prohibitions...

Trade negotiation may also concern MFN duties and not regional or preferential agreements. Liberalisation concerning tariff quotas must be applied at a very detailed level...

Maintaining the data source allows the user to be precise and selective in the application of shocks. A simulation may be the suppression of anti-dumping measures or the conversion of tariff quota into simple ad valorem equal to the Inside Quota Tariff Rate. This simulation is impossible if the database has not recorded all the different instruments used by a country to protect itself.

B MAC MAPS – GENERAL PROPERTIES

1 – Geographical coverage

MAC Maps accesses source files from the COMTRADE database of the UNCTAD and from the TRAINs database; it therefore analyses the trade policy of 137 countries ; it finally establishes the trade policy applied by these 137 countries on 220 suppliers (the list of these 220 countries is presented in Annex 1).

Table 3: Countries whose trade policy regimes are evaluated by MAC Maps

ANTIGUA BARB	ECUADOR	ST.LUCIA	ROMANIA
ALBANIA	ESTONIA	SRI LANKA	RUSSIAN FED
ARGENTINA	EGYPT	LITHUANIA	RWANDA
AUSTRALIA	ETHIOPIA	LATVIA	SAUDI ARABIA
BARBADOS	EUROPE (15)	LIBYA	SOLOMON ISLS
BANGLADESH	GABON	MOROCCO	SEYCHELLES
BURKINA FASO	GRENADA	REP.MOLDOVA	SUDAN
BAHRAIN	GEORGIA	MADAGASCAR	SINGAPORE
BRUNEI DAR.	GHANA	MALI	SLOVENIA
BOLIVIA	EQ.GUINEA	MONTSERRAT	SURINAME
BRAZIL	GUATEMALA	MALTA	EL SALVADOR
BAHAMAS	GUYANA	MAURITIUS	CHAD
BHUTAN	HONG KONG	MALDIVES	THAILAND
BELARUS	HONDURAS	MALAWI	TURKMENISTAN
BELIZE	HUNGARY	MEXICO	TUNISIA
CANADA	INDONESIA	MALAYSIA	TURKEY
CENT.AF.REP	ISRAEL	MOZAMBIQUE	TRINIDAD TBG
CONGO	INDIA	NIGERIA	TAIWAN
SWITZ.LIECHT	IRAN (ISLM.R)	NICARAGUA	UNTD.RP.TANZ
CÔTE D'IVOIRE	ICELAND	NORWAY	UKRAINE
CHILE	JAMAICA	NEPAL	UGANDA
CAMEROON	JORDAN	NEW ZEALAND	USA
CHINA	JAPAN	OMAN	URUGUAY
COLOMBIA	KENYA	PANAMA	S.VINCENT-GR
COSTA RICA	KYRGYZSTAN	PERU	VENEZUELA
CUBA	ST.KITTS NEV	PAPUA N.GUIN	VIET NAM
CZECH REP	KOREA REP.	PHILIPPINES	S.AFR.CUS.UN
DOMINICA	KAZAKSTAN	PAKISTAN	ZAMBIA
DOMINICAN RP	LAO P.DEM.R	POLAND	ZIMBABWE
ALGERIA	LEBANON	PARAGUAY	

The information used for the construction of MAC Maps is : (i) TRAINs source code files ; (ii) COMTRADE database for the estimation of import unit value and for the sectoral and geographic aggregation (ibid); (iii) the AMAD database to evaluate tariff quotas; (iv) national notifications made to the WTO for anti-dumping duties (files G\ADP\N\ on the WTO website) and for the method of administering tariff quotas.

2 – Sectoral coverage

MAC Maps preserves the information at the most disaggregated level possible : HS10, HS8 or HS6. Thus it is an estimation of trade policy on 10,000 products.

3 – Instruments of protection

The database integrates the following instruments of protection: ad valorem duties, specific duties, prohibitions, tariff quotas, anti-dumping duties, sanitary, environmental and technical norms.

MAC Maps does not have information on quotas in the textile and clothing sector. An evaluation of ad valorem equivalents using the price differences method is a difficult task given the number of HS positions and countries involved. Nevertheless, it is clear that to estimate market access into industrialised countries, quotas in textile and clothing sectors need to be taken into account. For this, since we have to measure the protection level for a country from the North block, globally or in these two sectors, we integrate the information obtained from the GTAP5 database (see Annex 3) to add it to the corresponding issue in MAC Maps and then measure market access.

Table 4: Ad Valorem Taxes in the Quad

	Canada	USA	Japan	EU
<i>No of ad valorem duties</i>	7970	8593	7589	10248
<i>Average duty</i>	7.10%	4.87%	6.55%	5.88%
<i>Maximum duty</i>	331.50%	350%	60%	88.90%
<i>Duties > 15% (number)</i>	835	467	870	771
<i>Duty > 15% (freq)</i>	10.47%	5.43%	11.46%	7.52%
<i>Duties > 3*average (number)</i>	111	561	515	416
<i>Duty > 3*average (freq)</i>	1.4%	6.5%	6.8%	4.1%
<i>Duties > 2*average (number)</i>	847	1237	1077	1808
<i>Duty > 2*average (freq)</i>	10.62%	14.39%	14.19%	17.64%

(Source: MAC Maps)

a) Ad valorem tariffs

Ad valorem tariffs are obtained from source files of the TRAINS database of the UNCTAD. Information on these duties is maintained at the most disaggregated level possible: HS10, HS8 or HS6.

Table 4 recapitulates some characteristics of ad valorem customs duties. United States set the lowest average tariff and the lowest part of tariff peaks (international and national definitions). For

European Union, average tariff is low, and north American maximum tariffs are much higher than in Europe; part of European tariffs greater than 15% is low, but the frequency of duties greater than twice the average is the highest one.

b) Specific duties

Specific duties are derived from source files of the TRAINS database. A specific duty has particular properties as compared to an ad valorem duty: impact on domestic produced qualities, since the degree of protection varies with the price of the good, variations in the degree of protection itself when world prices vary... Nevertheless in MAC Maps, an ad valorem equivalent has been calculated for every specific duty, by dividing the tariff by the unit value of bilateral imports.

If it is impossible to calculate a unit value for the countries in question, it is estimated at a group level representative of this country (ibid). This group consists of a set of countries similar to the country studied here, in terms of GDP per capita. We thus avoid any reference to a world unit value that could be very different from the unit value of this importing country.

It has been often argued that countries use specific tariffs for setting high protection in a hidden way. MAC Maps confirms this opinion since all countries 'average tariff (see table 5) is higher (in Ad Valorem Equivalent) than average ad valorem tariff. It is especially true for European Union of which the average tariff is greater than 50%.

Table 5: Specific Duties in the Quad

	Canada	USA	Japan	EU
<i>No. of specific duties</i>	203	1148	418	1059
<i>Average AVE</i>	7.97%	12.75%	7.37%	50.04%
<i>Maximum AVE</i>	346%	310%	171%	326%
<i>Number AVE > 15%</i>	22	170	34	679
<i>Freq AVE > 15%</i>	10.83%	14.80%	8.13%	64.11%
<i>Number AVE > 2* aver.</i>	22	140	34	107
<i>Freq AVE > 2* average</i>	10.83%	12.19%	8.13%	10.10%

(Source: MAC Maps)

c) Prohibitions

How are prohibitions included in the computations? Excluding them tends to under-estimate the protection of an economy (it would be equivalent to a 0% ad valorem import duty). Thus we add a tariff of 200 per cent on the corresponding HS position. Sensitivity tests will complete the integration of this instrument. To recall, the highest level of tariffs in the 4 countries in the agricultural as well as in other sectors is indicated in table 6 along with the number of prohibitions

worldwide. The number of prohibitions is very high in Europe but it is zero in Canada, United States and Japan.

Table 6: Maximum number of prohibitions and ad valorem taxes in the Quadrilateral

	Canada	USA	Japan	EU
<i>No. of prohibitions.</i>	0	0	0	881
<i>Agriculture – maximum tax</i>	331.5%	350%	55%	88.90%
<i>Other sectors – Maximum tax</i>	25%	48%	60%	22%

(Source: MAC Maps)

d) Tariff quotas

The Uruguay Round Agricultural Agreement attempted to normalise the agricultural sector by asking each country to convert all their existing instruments of protection into customs ad valorem duties, before proceeding to lower the tax rate. Faced with resistance from the countries, tariff quotas were negotiated, i.e. the combination of quantitative restrictions and classic taxes. A tariff quota is defined as an annual import volume quota and two taxes. The smallest tariff referred to as the Inside Quota Tariff Rate (IQTR) places a tax on the first set of imports; when the quota reached its limit, it is possible to further import more goods, but these are charged at a higher tax called Outside Quota Tariff Rate (OQTR).

Industrialised countries are the main users of these tariff quotas. Table 7 presents the number of such quotas, average IQTR and OQTR rates, and finally the average utilisation ratio (real imports over quotas) for the four countries.

The quotas are generally not fully-utilized: for the four countries, the utilisation ratio lies between 66 per cent and 85 per cent. IQTR are low for Canada and USA. OQTR are “prohibitive” in the case of Canada and Japan.

Table 7: Number of tariff quotas (1999), average IQTR and OQTR in the Quad

	Canada	USA	Japan	EU
<i>No. of tariff quotas</i>	87	21	20	54
<i>Average IQTR</i>	3.5%	8.7%	17.28%	15.17%
<i>Average OQTR</i>	169.12%	41.83%	234.83%	60.19%
<i>Utilisation ratio</i>	85%	66%	67%	69%

(Source: MAC Maps)

The previous definition of a tariff quota is theoretical. Different methods of administrating quotas exist around the world. There are four principles ⁽⁶⁾:

⁶ See corresponding section on the WTO website located at G/AG/NG/S/8/ or OECD 1999a.

- « levied duties »: products are imported without any quantitative restriction and the duty is always the IQTR .
- « Order of presentation of requests» : until the quota is reached, the first imports are taxed by the IQTR, the others by the OQTR.
- « Licences on request»: after examination, licences are delivered or not, according to the quantities asked at the inside quota.
- « Traditional importers »: Import licences are shared among the previous period suppliers and the tax paid is the IQTR.

It means that a major part of these methods (actually more than 90 per cent of tariff quotas) use the IQTR for all imports, except in the case of the second method. Since we have accessed to all the information stored on the AMAD database, and to information made available on the WTO web site, (notably concerning the management methods), we have calculated an ad valorem equivalent for each tariff quota, either by using the domestic rate in the case of methods 1, 3 and 4 or by using an average weighted by domestic and external taxes: the inside tariff is weighted by the quota, the outside tariff by imports outside the quota. This method suffers from an endogeneity bias, since we use the imports of the country in question as weights. To consider weighting by a group of countries would necessitate the availability of homogenous information on the quantities imported by the countries in each group.

e) Anti-dumping duties

The Marrakech agreement clearly reinforced the proliferation of anti-dumping duties. The WTO has authorised each member nation to adopt a national anti-dumping legislation. The number of applied anti-dumping duties has thus gone beyond 1,121 on 30th June 2000, of which 330 belong to USA and 190 to the EU. Most targeted countries are China, Korea, Indonesia...But what is really new is that developing countries are now using this form of protection in greater measure. Since 30 June 2000 onwards, South Africa has imposed 104 anti-dumping duties, India 90, Mexico 80 (WTO, 2001 Report).

MAC Maps incorporates anti-dumping duties, following national notifications sent to the WTO, in the form of bi-annual notices that are available on the WTO web site (document G/ADP/N) and more precisely on the 30 June 1999 (notification 53). This document indicates the effective anti-dumping duties, identifies the partners, the date the duty was imposed and the name of the product. Two difficulties arise:

- Since the oldest notification goes back only to 1995, it is impossible to know the level of all applied duties since many of them have been adopted before this date (unless the first notification received by the WTO contains this information). As the WTO indicated, since 1,097 anti-dumping measures were in practice until 30 June 1999, (WTO, 2000 Report), this means that we were able to recover two tiers of the total information, as MAC Maps can only integrate 725 anti-dumping measures. Hence there is a loss of information.

Table 8: Number of anti-dumping cases in the Quad, average duty, and most affected country

	Canada	USA	Japan	EU
<i>Number of HS positions</i>	339	566	42	260
<i>Average duty</i>	35.6%	22.2%	9.9%	29.1%
<i>Most taxed partner</i>	USA	Japan	Pakistan	China

(Source: MAC Maps)

- On the other hand, notifications precise the name of incriminated products, but do not cite a reference to any international nomenclature. The code of the targeted product has therefore to be retrieved from the HS6 or HS10 classification.

MAC Maps therefore integrates 725 anti-dumping practices and recovered them on 2,283 positions lines of HS6 or HS10. The average applied ad valorem tax is 82.4 per cent and the maximum tax levied is 691 per cent (India's duty on industrial sewing needles of Chinese origin). Protection adopted through these procedures is thus extremely high. Table 8 gives the number of HS positions for the four countries, as well as average ad valorem taxes and the exporting country that is most affected by these duties. These four industrialised nations apply lower duties on average as compared to world rates. If the USA is the country that most frequently uses these anti-dumping measures, then the duties it applies are relatively moderate.

f) Technical barriers to trade, sanitary, phytosanitary and environmental standards

While the number of traditional tariff and non-tariff barriers to trade has decreased in the past years (custom duties, quotas, voluntary export restraint), new obstacles as Technical barriers to Trade (TBT), sanitary and phytosanitary rules, notified by WTO members have been increasingly used since 1995. The integration of these barriers is an extremely delicate task. From the national notifications sent to the WTO, MAC Maps integrates 7 types of on non-tariff measures, adopted for technical, sanitary, phytosanitary or environmental reasons:

- (i) authorisations
- (ii) prohibitions
- (iii) prior surveillance
- (iv) quota
- (v) financial measures
- (vi) monopolistic measures
- (vii) technical measures (marketing, labelling, packaging, inspection, quarantine)

In what measure sanitary, phytosanitary and environmental issues are the main determinants of this increase in barriers to trade ? It is difficult to obtain an answer, due to several elements in the analysis:

- (i) collective preferences are linked to the level of a development of a particular country: see the protection of reptiles - HS 410320 -, applied by only 20 countries, but which affects 96 per cent of corresponding world imports;

- (ii) collective preferences can differ between countries, even when they are about as rich (hormone-treated beef);
- (iii) sanitary pre-requisites on some food products can be numerous (e.g in the case of refrigerated or frozen fresh fish fillets, HS 030410 and HS 030420): it represents world imports of only US\$ 6 billion;
- (iv) it is difficult to distinguish the protection of domestic species from foreign species from the protection of domestic producers (unrooted bulbs and tubers - HS060210- are frequently forbidden from being imported to avoid interbreedings of species while the imports of cut flowers and flower buds are often free - HS06010).

To add to the difficulties to make a distinction between fair quality standards or norms and protectionist one's, the estimation of an ad valorem equivalent of a norm poses in itself a problem. Indeed standards do not work like custom duties: either it bans the access of a product into a market, or it asks for an adaptation of the process of production. A tariff is identical to an increase in the marginal cost of the foreign firm. Adapting a product to foreign technical norms is either an increase in the marginal cost of production, or a fixed cost, or both. It therefore appears to be inappropriate to attempt to calculate the ad valorem equivalent of a norm.

MAC Maps proposes an original solution to integrate technical, sanitary and environmental barriers that avoids frequency or coverage index (see underneath) which contain poor informative value.

C – AGGREGATION METHOD

Economic literature has always presented evidence of the difficulties encountered in the construction of a sectoral aggregation of tariffs (see a recent article by Bach and Martin « Would the right tariff aggregator please stand up? »). Effectively, since we have to aggregate different tariffs to measure global protection of a sector or an economy, we would first use national imports as weights. Since these imports depend on the tariff, there is an endogeneity bias: a high tariff (respectively low) generates limited (respectively large) imports and its level is then reduced (respectively increased). Using imports as weights leads to an under-valuation of the protection level of a country. The same problem arises while aggregating importing and exporting countries.

- Let us consider two countries, New Zealand and Australia, importing product X, New Zealand has a tariff rate of 50 per cent and Australia 5 per cent; if we have to measure the protection rate of the group (New Zealand and Australia) for this position, using imports of each country as weights will reduce the weight of the high tariff as the result of such a high tariff is low imports.
- The same problem arises while aggregating EU tariffs vis-à-vis two exporting countries subjected to discrimination. European imports originating from New Zealand taxed at 50 per cent will be weak while Australian imports taxed at 5 per cent will be more important, the EU tariff vis-à-vis the group (New Zealand and Australia) will be under-estimated by this method.

In short, sectoral as well as geographical aggregation of importers and exporters using this method of weights systematically under-estimates rates of protection levied. Global imports can be used as weights, but they may constitute import structures that are radically different from those under observation in this study. A value added weight, a workforce weight or even a simple average have few chances of being representative of potential imports of the countries in question. Hence,

we have retained the option of weighing the imports of a country by those of a reference group to which the country belongs, the assembling criteria being GDP per capita. We shall now describe this method in a detailed manner.

Table 6: reference groups of MAC Maps

GDP per capita (volume PPP –USD)											
Group 1	2000	Aver..	Group 2	2000	Aver.	Group 3	2000	Aver..	Group 3		
<i>Luxembourg</i>	3530	2376	<i>Czech Rep</i>	846	776	<i>Vanuatu</i>	4200	4001	<i>Benin</i>	1511	140
<i>United States</i>	2815	2240	<i>Venezuela</i>	707	756	<i>Peru</i>	4136	4000	<i>Nicaragua</i>	1200	131
<i>Kuwait</i>	2146	2115	<i>Mexico</i>	835	728	<i>Bulgaria</i>	3957	3971	<i>Kenya</i>	1265	126
<i>Switzerland</i>	2168	1999	<i>Uruguay</i>	830	712	<i>Equator</i>	3582	3955	<i>Nigeria</i>	1235	119
<i>Norway</i>	2434	1945	<i>Argentina</i>	797	695	<i>Egypt</i>	4636	3894	<i>Iran</i>	1334	118
<i>Qatar</i>	1732	1856	<i>Malaysia</i>	935	669	<i>Saint-Lucia</i>	4724	3715	<i>Indochine</i>	1729	116
<i>Canada</i>	2162	1842	<i>Barbade</i>	762	656	<i>Swaziland</i>	4075	3641	<i>Viet Nam</i>	1697	113
<i>Bermudes</i>	2001	1830	<i>Gabon</i>	714	630	<i>Dominica</i>	4597	3624	<i>India</i>	1568	109
<i>Singapore</i>	2642	1816	<i>Libya</i>	464	617	<i>Jamaica</i>	3528	3575	<i>Liberia</i>	497	104
<i>Denmark</i>	2177	1793	<i>Hungary</i>	717	613	<i>Romania</i>	2830	3506	<i>Maurit.</i>	1067	103
<i>Island</i>	2165	1791	<i>Tri and Tob.</i>	715	607	<i>Saint-Vinc.</i>	4405	3430	<i>Congo, R.</i>	408	101
<i>Japan</i>	2056	1777	<i>Turkey</i>	717	591	<i>Dominic Rep</i>	4476	3425	<i>Angola</i>	1041	101
<i>Hong Kong</i>	2161	1748	<i>Saint-Kitts</i>	910	591	<i>Grenada</i>	4517	3288	<i>Zambia</i>	913	993
<i>France</i>	2019	1729	<i>Poland</i>	727	539	<i>Algeria</i>	3194	3263	<i>Ouganda</i>	1242	974
<i>Sweden</i>	2012	1716	<i>Brazil</i>	586	535				<i>Bangladesh</i>	1207	925
<i>Germany</i>	1840	1693	<i>Syria</i>	564	528	<i>Marocco</i>	3364	3227	<i>Somalia</i>	707	915
<i>Virgin islands</i>	1945	1687	<i>Fidji</i>	517	522	<i>Paraguay</i>	2853	3221	<i>Guinea</i>	1029	884
<i>Australia</i>	2087	1657	<i>Jordan</i>	443	500	<i>Salomon</i>	3032	2980	<i>Bhutan</i>	1250	882
<i>Netherlands</i>	2077	1657	<i>Lebanon</i>	606	490	<i>El Salvador</i>	3310	2924	<i>Honduras</i>	891	869
<i>Belgium</i>	2007	1654	<i>Costa Rica</i>	584	482	<i>Papoua</i>	2955	2809	<i>Madagascar</i>	802	860
<i>Austria</i>	1969	1647	<i>Surinam</i>	578	471	<i>Guatemala</i>	2900	2769	<i>Nepal</i>	1010	834
<i>Italy</i>	1889	1623	<i>Thailand</i>	643	470	<i>Myanmar</i>	3496	2702	<i>Rwanda</i>	819	818
<i>United King</i>	1927	1583	<i>Colombia</i>	486	454	<i>Indonesia</i>	3093	2601	<i>Haiti</i>	691	801
<i>Finland</i>	1978	1571	<i>Seychelles</i>	608	450	<i>Irak</i>	1198	2548	<i>Sao Tome</i>	706	779
<i>French Guyana</i>	1612	1565	<i>Tunisia</i>	575	447	<i>Sri Lanka</i>	3314	2531	<i>Gambia</i>	736	754
<i>New Zealand</i>	1592	1434	<i>South Africa</i>	445	445	<i>Congo</i>	2169	2413	<i>Lesotho</i>	956	739
<i>Unit Arab Em</i>	1276	1325	<i>Botswana</i>	588	437	<i>China</i>	4172	2317	<i>Togo</i>	657	719
<i>Oman</i>	1379	1297	<i>Panama</i>	499	433	<i>Samoa</i>	2606	2192	<i>Guinea-Bis</i>	476	716
<i>Israël</i>	1530	1276	<i>Belize</i>	493	410	<i>Bolivia</i>	2386	2186	<i>Malawi</i>	811	700
<i>Taiwan</i>	1938	1218				<i>Cameroon</i>	1848	2181	<i>Cent Af R</i>	648	667
<i>Ireland</i>	2057	1201				<i>Philippines</i>	2211	2147	<i>Sierra Leo</i>	351	653
<i>Spain</i>	1510	1177				<i>Kiribati</i>	2087	2088	<i>Niger</i>	579	611
<i>New Caledonia</i>	1439	1171				<i>Yemen</i>	1919	1966	<i>Burundi</i>	474	557
<i>French Polyn.</i>	1377	1169				<i>Pakistan</i>	2116	1790	<i>Chad</i>	541	555
<i>Gibraltar</i>	1457	1149				<i>Zimbabwe</i>	1768	1752	<i>Mali</i>	603	551
<i>Chypre</i>	1480	1078				<i>Cape Verde</i>	2332	1749	<i>Ethiopia</i>	538	543
<i>Maurice</i>	1556	1050				<i>Guyana</i>	2393	1746	<i>Burkina</i>	600	537
<i>Bahamas</i>	1052	1039				<i>Djibouti</i>	1310	1736	<i>Tanzania</i>	544	519
<i>Brunéi Dar</i>	9116	1036				<i>Ghana</i>	1850	1657	<i>Sudan</i>	435	349
<i>Portugal</i>	1337	1027				<i>Côte d'Ivoire</i>	1495	1635	<i>Mozambiq</i>	231	169
<i>Saudi Arabia.</i>	8803	1011				<i>Maldives</i>	2344	1621			
<i>Greece</i>	1183	9874				<i>Eq Guinea</i>	3979	1558			
<i>Malte</i>	1328	9596				<i>Senegal</i>	1611	1548			
<i>Bahreïn</i>	1038	9556				<i>Afghanistan</i>	977	1542			
<i>Puerto Rico</i>	1133	9297						1458			
<i>Chile</i>	1348	9219									
<i>South Korea</i>	1356	8573									
<i>Antig. and Bar</i>	1114	8244									

(Source: Chelem and authors' estimates – missing countries are in group 3)

For every importer and every supplier, on every HS position, we add 5 ad valorem equivalents corresponding to 5 instruments integrated in MAC Maps (it is possible to have substitution and not addition, notably for anti-dumping duties and prohibitions vis-à-vis WTO tariffs). Once we have for every importing country vis-à-vis every supplier nation on each position of the HS, an ad valorem equivalent representing all the instruments of protection, we aggregate, by transforming a matrix $137*220*10\ 000$ into a matrix $r*r*n$ where r is the number of global regions and n the number of sectors: e.g. we consider on $r=8$, et $n=6$.

We define an invariant world classification of countries, which have about the same level of GDP per capita. An average is fixed for 1981-2000 (column Aver. in table 6) and two thresholds are fixed: 25 per cent and 50 per cent of the average of the OECD countries over these 20 years. These thresholds define the three reference groups in table 6. Each country or trading zone (EU or SACU – Southern African Custom Union) i thus belongs to a reference zone $ZR(i)$.

(i) Aggregation of the suppliers of a particular country.

Assume that a country ‘ i ’ on an HS position ‘ s ’ imposes different tariffs $t_{i,j}^s$ on every potential supplier ‘ j ’ (220 suppliers). We have to aggregate these 220 tariffs into 8 tariffs.

$$\forall k = 1, 2, \dots, r, \quad t_{i,k}^s = \frac{\sum_{l \in k} m_{ZR(i),l}^s \times t_{i,l}^s}{\sum_{l \in k} m_{ZR(i),l}^s} \quad (1)$$

‘ i ’ is a supplier country that belongs to one of the eight trading zones (zone k). The tariff $t_{i,l}^s$ levied by ‘ i ’ on imports originating from ‘ l ’ is weighted by the imports of the ‘ i ’ reference zone (and not by imports of country ‘ i ’) originating from ‘ l ’ i.e. $m_{ZR(i),l}^s$, this is to avoid the traditional endogeneity bias.

Thus the tariff imposed by country ‘ i ’ on supplier ‘ l ’ is not weighted by imports of ‘ i ’ originating from ‘ l ’, but by the imports of the group of countries whose GDP per head is closer to ‘ i ’, originating from ‘ l ’.

(ii) Tariff aggregation of importing countries

The 220 potential suppliers have been aggregated into 8 groups of suppliers. We have now a $137*8*10,000$ matrix. To obtain a new matrix having the form $8*8*10,000$, we use the same method of aggregation, which is as follows:

$$\forall k = 1, 2, \dots, r, \quad \forall u = 1, 2, \dots, r, \quad t_{k,u}^s = \frac{\sum_{l \in k} m_{ZR(l),u}^s \times t_{l,u}^s}{\sum_{l \in k} m_{ZR(l),u}^s} \quad (2)$$

The tariff levied by the group of countries ‘ k ’ on the imports originating from group ‘ u ’ is thus weighted, not by imports of countries ‘ k ’ originating from ‘ u ’, but by the imports of the reference groups of each country that belongs to ‘ k ’, originating from ‘ u ’.

(iii) *Tariffs aggregation on products*

We have therefore aggregated the 137*220*10 000 matrix into a 8*8*10,000 matrix. Finally, to aggregate the 10,000 products into 6 sectors, we use the same procedure, which is:

$$\forall k = 1, 2, \dots, r, \forall u = 1, 2, \dots, r, \forall z = 1, 2, \dots, n, t_{k,u}^z = \frac{\sum_{s \in z} m_{ZR(k),u}^s \times t_{k,u}^s}{\sum_{s \in z} m_{ZR(k),u}^s} \quad (3)$$

where 's' is the index that defines the HS positions that make up sector 'z'. The tariff on product 's' of group 'k' originating from 'u' is thus weighted by the imports of 's' made by the reference group of 'k' originating from 'u'.

II FOUR CASE STUDIES BASED ON MAC MAPS

A – GENERAL RESULTS

We present general results obtained by using MAC Maps. To do so, we regroup all the instruments of protection and adopt the following classification: on the geographic level, we choose 8 countries (European Union, USA, Japan, Australia, Morocco, Brazil, Switzerland and China) and we adopt 6 sectors (Cereals, Other agricultural and food products, Other primary products, Textiles and clothing, Other manufacturers, Services).

Table 7 : market access in the cereal sector

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		20.9%	18.6%	20.6%	1.6%	7.7%	61.9%	89.3%
<i>Japan</i>	0.0%		18.6%	25.0%	1.1%	7.7%	85.6%	89.3%
<i>Moro.</i>	0.0%	20.9%		27.6%	1.6%	7.7%	94.7%	89.3%
<i>Eur. U..</i>	0.0%	20.9%	18.6%		1.2%	7.7%	67.3%	89.3%
<i>USA</i>	0.0%	20.9%	18.6%	20.4%		7.7%	43.8%	89.3%
<i>Brazil</i>	0.0%	20.9%	18.6%	21.1%	1.6%		93.9%	89.3%
<i>Switz.</i>	0.0%	20.9%	18.6%	25.5%	1.6%	7.7%		89.3%
<i>China</i>	0.0%	20.8%	18.6%	24.1%	4.3%	7.7%	93.7%	

(Source: MAC Maps)

Table 8 : market access in other agric. products and food industry

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		17.4%	45.8%	20.7%	16.3%	14.7%	50.2%	38.0%
<i>Japan</i>	1.2%		45.8%	17.2%	11.6%	14.7%	45.4%	37.9%
<i>Moro.</i>	1.4%	17.2%		23.3%	17.7%	14.7%	52.5%	38.1%
<i>Eur. U..</i>	1.3%	16.3%	45.8%		11.4%	14.7%	38.8%	38.0%
<i>USA</i>	1.2%	16.8%	45.8%	19.9%		14.7%	30.7%	38.0%
<i>Brazil</i>	1.4%	18.1%	45.8%	18.3%	18.2%		48.4%	38.1%
<i>Switz.</i>	1.4%	16.7%	45.8%	17.5%	11.8%	14.7%		38.1%
<i>China</i>	1.2%	18.8%	45.8%	18.8%	18.4%	14.6%	50.7%	

(Source: MAC Maps)

Table 9 : market access in other primary products

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		0.3%	6.8%	0.0%	1.3%	5.6%	0.8%	2.6%
<i>Japan</i>	0.3%		6.8%	0.0%	1.0%	5.6%	0.8%	1.9%
<i>Moro.</i>	0.3%	0.3%		0.0%	1.0%	5.6%	0.7%	9.5%
<i>Eur. U..</i>	0.3%	0.3%	6.8%		1.1%	5.6%	0.3%	3.2%
<i>USA</i>	0.3%	0.3%	6.8%	0.1%		5.6%	0.1%	2.8%
<i>Brazil</i>	0.3%	0.3%	6.8%	0.0%	1.1%		0.7%	9.5%
<i>Switz.</i>	0.3%	0.3%	6.8%	0.1%	1.0%	5.6%		9.5%
<i>China</i>	0.3%	0.3%	6.8%	0.0%	1.5%	5.6%	0.7%	

(Source: MAC Maps)

Table 10 : market access in the textile and clothing sector

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		20.7%	28.7%	10.9%	12.8%	19.7%	13.7%	24.8%
<i>Japan</i>	17.8%		28.7%	10.9%	12.8%	19.7%	12.2%	24.8%
<i>Moro.</i>	17.8%	20.7%		0.0%	12.8%	19.7%	5.8%	24.8%
<i>Eur. U..</i>	17.8%	20.7%	28.7%		12.9%	19.7%	2.2%	24.8%
<i>USA</i>	17.8%	20.7%	28.7%	10.9%		19.7%	8.0%	24.8%
<i>Brazil</i>	17.8%	20.7%	28.7%	6.2%	13.1%		5.8%	24.8%
<i>Switz.</i>	17.8%	20.7%	28.7%	10.9%	13.1%	19.7%		24.8%
<i>China</i>	17.8%	20.7%	28.7%	31.0%	41.3%	19.7%	5.2%	

(Source: MAC Maps)

Table 11 : market access in other manufactured products

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		1.8%	15.2%	3.6%	3.0%	13.6%	2.0%	15.4%
<i>Japan</i>	11.7%		15.2%	4.0%	4.0%	13.6%	1.3%	15.4%
<i>Moro.</i>	9.2%	1.8%		0.0%	3.0%	13.6%	1.4%	15.4%
<i>Eur. U..</i>	10.1%	1.8%	15.2%		5.0%	13.6%	0.7%	15.4%
<i>USA</i>	10.9%	1.8%	15.2%	3.6%		13.6%	1.0%	15.4%
<i>Brazil</i>	9.2%	1.8%	15.2%	2.6%	3.2%		1.2%	15.4%
<i>Switz.</i>	9.3%	1.8%	15.2%	3.6%	3.0%	13.6%		15.4%
<i>China</i>	11.5%	1.8%	15.2%	2.9%	29.0%	13.6%	1.4%	

(Source: MAC Maps)

Table 12 : market access in services

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		0.0%	10.0%	0.0%	0.0%	0.0%	6.0%	5.0%
<i>Japan</i>	2.5%		10.0%	0.0%	0.0%	0.0%	6.0%	5.0%
<i>Moro.</i>	2.5%	0.0%		0.0%	0.0%	0.0%	0.0%	5.0%
<i>Eur. U..</i>	2.5%	0.0%	10.0%		0.0%	0.0%	0.0%	5.0%
<i>USA</i>	2.5%	0.0%	10.0%	0.0%		0.0%	6.0%	5.0%
<i>Brazil</i>	2.5%	0.0%	10.0%	0.0%	0.0%		0.0%	5.0%
<i>Switz.</i>	2.5%	0.0%	10.0%	0.0%	0.0%	0.0%		5.0%
<i>China</i>	2.5%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	

(Source: MAC Maps)

Tables 7 to 12 point out that trade globalisation is not achieved. Importing countries are in column; thus, table 7 for example shows that in Switzerland cereals imports from Japan are taxed by a duty of 85.6%.

- (i) Agricultural and food protection is high in all countries except Australia; it is especially high in China and Switzerland.
- (ii) Market access in developing countries is generally difficult, as in Morocco or China; the level of protection is intermediate in Brazil.
- (iii) In the textile and clothing sector, market access is difficult in the eight countries, but information brought by table 10 is incomplete because it does not integrate ad valorem equivalent of MFA quotas. This information is available in the GTAP5 database ; hence we add estimations of market access from MAC Maps and ad valorem equivalent of MFA quotas from GTAP5 in table 13. Only the industrialised countries protection on Moroccan and Chinese products are modified. Chinese exports are still heavily taxed worldwide even after a liberalisation period (initial dismantling of quotas during 1995-1999).
- (iv) Finally, Morocco benefits from strong trade preference with European Union in the industrial sector, due to bilateral treaties. Moroccan exports to Europe in the textile and clothing sector, and in other manufactured products are duty-free, but it is not the case in the cereals sector and in the agri-food sector. By bilateral treaties, European Union and Morocco negotiated partial preferences, but not free trade in agri-food

sector. For example, in table 1, white chocolate from WTO countries is taxed by an ad valorem duty of 10,4%, plus a specific tariff of 515 Euro by ton, while white chocolate from Morocco is taxed by only the same specific tariff. But as the unit value of European imports from Morocco is much lower than imports from WTO countries, the ad valorem equivalent of the same specific tariff is greater on Moroccan imports than on world imports, such that the global European protection is higher on Moroccan imports than on world imports. On average, the ad valorem equivalent of European specific tariffs is 58.6% on Morocco products and 43.8% on USA products. This element explains why on tables 7 (cereals) and 8 (other agri-food products) , the global rate of protection of European Union is higher on Morocco (27.6% and 23.3%) than on other Northern countries (20.4% and 19.9% on United States for example). This not a statistical artefact: Moroccan producers are effectively disadvantaged in the European market access compared to exporters from other industrialised countries. In this case, the trade preference is reversed.

Table 13: global protection in the textile and clothing sectors in eight countries

	Austral.	Japan	Moro.	Eur. U.	USA	Brazil	Switz.	China
<i>Austral.</i>		20.7%	28.7%	10.9%	12.8%	19.7%	13.7%	24.8%
<i>Japan</i>	17.8%		28.7%	10.9%	12.8%	19.7%	12.2%	24.8%
<i>Moro.</i>	17.8%	20.7%		0.0%	13.2%	19.7%	5.9%	24.8%
<i>Eur. U..</i>	17.8%	20.7%	28.7%		12.9%	19.7%	2.2%	24.8%
<i>USA</i>	17.8%	20.7%	28.7%	10.9%		19.7%	8.0%	24.8%
<i>Brazil</i>	17.8%	20.7%	28.7%	6.9%	14.1%		8.4%	24.8%
<i>Switz.</i>	17.8%	20.7%	28.7%	10.9%	13.1%	19.7%		24.8%
<i>China</i>	17.8%	20.7%	28.7%	38.6%	51.3%	19.7%	15.7%	

(Source: MAC Maps and GTAP 5)

Comparing MAC Maps estimation of market access to GTAP protection data according to the same geographical and sectoral classification points out significant differences (GTAP5 protection data are presented in Annex 4): absolute differences are not great in weakly protected sectors (services), but are great in the textile and clothing sector and huge in cereals and agri-food sectors. For example, Japanese imports of cereals from Australia are taxed by a 195.8% ad valorem equivalent according to the GTAP5 database, while they are taxed by an 20.9% ad valorem equivalent according to MAC Maps ! Why such a discrepancy ? because methodologies are quite different. MAC Maps is a direct measurement of market access which integrates main instruments of protection and estimate ad valorem equivalents. GTAP5 is a macroeconomic and multinational database, of which the main objective is an utilisation by Computable General Equilibrium Model. GTAP5 protection data are based on the estimation of price differentials.

A comparison between MAC Maps and the OECD database (Table 14) is difficult because OECD records only MFN ad valorem duties: preferential agreements and other instruments like specific tariffs, tariff quotas... are not included. It means that multilateral protection databases provide a significantly biased information.

Table 14 : simple mean of NPF bound rates for 5 sectors and 6 countries- 1996

	Australia	Japan	Eur. Union	USA	Brazil	Switz.
<i>Agric</i>	3.1	9.3	17.8	5.0	35.6	30.1
<i>Other primary prod.</i>	1.7	0.8	1.0	0.6	34.4	4.9
<i>Textile and clothing</i>	16.4	14.3	6.2	8.8	34.9	3.4
<i>Other manuf.</i>	6.1	1.6	2.0	2.3	31.2	1.7
<i>Serv.</i>	Nd	Nd	Nd	Nd	Nd	Nd

(Source : OCDE, 1999)

B – MEASUREMENT OF TARIFF PEAKS

The only information about tariff mean is not sufficient. Let us suppose two tariff structures with the same mean (weighted or not). These two trade policies have not the same economic impact, on trade flows and on collective utility, if they have not the same dispersion. A partial equilibrium analysis points out that economic distortions are proportional to the square of a tariff. It means that when tariffs standard error is higher, economic distortion is greater.

A precise information about the dispersion of tariffs is crucial. According to the international definition (OECD), a tariff peak is an ad valorem duty greater than 15%. The importance of tariff peaks is traditionally estimated by a frequency coverage ratio (percentage of HS positions taxed by a peak) or a trade coverage ratio (part of imports taxed by a peak). Thus according to OECD, frequency coverage ratio of tariff peaks is 2.2% in USA, 2.8% in Japan, 5.1% in European Union and 6.5% in Canada.

This methodology is subject to numerous criticisms :

- (i) it does not include specific tariffs, prohibitions, tariff quotas...
- (ii) It does not take into account preferential agreements, bilateral treaties... If European Union sets a 18% duty on a HS position, it may be a MFN tariff which does not concern GSP countries, ACP countries...
- (iii) A frequency coverage ratio gives two peaks the same weight, even if on these two HS positions, trade flows are extremely different.
- (iv) A trade coverage ratio contains an endogeneity bias since a “prohibitive” tariff is not included.
- (v) Frequency coverage ratio and trade coverage ratio give two very different peaks (15.5% and 400% for example) the same importance.

In order to estimate the precise importance of tariff peaks, MAC Maps adopts the following methodology. It evaluates the level of protection with the same method as in part A (including all protection instruments, eight countries, six sectors), but it substitutes a tariff of 15% for tariff peaks (tariffs greater than 15%) in all source files. We then compare the two levels of protection.

Table 15 : tariff peaks in the cereal sector

	Austr.	Japan	Moro.	Eu. U.	USA	Brazil	Switz.	China
<i>Australia</i>		7.1%	7.9%	11.2%	1.6%	7.7%	9.5%	14.0%
		-66%	-58%	-46%	0%	0%	-85%	-84%
<i>Japan</i>	0.0%		7.9%	11.3%	1.1%	7.7%	9.9%	14.0%
	0%		-58%	-55%	0%	0%	-88%	-84%
<i>Morocco</i>	0.0%	7.2%		10.6%	1.6%	7.7%	9.5%	14.0%
	0%	-66%		-62%	0%	0%	-90%	-84%
<i>Europ. Un</i>	0.0%	7.1%	7.9%		1.2%	7.7%	9.6%	14.0%
	0%	-66%	-58%		-2%	0%	-86%	-84%
<i>USA</i>	0.0%	7.1%	7.9%	11.2%		7.7%	8.8%	14.0%
	0%	-66%	-58%	-45%		0%	-80%	-84%
<i>Brazil</i>	0.0%	7.1%	7.9%	11.2%	1.6%		9.5%	14.0%
	0%	-66%	-58%	-47%	0%		-90%	-84%
<i>Switzerl</i>	0.0%	7.2%	7.9%	11.1%	1.6%	7.7%		14.0%
	0%	-66%	-58%	-57%	0%	0%		-84%
<i>China</i>	0.0%	7.0%	7.9%	11.2%	3.7%	7.7%	9.5%	
	0%	-66%	-58%	-54%	-13%	0%	-90%	

(Source: MAC Maps)

Table 16 : tariff peaks for other agricultural products and for the food industry

	Austr.	Japan	Moro.	Eu. U.	USA	Brazil	Switz.	China
<i>Australia</i>		10.8%	11.0%	10.1%	8.1%	12.3%	9.9%	13.1%
		-38%	-76%	-51%	-50%	-16%	-80%	-66%
<i>Japan</i>	1.2%		11.0%	9.9%	7.8%	12.3%	9.1%	13.1%
	0%		-76%	-43%	-33%	-16%	-80%	-65%
<i>Morocco</i>	1.4%	10.6%		9.3%	9.0%	12.3%	8.9%	13.1%
	0%	-38%		-60%	-49%	-16%	-83%	-66%
<i>Europ. Un</i>	1.3%	10.3%	11.0%		7.9%	12.3%	8.4%	13.1%
	0%	-36%	-76%		-30%	-16%	-78%	-65%
<i>USA</i>	1.2%	10.5%	11.0%	10.1%		12.3%	7.8%	13.1%
	0%	-38%	-76%	-49%		-16%	-75%	-65%
<i>Brazil</i>	1.4%	10.5%	11.0%	9.7%	9.1%		9.6%	13.1%
	0%	-42%	-76%	-47%	-50%		-80%	-66%
<i>Switzerl</i>	1.4%	10.3%	11.0%	10.0%	7.9%	12.3%		13.1%
	0%	-38%	-76%	-43%	-33%	-16%		-66%
<i>China</i>	1.2%	10.8%	11.0%	9.6%	11.0%	12.3%	9.1%	
	0%	-42%	-76%	-49%	-40%	-16%	-82%	

(Source: MAC Maps)

Table 17 : tariff peaks for other primary products

	Austr.	Japan	Moro.	Eu. U.	USA	Brazil	Switz.	China
<i>Australia</i>		0.3%	5.6%	0.0%	0.8%	5.3%	0.3%	2.6%
		0%	-18%	0%	-40%	-5%	-61%	0%
<i>Japan</i>	0.3%		5.6%	0.0%	0.7%	5.3%	0.3%	1.9%
	-7%		-18%	0%	-29%	-5%	-62%	0%
<i>Morocco</i>	0.3%	0.3%		0.0%	0.7%	5.3%	0.2%	9.5%
	-7%	0%		0%	-29%	-5%	-72%	0%
<i>Europ. Un</i>	0.3%	0.3%	5.6%		0.8%	5.3%	0.2%	3.2%
	-7%	0%	-18%		-28%	-5%	-24%	0%
<i>USA</i>	0.3%	0.3%	5.6%	0.0%		5.3%	0.1%	2.8%
	-7%	0%	-18%	-78%		-5%	-1%	0%
<i>Brazil</i>	0.3%	0.3%	5.6%	0.1%	0.8%		0.2%	9.5%
	-7%	0%	-18%	0%	-28%		-71%	0%
<i>Switzerl</i>	0.3%	0.3%	5.6%	0.0%	0.7%	5.3%		9.5%
	-7%	0%	-18%	-79%	-29%	-5%		0%
<i>China</i>	0.3%	0.3%	5.6%	0.1%	1.2%	5.3%	0.2%	
	-7%	0%	-18%	195%	-19%	-5%	-73%	

(Source: MAC Maps)

Table 18 : tariff peaks in the textile and clothing sector

	Austr.	Japan	Moro.	Eu. U.	USA	Brazil	Switz.	China
<i>Australia</i>		12.2%	13.5%	10.5%	10.0%	14.2%	10.2%	14.3%
		-41%	-53%	-4%	-22%	-28%	-25%	-42%
<i>Japan</i>	11.6%		13.5%	10.5%	10.1%	14.2%	9.2%	14.3%
	-35%		-53%	-4%	-22%	-28%	-25%	-42%
<i>Morocco</i>	11.6%	12.2%		0.0%	10.1%	14.2%	5.5%	14.3%
	-35%	-41%		0%	-21%	-28%	-7%	-42%
<i>Europ. Un</i>	11.5%	12.2%	13.5%		10.0%	14.2%	2.1%	14.3%
	-35%	-41%	-53%		-22%	-28%	-6%	-42%
<i>USA</i>	11.5%	12.2%	13.5%	10.5%		14.2%	6.4%	14.3%
	-35%	-41%	-53%	-4%		-28%	-20%	-42%
<i>Brazil</i>	11.6%	12.2%	13.5%	5.8%	10.3%		5.4%	14.3%
	-35%	-41%	-53%	-6%	-21%		-7%	-42%
<i>Switzerl</i>	11.6%	12.2%	13.5%	10.5%	10.2%	14.2%		0.143
	-35%	-41%	-53%	-4%	-22%	-28%		-42%
<i>China</i>	11.6%	12.2%	13.5%	7.1%	17.0%	14.2%	5.0%	
	-35%	-41%	-53%	-77%	-59%	-28%	-5%	

(Source: MAC Maps)

Table 19 : tariff peaks for other manufactured products

	Austr.	Japan	Moro.	Eu. U.	USA	Brazil	Switz.	China
<i>Australia</i>		1.8%	9.7%	3.5%	2.9%	10.8%	1.9%	11.3%
		-1%	-36%	-2%	-6%	-20%	-5%	-27%
<i>Japan</i>	6.4%		9.7%	3.5%	2.9%	10.8%	1.3%	11.3%
	-45%		-36%	-10%	-29%	-20%	-4%	-27%
<i>Morocco</i>	6.4%	1.8%		0.0%	2.9%	10.8%	1.3%	11.3%
	-31%	-1%		0%	-4%	-20%	-4%	-27%
<i>Europ. Un</i>	6.4%	1.8%	9.7%		3.3%	10.8%	0.7%	11.3%
	-36%	-1%	-36%		-35%	-20%	-2%	-27%
<i>USA</i>	6.5%	1.8%	9.7%	3.5%		10.8%	0.9%	11.3%
	-41%	-1%	-36%	-2%		-20%	-3%	-27%
<i>Brazil</i>	6.4%	1.8%	9.7%	2.6%	2.9%		1.2%	11.3%
	-31%	-1%	-36%	-3%	-11%		-4%	-27%
<i>Switzerl</i>	6.4%	1.8%	9.7%	3.5%	2.9%	10.8%		0.113
	-31%	-1%	-36%	-2%	-3%	-20%		-27%
<i>China</i>	6.4%	1.8%	9.7%	2.6%	12.2%	10.8%	1.3%	
	-45%	-1%	-36%	-11%	-58%	-20%	-5%	

(Source: MAC Maps)

Services are omitted because there is no tariff peak in this sector. Tables 15 to 19 provide two figures for each case: the above figure is the level of protection with substitution of 15% for any tariff peak, the under figure is the rate of reduction in the level of protection due to this substitution.

Tariff peaks are concentrated in agriculture, especially in Japan, Morocco, Switzerland, China and in the European Union. This “disappearance” of tariff peaks would cause a 85% reduction (approximately) of Swiss agricultural protection ! Tariff peaks have also an important impact in the textile and clothing sector, except in Europe.

This method of tariff peaks measurement avoids all the previous criticisms: it takes into account all the protective instruments, all the discriminatory regimes, the importance of trade flows; it has not an endogeneity bias and gives higher tariffs a greater weight.

C – MEASURING THE MOST PROTECTED COUNTRIES

It is interesting to rank countries by their level of protection, even if this kind of information is restrictive. This ranking is possible with MAC Maps; it is then necessary to integrate all the protective instruments, to aggregate all exporting countries and all products. Table 20 provides this ranking and compares it with the index of economic freedom (Fraser Institute) and an OECD mean of applied ad valorem MFN tariffs. In the case of the index of economic freedom, higher the figure is, less protected the country is.

Comparing MAC Maps and OECD estimations of average protection points out that the omission of some protective instruments like specific tariffs is misleading: the MAC Maps tariff mean is about five times as big. The most interesting element is the ranking of United States and European Union. Tables 4 to 7 show that MFN instruments (ad valorem and specific duties, tariff quotas, prohibitions) are more protective in Europe. Thus the aggregate level of protection should be higher in the European Union, but it is not the case due to discriminatory regimes and preferential agreements. Europe has negotiated this kind of accord in a more extensive way than United States. It

means that if the protection is higher in USA, it is more discriminatory in Europe and discrimination causes another kind of economic distortion.

Table 20: ranking of countries by degree of protection

Country	Tarif MAC Maps 1999	Index of economic freedom - 1997	OECD 1996
<i>Australia</i>	8.8%	8.4	6.1
<i>Japan</i>	9.0%	7.9	6.7
<i>Morocco</i>	19.4%	nd	nd
<i>Europ. Un.</i>	9.7%	8.5	9.5
<i>USA</i>	11.8%	7.8	6.2
<i>Brazil</i>	13.4%	6.2	nd
<i>Switzerland</i>	15.1%	nd	3.2
<i>China</i>	18.4%	7.2	nd

(source: MAC Maps, Fraser Institute and OECD)

D – MEASURING TECHNICAL BARRIERS AND STANDARDS

To integrate technical barriers to trade, sanitary, phytosanitary and environmental standards, the first objective of MAC Maps is to avoid the simple accumulation of coverage frequency and trade coverage ratios. It adopts the following methodology: it identifies six different categories of justifications to environmental barriers to trade (EBT) in the notifications of the declaring countries:

- Protection of the environment
- Protection of flora and fauna
- Protection of vegetable life
- Protection of animal life
- Protection of human life
- Protection of human security

For every trade barrier, the importing country which issues a notification is identified, the affected product is classified according to its HS code and the barrier is recorded as per the type of non-tariff measure. Thus MAC Maps does not estimate Ad Valorem Equivalents of norms, but it fulfills three objectives :

- (i) Establish a *positive list* of products that present a risk (perceived) for the environment, this risk being responsible of imposed barriers to trade.
- (ii) Quantify the value of potential trade affected by these measures (global imports from HS tariff lines subjected to notified environmental barriers) and the value of trade subsequently affected (imports of notifying countries); the ratio of the second to the first is a *subjection ratio*.
- (iii) Identify which measures are protectionist, on the grounds of the following test : how many countries have notified this kind of measure on this product ?

This approach indirectly helps avoid the many susceptible traps that can be encountered while realising a classification based on the environmental impact criteria revealed by a panel of experts. But this approach may be criticised on the grounds that to justify trade barriers, governments use arguments which do not reflect their true reasons. Thus it is necessary to analyse the frequency of these barriers for each HS position.

On the basis of this argument, Fontagné, Mimouni & Von Kirchbach (2001) propose to distinguish between four different levels :

- *Products not affected*, i.e. products on which no importer has imposed any kind of environmental barrier;
- *Products affected*, i.e. products for whom at least one importer has introduced an environmental obstacle;

Table 15: concentration of environmental barriers, depending on the number of notifying countries, 1999

Number of importing countries notifying ETB	Number of HS 6 positions	World imports in HS positions covered by ETB, USD billion (1)	Imports of products covered by ETB by notifying countries, USD billion (2)	% world trade potentially affected (2/1)
0	1 171	670	0	0
[1 ; 5]	1 983	2729	110	4
[6 ; 10]	521	691	75	11
[11 ; 20]	638	672	227	34
[21 ; 30]	354	289	104	36
[31 ; 40]	171	200	78	39
[41 ; 50]	68	129	68	52
[51 ; 60]	9	17	15	85
[61 ; 70]	2	4	4	91
S/Total	3 746	4732	680	14
Total	4 917	5402	680	13
> 33 countries	185	286	140	49
> 50 countries	11	21	18	86
= 1 country	529	908	11	1

Source: Estimates based on the trade database COMTRADE and on the UNCTAD database of trade barriers.

- *Products greatly affected*, i.e. products for whom at least 25 per cent of global imports in value terms are directly affected by environmental obstacles.
- *Sensitive products*, i.e. products for whom at least 25 per cent of notifying importers deemed it necessary to impose environmental obstacles independent of their share in the overall trade.

It appears that in the database on the 4,917 products considered, only 1,171 products are not faced with any barrier limiting their trade. The total value of global imports of these products amounts to US\$ 669 billion. On the other hand, the remaining 3,746 products are subjected to at least one environmental-related import barrier in at least one importing country. These 3,746 products represent 88 per cent of global trade of goods in 1999. The vast majority of international trade thus comprises of products that may be potentially affected by environment-related obstacles. But do these trade barriers constitute protectionist barriers ?

When a very restricted number of countries impose at least one particular measure on a given product, the presumption of instrumentalisation of ERB to protectionist ends is strong. In table 15 it appears that 1,983 products, out of 4,917, have the objective of protectionism in mind: five countries at the most apply barriers, and global trade affected is about US\$ 110 billion, from a total of US\$ 2,700 billion affected in the case of these products. The low subjection ratio, 4 per cent, underlines a characteristic of these protectionist measures: they are effective in the sense that they have a strong impact on the imports of these countries. An alternative way of presenting the facts is to emphasise that half of global trade (US\$ 2,700 billion against US\$ 5,400 billion) is potentially affected by environmental-related protectionist measures.

CONCLUSION

Understanding the mechanisms by which trade barriers have an impact on market access and trade flows, establishing a precise and exhaustive list of these barriers and of their importance, aggregating this information in a flexible and consistent way are fundamental objectives for policy makers. This kind of database may allow to answer to a lot of questions about the level of national protections, the level of trade preferences for developing countries, the real impact of anti-dumping duties...

MAC Maps has been created to measure the market access in a very disaggregated way. Its main feature is to take into account all discriminatory regimes, and this information may be aggregated quickly and consistently. Nevertheless, it remains to integrate more information on production and export subsidies. This will be the next objective of MAC Maps.

Annex 1: List of exporting countries in MAC Maps

AFGHANISTAN	GHANA	PALAU
ALBANIA	GIBRALTAR	PAKISTAN
ALGERIA	KIRIBATI	PANAMA
AMERICAN SAMOA	GREECE	PAPUA NEW GUINEA
ANDORRA	GREENLAND	PARAGUAY
ANGOLA	GRENADA	PERU
ANTIGUA AND BARB.	GUAM	PHILIPPINES
AZERBAIJAN	GUATEMALA	PITCAIRN
ARGENTINA	GUINEA	POLAND
AUSTRALIA	GUYANA	PORTUGAL
AUSTRIA	HAITI	GUINEA-BISSAU
BAHAMAS	HONDURAS	EAST TIMOR
BAHRAIN	HONG KONG	PUERTO RICO
BANGLADESH	HUNGARY	QATAR
ARMENIA	ICELAND	ROMANIA
BARBADOS	INDIA	RUSSIAN FEDERATION
BELGIUM	INDONESIA	RWANDA
BERMUDA	IRAN	ST. HELENA
BHUTAN	IRAQ	SAINT KITTS & NEVIS
BOLIVIA	IRELAND	ANGUILLA
BOSNIA AND HERZ.	ISRAEL	SAINT LUCIA
BOTSWANA	ITALY	ST. PIERRE AND MIQU.
BRAZIL	CÔTE D'IVOIRE	SAINT VINCENT AND
BELIZE	JAMAICA	SAN MARINO
SOLOMON ISLANDS	JAPAN	SAO TOME AND PRINC.
VIRGIN ISLANDS	KAZAKHSTAN	SAUDI ARABIA
BRUNEI DAR.	JORDAN	SENEGAL
BULGARIA	KENYA	SEYCHELLES
MYANMAR	KOREA, DEM. PEOPLE'S REP.	SIERRA LEONE
BURUNDI	KOREA, REPUBLIC OF	SINGAPORE
BELARUS	KUWAIT	SLOVAKIA
CAMBODIA	KYRGYZSTAN	VIET NAM
CAMEROON	LAO PEOPLE'S DEM. REP.	SLOVENIA
CANADA	LEBANON	SOMALIA
CAPE VERDE	LESOTHO	SOUTH AFRICA
CAYMAN ISLANDS	LATVIA	ZIMBABWE
CENTRAL AFRICAN REP.	LIBERIA	SPAIN
SRI LANKA	LIBYA	SUDAN
CHAD	LIECHTENSTEIN	SURINAME
CHILE	LITHUANIA	SWAZILAND
CHINA	LUXEMBOURG	SWEDEN
TAIWAN	MACAU	SWITZERLAND
CHRISTMAS ISLAND	MADAGASCAR	SYRIAN ARAB REP.
COCOS ISLANDS	MALAWI	TAJKISTAN

COLOMBIA	MALAYSIA	THAILAND
COMOROS	MALDIVES	TOGO
CONGO	MALI	TOKELAU
ZAIRE	MALTA	TONGA
COOK ISLANDS	MAURITANIA	TRINIDAD AND TOB.
COSTA RICA	MAURITIUS	UNITED ARAB EMIR.
CROATIA	MEXICO	TUNISIA
CUBA	MONGOLIA	TURKEY
CYPRUS	MOLDOVA, REPUBLIC OF	TURKMENISTAN
CZECH REPUBLIC	MONTSERRAT	TURKS AND CAICOS ISL.
BENIN	MOROCCO	TUVALU
DENMARK	MOZAMBIQUE	UGANDA
DOMINICA	OMAN	UKRAINE
DOMINICAN REP.	NAMIBIA	MACEDONIA
ECUADOR	NAURU	EGYPT
EL SALVADOR	NEPAL	UNITED KINGDOM
EQU. GUINEA	NETHERLANDS	TANZANIA, UNITED REP.
ETHIOPIA	NETH. ANTILLES	UNITED STATES
ERITREA	ARUBA	VIRGIN ISLANDS
ESTONIA	VANUATU	BURKINA FASO
FAROE ISLANDS	NEW ZEALAND	URUGUAY
FALKLAND ISLANDS	NICARAGUA	UZBEKISTAN
FIJI	NIGER	VENEZUELA
FINLAND	NIGERIA	WALLIS AND FUTUNA
France	NIUE	SAMOA
DJIBOUTI	NORFOLK ISLAND	YEMEN
GABON	NORWAY	YUGOSLAVIA
GEORGIA	NORTHERN MARIANA ISL.	ZAMBIA
GAMBIA	MICRONESIA	
GERMANY	MARSHALL ISLANDS	

Annex 2: Multi-Fibre Agreement quotas and Ad Valorem equivalents

Imposition of import quotas is usually forbidden by international treaties (GATT or WTO). Nevertheless, developed countries have since 1973 drafted special agreements in the textiles and clothing industries (Multi-Fibre Agreements). The richest countries of the OECD have thus levied on a bilateral basis import quotas on products from countries which have expanded their local market share. The integration of MFA quotas into MAP Macs calls for the availability of ad valorem equivalents. The only source, to our knowledge, that applies the same estimation method to each importing country for all exporting countries, simultaneously in the textile and the clothing sector is the GTAP database.

Estimates by GTAP of protection rates from these MFA treaties, are given in tables 3 and 4. These estimates have been reduced to take into account the liberalization which have been conducted between 1997 and 1999 (16 per cent of the products affected par the quotas must be liberalised). We applied a reduction coefficient of 16 per cent. Thus we implicitly assume that eliminating quotas on $x\%$ of products concerned, is equivalent to reducing the AVE of protection on the group of products by $x\%$.

Table 3: AVE of the MFA quotas– textile sector – 1999

	Can	USA	Aust	Blg	Dnk	Fin	Fce	Ger	UK	Grc	Irl	Ita	Lux	Neth	Por	Spain	Swed	Swit	RA	RM	
China	17.4	17.4	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	0.0
H-Kong	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.0
Korea	2.1	2.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.0
Taiwan	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indonésia	7.1	7.1	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	0.0
Malaysia	7.1	7.1	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	0.0
Philipp.	5.7	5.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.1	5.0	5.0	5.0	5.0	5.0	5.0	4.9	0.2
Singapore	0.0	0.0	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.0
Thailand	7.2	7.2	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	0.0
Vietnam	6.0	6.0	6.5	6.5	6.4	6.6	6.5	6.5	6.5	6.6	6.5	6.5	6.6	6.6	6.5	6.6	6.5	6.6	6.6	6.6	0.5
Bg-Desh	13.3	13.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4	7.3	7.3	7.3	7.3	7.3	1.0
India	8.5	8.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	0.2
Sri Lanka	13.3	13.3	4.8	4.8	4.8	4.6	4.8	4.8	4.8	4.9	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	0.9
RAS (*)	13.3	13.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	0.1
Mexico	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
ACC(**)	6.3	6.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.1
Colombia	6.3	6.3	3.0	2.7	2.7	2.4	2.7	2.7	2.7	2.5	6.5	2.7	2.4	2.6	2.7	2.7	2.7	2.6	2.8	1.4	
Peru	6.3	6.3	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.7	2.7	2.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.1
Vénézuela	6.3	6.3	68.4	221	2.9	18.2	2.8	2.7	2.7	37.4	29.1	2.7	0.0	2.7	2.7	2.8	27.0	63.2	2.6	2.5	
RPA(***)	6.2	6.3	2.9	2.7	2.5	2.4	2.7	2.7	2.7	50.5	2.6	2.7	4.4	2.8	2.0	2.7	2.6	2.7	2.4	2.8	
Argentina	6.3	6.3	2.7	2.7	2.6	2.7	2.7	2.7	2.7	2.7	6.0	2.7	3.1	2.7	2.8	2.7	2.8	2.7	2.8	2.2	
Brazil	6.3	6.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.6
Chile	6.3	6.3	2.8	2.5	2.9	9.7	2.7	2.7	2.7	2.4	14.5	2.7	9.7	77.3	2.8	2.7	2.6	3.0	2.8	1.1	
Uruguay	6.3	6.3	2.7	2.7	2.5	5.8	2.7	2.7	2.7	2.8	5.8	2.7	2.9	35.9	2.5	2.7	3.6	2.6	2.5	0.0	
RA(****)	6.2	6.3	2.8	683	131	58.1	2.6	3.2	2.7	131	0.0	2.7	0.0	3.1	349	2.7	5.5	187	0.0	0.0	
Hungary	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Poland	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
AP (i)	6.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
AU S (ii)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turkey	6.1	6.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0
RMO(iii)	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0
Moroc	0.5	0.4	0.2	0.3	0.0	0.3	0.3	0.3	0.3	0.0	0.4	0.3	0.4	0.3	0.3	0.3	0.0	0.3	0.0	0.2	
RAN(iv)	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0
Botswana	0.3	0.3	0.0	0.0	0.0	0.0	87.2	174	0.0	0.0	0.0	87.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Namibia	0.4	0.4	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.2	0.3	0.0	
Malawi	29.1	0.0	0.0	43.6	0.0	0.0	0.0	149	0.3	0.0	0.0	0.0	0.0	43.6	0.0	29.1	0.0	0.0	0.0	0.0	
Mozamb.	87.2	0.5	0.0	0.3	0.0	0.0	0.3	0.3	192	0.0	0.0	488	0.5	131	0.3	87.2	0.0	87.2	0.0	0.0	
Tanzania	56.7	0.4	0.0	0.3	18.7	10.9	0.0	0.3	0.3	17.4	0.0	0.2	0.0	0.3	0.4	0.2	11.4	29.1	0.0	0.0	
Zambia	29.1	0.5	0.0	0.3	0.0	0.0	0.3	0.3	0.3	0.2	0.0	0.3	0.0	29.1	0.3	0.3	0.0	12.5	0.0	0.0	
Zimbab.	0.3	0.4	0.0	0.3	0.0	0.0	0.3	0.3	0.3	8.7	0.3	0.3	0.0	0.4	0.3	0.3	0.0	0.0	0.0	0.0	
RSA (v)	0.4	0.4	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.1	
Uganda	1046	6758	0.0	2791	262	0.0	0.0	5071	0.5	0.0	0.0	5117	0.0	2442	0.0	785	262	523	0.0	0.0	
RASS (vi)	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.1	
Rest of worl	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

(Source : GTAP et authors' calcul)

* : rest of Southern Asia; ** : Central America and Carribean; *** : rest of Andean Pact; **** : rest of south America; i : other countries from Eastern Europe; ii : former Soviet Union; iii: rest of Middle East; iv : rest of North Africa; v : rest of South Africa; vi : rest of sub-saharian Africa.

Table 3: AVE of the MFA quotas - clothing sector – 1999

	Can	USA	Aust	Blg	Dnk	Fin	Fce	Ger	UK	Grc	Irl	Ita	Lux	Neth	Por	Spain	Swed	Swit	RA	RM
China	28.8	28.8	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	0.1
H-Kong	8.7	8.7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	0.3
Korea	1.7	1.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Taiwan	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indonésia	6.8	6.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	0.2
Malaysia	6.8	6.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.2	5.2	5.2	0.1
Philipp.	6.8	6.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.2	5.1	5.2	5.2	5.2	5.2	0.3
Singapore	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.1	0.2	0.2	0.2	0.2	0.0
Thailand	11.5	11.5	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	0.1
Vietnam	6.2	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.2	6.3	6.2	6.3	6.3	6.3	6.3	2.3
Bg-Desh	7.1	7.1	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.3	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	3.1
India	29.8	29.8	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.2	13.3	13.3	13.3	13.3	13.3	13.3	1.9
Sri Lanka	7.1	7.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.2	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	0.9
RAS (*)	7.1	7.1	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	0.4
Mexico	0.0	0.0	4.1	4.1	4.1	4.2	4.1	4.1	4.1	0.9	4.0	4.1	3.9	4.1	4.1	4.1	4.1	4.0	4.1	2.7
ACC(**)	4.6	4.6	4.6	4.5	4.6	4.5	4.5	4.5	4.5	4.6	4.5	4.5	4.4	4.5	2.0	4.5	4.6	4.5	4.5	0.3
Colombia	4.6	4.6	4.6	4.5	4.5	4.3	4.6	4.5	4.5	4.9	4.6	4.5	4.6	4.6	4.7	4.5	4.6	4.4	4.6	3.5
Peru	4.6	4.6	4.5	4.5	4.4	4.4	4.5	4.5	4.5	4.4	4.5	4.5	4.6	4.5	4.6	4.5	4.5	4.5	4.5	0.1
Vénézuela	4.6	4.6	4.5	1402	973	5.0	4.5	4.5	4.6	851	352	4.6	65.4	2301	5.0	4.6	372	4.7	4.5	3.0
RPA(***)	4.6	4.6	4.5	4.6	4.8	4.1	4.6	4.5	4.5	5.1	81.0	4.5	4.4	4.6	4.3	4.6	4.6	4.5	4.6	0.5
Argentina	4.6	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.6	4.5	4.5	4.6	4.3	4.5	4.5	4.5	4.5	3.3
Brazil	4.6	4.6	4.5	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.8	4.5	4.7	4.5	4.5	4.5	4.5	4.5	4.6	2.2
Chile	4.6	4.6	4.6	4.6	4.5	4.4	4.6	4.5	4.5	4.1	4.5	4.6	5.8	4.6	4.6	4.6	4.5	4.6	4.6	3.5
Uruguay	4.6	4.6	4.6	4.4	4.6	4.6	4.6	4.5	4.5	4.2	4.7	4.5	0.0	4.5	4.7	4.4	4.5	4.5	4.8	1.8
RA(****)	4.6	4.6	5.8	321	218	7.9	866	4.6	4.6	203	4.8	1932	0.0	5.1	461	4.7	81.8	3.1	5.1	3.8
Hungary	4.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poland	4.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AP (i)	4.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AU S (ii)	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turkey	4.3	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RMO(iii)	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Moroc	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAN(iv)	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Botswana	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namibia	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malawi	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mozamb.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tanzania	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zambia	1862	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zimbab.	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RSA (v)	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uganda	3096	16126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RASS (vi)	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest of worl	2.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(Source : GTAP and authors'calcul)

RA : rest of EFTA; RM : rest of the world; * : rest of South Asia; ** : Central America and Carribean; *** : rest of Andean Pact; **** : rest of South America; i : other countries from Eastern Europe; ii : former Soviet Union; iii : rest of Middle-East; iv : rest of North Africa; v : rest of South Africa; vi : rest of sub-saharian Africa.

Annex 4: Rates of protection in the GTAP database

Levels of protection used in the GTAP database according to the classification indicated in the main text body are given in the 5 following tables – the importing countries are listed in the columns:

Table A1 : market access for cereals

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		195.8%	23.1%	25.1%	21.3%	9.0%	78.2%	94.0%
<i>Japan</i>	2.7%		33.3%	3.1%	21.4%	9.4%	35.7%	2.9%
<i>Morocco</i>	1.2%	77.8%		11.3%	12.9%	7.5%	39.8%	0.0%
<i>Eur. Union</i>	2.7%	22.2%	22.2%		19.1%	8.9%	40.1%	65.7%
<i>USA</i>	2.7%	62.7%	18.1%	20.4%		8.4%	56.5%	51.0%
<i>Brazil</i>	2.7%	22.1%	19.2%	3.1%	21.5%		35.7%	39.2%
<i>Switzerland</i>	2.9%	22.7%	0.0%	3.4%	21.5%	9.4%		14.6%
<i>China</i>	2.4%	51.8%	19.3%	15.5%	19.0%	9.8%	46.3%	

(Source : GTAP5)

Table A2 : market access for other agricultural products and food industry

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		69.4%	72.9%	29.6%	11.4%	18.3%	168.3%	19.0%
<i>Japan</i>	5.7%		46.2%	29.0%	9.4%	16.1%	120.6%	25.6%
<i>Morocco</i>	4.7%	39.2%		20.2%	10.3%	17.9%	95.9%	18.9%
<i>Eur. Union</i>	6.4%	49.6%	67.9%		8.0%	17.4%	136.7%	48.8%
<i>USA</i>	4.9%	48.3%	64.4%	14.5%		10.8%	127.8%	54.1%
<i>Brazil</i>	5.3%	47.7%	45.1%	16.2%	15.4%		166.7%	63.6%
<i>Switzerland</i>	5.6%	53.1%	60.8%	38.7%	16.3%	16.5%		17.7%
<i>China</i>	5.1%	39.4%	36.1%	18.3%	8.3%	11.3%	202.2%	

(Source : GTAP5)

Table A3 : market access for other primary products

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		0.5%	0.0%	0.0%	0.4%	0.2%	0.2%	3.4%
<i>Japan</i>	0.1%		0.0%	0.0%	0.3%	0.8%	0.0%	3.9%
<i>Morocco</i>	0.0%	1.9%		0.0%	0.2%	0.1%	0.0%	0.0%
<i>Eur. Union</i>	0.5%	-0.2%	5.7%		0.4%	3.1%	0.0%	2.9%
<i>USA</i>	0.1%	-0.1%	2.5%	0.2%		1.4%	0.1%	2.6%
<i>Brazil</i>	0.2%	0.2%	2.5%	0.0%	0.5%		0.1%	0.1%
<i>Switzerland</i>	5.2%	0.0%	10.4%	0.0%	0.5%	5.7%		3.3%
<i>China</i>	0.1%	-0.9%	0.2%	0.1%	0.7%	0.8%	0.4%	

(Source : GTAP5)

Table A4 : market access in the textile and clothing sector

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		2.2%	16.2%	3.3%	9.0%	8.8%	1.5%	15.9%
<i>Japan</i>	15.3%		17.5%	8.7%	10.9%	16.9%	2.1%	27.9%
<i>Morocco</i>	28.4%	15.9%		12.1%	11.8%	21.4%	1.8%	0.0%
<i>Eur. Union</i>	15.5%	12.4%	30.9%		9.7%	15.4%	0.0%	19.7%
<i>USA</i>	14.4%	12.1%	22.6%	8.8%		16.3%	2.1%	17.0%
<i>Brazil</i>	18.3%	9.6%	5.3%	6.3%	8.5%		1.7%	12.0%
<i>Switzerland</i>	13.9%	13.2%	25.1%	0.0%	9.6%	15.6%		27.1%
<i>China</i>	23.6%	12.1%	33.2%	10.1%	13.4%	22.2%	2.6%	

(Source : GTAP5)

Table A5 : market access for other manufactured products

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		0.3%	13.3%	2.0%	1.7%	14.2%	0.3%	13.0%
<i>Japan</i>	5.7%		10.6%	5.1%	2.4%	17.5%	0.2%	14.4%
<i>Morocco</i>	1.8%	0.4%		5.6%	0.9%	4.5%	0.5%	5.5%
<i>Eur. Union</i>	4.2%	0.7%	13.9%		2.5%	14.7%	0.0%	12.6%
<i>USA</i>	3.4%	0.5%	11.4%	3.3%		13.2%	0.4%	11.1%
<i>Brazil</i>	4.6%	0.8%	11.9%	4.0%	2.5%		10.6%	10.4%
<i>Switzerland</i>	2.3%	0.8%	10.3%	0.0%	3.0%	11.2%		12.9%
<i>China</i>	4.4%	1.1%	17.7%	4.8%	2.6%	16.2%	7.7%	

(Source : GTAP5)

Tableau A6 : market access for services

	Austral.	Japan	Moro.	Eur. union	USA	Brazil	Switz.	China
<i>Australia</i>		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<i>Japan</i>	0.1%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<i>Morocco</i>	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
<i>Eur. Union</i>	0.1%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%
<i>USA</i>	0.1%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
<i>Brazil</i>	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
<i>Switzerland</i>	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%
<i>China</i>	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

(Source : GTAP5)

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