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ASSESSING MARKET ACCESS: DO DEVELOPING COUNTRIES REALLY GET A PREFERENTIAL TREATMENT?*

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ABSTRACT

This paper provides an assessment of the existing preferences on the products currently exported in a few key developed countries' markets: EU, Japan and US. The analysis is undertaken drawing on the trade preferences database provided by the most recent version (release 6) of the GTAP database. This includes a presentation of the structure of tariff regimes in these key developed countries and identification of countries and sectors that are most reliant on tariff preferences. The paper computes theoretically consistent protection indexes using a comparative static applied general equilibrium model (Global Trade Analysis Project – GTAP) featuring imperfect competition. We construct bilateral indicators of protection focused on the applied tariffs faced by the exports of each country, using an index of trade policy restrictiveness, the Mercantilistic Trade Restrictiveness Index (MTRI), as the tariff aggregator. Our results provide a picture which is quite different from the one yielded by traditional indexes, such as the trade-weighted tariff average, or market access measures based on bound tariffs.

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♣ The opinions and judgements expressed in this paper only reflect those of the author, while they do not reflect those of FAO or its member governments.

1 Introduction

The study of the impact of industrial nations tariffs on the level and composition of their imports from developing countries has a long tradition (Balassa, 1965 and 1967). There are two major sources of bias against imports from developing countries: first, tariffs used by industrial nations have been found to bear more heavily on products of export interest to developing countries than on all imports or imports from other industrial nations; the second bias relates to tariff escalation.

On the other hand, over the years, major trading countries have extended trade preferences through a range of schemes aimed at promoting export growth in beneficiary countries. Preferential agreements are discriminatory policies entailing trade liberalization with respect to a subset of trading partners, which have been frequently utilized as an instrument for integrating the developing countries into the world trading system, on the basis of the assumption that this would promote their development. The world trading system is characterized by a wide variety of such agreements, which can be broadly categorized into two major types: reciprocal, entailing symmetric trade liberalization, and nonreciprocal, entailing asymmetric trade liberalization aimed at providing support to the country which gains improved market access without being required to open up its own domestic market.

Several studies have recently assessed the role of preferences (Bouët et al., 2005c; Candau and Jean, 2005), Hoekman and Ozden, 2005; Low et al., 2006). In particular, a comprehensive survey of studies on the benefits of preference regimes, undertaken by the Organisation of Economic Cooperation and Development (OECD, 2003), indicates that despite the different methodologies, different data sets and different assumptions, the overall impact of preferential trade arrangements on welfare and trade is non-negligible and generally positive, but also relatively small.

This paper contributes to this literature through a comparative assessment of the actual degree of market access granted by the European Union (EU), the United States (US) and Japan to different countries or group of countries. Two features of this study represent improvements over other attempts in the literature. Firstly, we use the detailed and comprehensive information on the level of applied trade barriers provided by the MAcMap database (Bouët et al., 2005a). Secondly, we assess the differential incidence of tariffs not relying on purely statistical measure of protection, such as average tariff rates, but we use a theoretically sound measure of market access: the Mercantilsitic Trade Restrictiveness Index (Anderson and Neary, 2003). Bilateral MTRIs are estimated on the basis of bilateral trade flows generated within a general equilibrium model framework.

The paper is organized into five more sections. The next section summarizes some major initiatives recently undertaken by the EU, the US and Japan in the area of preferences. Section 3 is devoted to the description of the model and database employed. The following section explains the approach

followed to develop the index used to compare the protection faced by different exporter in each market. Section 5 presents the results, and section 6 concludes.

2. A brief review of European Union, Japan and United States major preferential schemes

European Union

The EU is engaged in a web of preferential trade relations with other countries or regional groupings, which can be conceived as being made up of 'concentric circles', each one involving a different intensity of preferences, reciprocity and co-operation instruments. These range from the core integration among the 25 members, to the most distant circle where most-favoured-nation (MFN) treatment is applied according to the WTO rules. Between these two extremes there are the trade regimes applied to the European Economic Area (Norway, Iceland and Liechtenstein) and Switzerland; the Mediterranean partners (the Euro-Med agreements); the Africa, the Caribbean and the Pacific (ACP – formerly the Lome Convention, now the Cotonou Agreement) regime; the "Everything But Arms" preferences for least-developed countries (LDCs); the bilateral free trade areas with Mexico, South Africa (SA) and Chile, plus the ongoing negotiations with Mercosur; and the Generalyzed System of Preferences (GSP) for developing countries which are not included in the previous categories.

The unilateral preferences granted by the EU for developing countries exports are regulated by two main trade arrangements:

a) The GSP scheme recently extended till 2008.[1] The new EU GSP scheme, which was decided in April 2005, includes 3 categories of benefits: the General Scheme for all developing countries (with 40 percent of products receiving duty-free access, but with ceilings and graduation criteria that eliminate largest exporters); the 'Everything but arms' initiative granting to the LDCs duty-free access on all products with the exception of arms and munitions; the 'GSP plus', providing duty-free access to all products from 'countries with special development needs' which implement international conventions on the environment, and on human rights, and labour standards. The EBA considerably improved the preferential market access granted to LDCs, though a significant limitation may be found in the absence of improvement in the field of rules of origin.

b) The Cotonou Partnership Agreement includes preferences and linkages between trade and financial assistance for the over 70 ACP countries, which are mostly former colonies of the EU member States. The agreements constitutes the follow-up of a series of Yaoundè and Lomé

[1] The GSP Scheme is an exception to the MFN principle and was introduced into the GATT in 1971: it allows GATT (and then WTO) members to grant unilateral preferences to products originating from developing countries.

Conventions which provided non-reciprocal trade benefits in 99 percent of the industrial goods and some agricultural products. The Lomé preferences will last until 31 December 2007 (except for LDCs), after which reciprocity will be gradually introduced through new Economic Partnership Agreements. While the GSP is conceived as a unilateral, unbound grant by industrialized countries, the Lomé/Cotonou preferences are an integral part of a broader international treaty which is legally binding upon the two parties and by which the EU has committed itself on a contractual basis to ensure non-reciprocal preferential market access conditions for ACP products.

Concerning the bilateral Agreements, those with Mexico, Chile, and South Africa (SA) provide for progressive mutual liberalisation of goods and services, although free trade in agriculture and fisheries is not fully reciprocal and it is limited to lists of products. In the case of SA, for example, EU is bound to offer duty-free access to 95 percent (only 62 percent in the case of agricultural products) of SA products by 2010.

Finally, the Euro-Mediterranean Agreements apply to 10 Mediterranean partners as agreed at the 1995 Barcelona Conference, which launched the Euro-Mediterranean partnership with the goal to establish a Free Trade Area by 2010. The Bilateral Euro-Mediterranean Association Agreements are a first step in this direction; some of these provide for non-reciprocal free access for non-sensitive products into the EU market and progressive liberalization for other products.

United States

In the case of the US, a number of nonreciprocal preferential agreements are granted mainly to Latin American and African countries, either for developmental purposes, or with the aim at tackling specific economic and/or social problems of the regions. Moreover, a number of free-trade agreements are undertaken with Canada and Mexico – under the North American Free Trade Agreement (NAFTA) – and also with Australia, Chile, Israel, Jordan, and Singapore.

In general, the US follows the criterion of granting non reciprocal or unilateral preferential tariff treatment mostly to countries which qualify for the GSP. The US GSP programme provides for duty-free entry to all products covered by the scheme from designated beneficiaries. The scheme has been in operation since 1976, and then it has always been renewed.[2]

A significant improvement in the US scheme was recorded in 1997, when 1,783 new peoducts originating in LDCs were granted duty-free treatment. However, certain articles are excluded from the list of eligible products, and any article determined to be “import-sensitive” cannot be made eligible. Furthermore, the US scheme provides for ceilings for each product and country (“competitive need limits”), as well as for a “graduation” mechanism (Inama, 2006).

[2] The latest renewal occurred in 2002 and officially reauthorized the scheme through December 2006.

Other examples of non reciprocal developmental-based initiatives are the Caribbean Basin Trade Partnership Act (CBTPA), which was signed in 2000, with the aim of promoting the development of trade relations and the diversification of the small economies of the region. A similar initiative is The Andean Trade Preference Act, which was started in 1991 and expanded in 2002 under the Andean Trade Promotion and Drug Eradication Act, with the aim of combating drug production and trafficking in Bolivia, Colombia, Ecuador and Peru.

Another important initiative is the African Growth and Opportunity Act (AGOA), which was first signed in year 2000, and subsequently extended in July 2004 to a time horizon up to year 2015. The initiatives involves 37 African countries, to which the initiative offers duty free access for most agricultural commodities, some subject to tariff rate quotas and quota free access, as well as a certain number of textile and oil products. Rules of origin require that products should be grown, produced or manufactured in a beneficiary sub-Saharan African country, subject to a number of additional conditions related to national security, trade liberalisation, human rights respect, which are reviewed on an annual basis.

Altogether, LDCs are eligible for duty-free access with respect to the vast majority – 83 percent according to the US authorities - of the products listed in the US tariff schedule.

Concerning the free trade agreements, the implementation of the NAFTA started in 1994, and it has brought about a progressive elimination of trade barriers among the three countries involved. The agreement with Australia has been implemented since January 2005, and involves a progressive elimination of tariffs between the two countries over a period of 18 years as a maximum. Most tariffs on manufacture goods have been eliminated from the beginning, while exceptions include sugar and some dairy products on the US side, while Australia has agreed to maintain its quarantine system. With Chile, the agreement come into force in 2004, and it involves the establishment of a free trade area over a 12-years period. The vast majority of industrial goods have been covered by the agreement since its inception – up to 85 percent - while duties on other products are due to be gradually phased out. Finally, a free trade agreement was negotiated in 2004 with Morocco, providing for the implementation since the first of January 2006, as a first step of a wider strategy involving other countries in the Middle Eastern region. Most tariffs have to be eliminated immediately, while 5 percent of the lines will be gradually phased out over a period of nine years.

Japan

Also for Japan, the preferential trade policy mainly include the GSP system on the one hand, and a number of reciprocal regional agreements on the other. The Japanese scheme of generalized preferences was recently reviewed and extended for a new decade, until 31 March 2014. It provides selected preferences to 140 developing countries with reduction of MFN duties for agricultural

products according to a positive list approach. Most industrial products are covered and granted duty-free subject to ceiling and maximum country amounts. On average, the degree of preference is higher for industrial products than for agricultural ones, and a number of specific goods are excluded from the agreements, such as dairy products, footwear and textiles and clothing. Preferential margins are relatively low also for certain manufactured goods, such as leather, rubber, footwear and travel services.

LDCs enjoys a special treatment (duty-free entry, exemption from ceiling restrictions) for an extended list of products, which is deemed to account for about 80 to 90 percent of the total import value from these countries. Similar benefits has been granted since 2003 also to Singapore, under the Japan-Singapore Economic Agreement for a New Age Partnership (JSEPA), which covers a number of agricultural and fishery products.

Concerning reciprocal agreements, the main initiative in which Japan is involved is the Asia-Pacific Economic Cooperation (APEC), which was started in 1989, and sees the participation of 21 members economies, including Asian countries but also the US and the Russian Federation. The APEC goals include the establishment of a free trade area and an open investment space in the Asia-Pacific region by year 2010 for the more industrialised economies, and by year 2020 for the developing economies which are participating in the initiative. Since 2003, Japan has also started a structured dialogue with the Association of South-East Asian Nations (ASEAN), within the "Framework for a Japan–ASEAN Comprehensive Economic Partnership", which involves regular consultations on the liberalization and facilitation of trade in goods, with the aim of negotiating a free-trade area by year 2012.

3. Model and database

We use the GTAP model of global trade (version 6.2), that is a static, multi-region, general equilibrium model based on a representative household taking decisions about consumption, production, and public expenditure. The model includes international trade and transport margins, and bilateral international trade flows are handled assuming that products are exogenously differentiated by origin (Armington, 1969). As a standard closure, global investment adjusts to global saving, so that national balances of payments are endogenous: a "global bank" allocates world savings and investment across the countries or regions. As from Hertel (1997) and the GTAP web site (www.gtap.org), the model includes: demand for goods for final consumption (based on a Constant Difference of Elasticity functional form), intermediate use and government consumption,

demands for factor inputs (based on a Constant Elasticity of Substitution functional form), supplies of factors and goods, and international trade in goods and services.

The GTAP database is based on a set of the Social Accounting Matrices for individual countries; the latest version of GTAP database, version 6.2, provides a baseline referred to year 2001 for up to a maximum of 87 regions and 57 sectors. Trade policy is set at the tariff line level, but this implies a level of detail that is not consistent with the GTAP (or any other existing) model: the EU tariff schedule, for example, includes more than 10000 tariff lines. To reach consistency between trade distortions and model aggregation, a-theoretic trade weighted average tariffs are used.

It should be noted that the quality of the trade distortion data included in the version 6 of the GTAP database is much better than in the previous release due to the use of the MacMap-HS6 (version 1), a database at the HS-6 level intended to provide a set of consistent and exhaustive *ad valorem* equivalents (AVEs) of applied border protection across the world.[3] This resulted in considering applied/preferential tariffs rather than bound ones, and in a more accurate computation of the AVE for each trade instrument (Bouët et al., 2005a).

Specific tariffs are converted in AVEs terms by taking the ration of each import duty and a unit value, whose choice is a rather sensitive issue both from a theoretical and a political point of view. In MacMap, AVEs calculations are based on the median unit value of worldwide exports originating from a reference group to which the exporter belongs.[4]

For mixed tariffs, i.e. tariffs involving a choice (a maximum or a minimum operator) between different terms, the MacMap approach is the following:

- when the tariff is defined as an ad valorem base tariff, with in addition a cap and a floor (which are defined in specific terms), the base tariff is retained. If the base tariff is in specific terms and the cap and the floor are *ad valorem*, a simple average of the two bounds is retained. This prevents from adding any additional noise through AVE calculation;
- when the tariff involves a choice between two terms, priority is given to the one defined in *ad valorem* terms.

Concerning tariff rate quotas, three market regimes are considered, depending on the extent to which the quota is filled:

- if less than 90% of the quota is filled, it is considered not to be binding, hence the in-quota tariff rate is chosen as applied rate;

[3] MAcMap-HS6 is regularly improved and updated, and the corresponding information is available on the CEPII's website (*www.cepii.fr*).

[4] These groups are defined on the basis of a hierarchical clustering analysis based on GDP per capita (in terms of PPP) and trade openness.

- in the 90% to 99% range the quota is assumed to be binding, hence a simple arithmetic mean is considered as applied rate;
- if more than 99% of the quota is filled, this is considered to be binding, and therefore out-quota tariff rate is chosen as applied rate.

Finally, for prohibitive tariffs – whose presence is problematic when calculating AVEs - an upper limit to the is established starting at the HS6 level, which involves setting 1,000% as a maximum for the sum of all measures.

Changes to the model and generation of the 2004 baseline

In order to evaluate the market access level for all products and services, including agri-food and manufactured goods, we adopted an imperfect competition closure for the model. More specifically, we adopted the same approach suggested by Francois (1998) in order to model economies of scale and monopolistic competition. Regarding the former, scale economies are introduced in an otherwise standard specification through a new exogenous variable (OSCALE), while the output augmenting technical change variable (AO) is declared endogenous for the relevant sectors.

As far as the latter is concerned, in each region, when an industry *j* is assumed to be monopolistically competitive, this means that individual firms produce unique varieties of good *j*, and hence are monopolists within their chosen market niche. Given the demand for variety, the demand for each variety is less than perfectly elastic. However, while firms are thus able to price as monopolists, free entry drives their economic profits to zero, so that pricing is at average cost. Moreover, since consumers decide over different varieties and a non-nested structure for import demand is adopted, the Armington assumption is dropped. In practice, the substitution parameter between the domestic and the composite imported commodities (ESUBD) has been set equal to the "Armington elasticity" among imported commodities from different sources (ESUBM), where the latter is calibrated from the distance between average and marginal cost ("cost disadvantage ratio").

Concerning the service sectors, since the database does not include any protection measures, we introduced estimates of *ad-valorem* equivalent tariffs drawn from the literature (Park, 2002).

Version 6.2 of the database was aggregated for this application to include 22 regions, 39 products and 5 endowments (Table 1).

Table 1. Countries, regions, products and endowments

countrie/regions	products	endowments
Australia&New Zealand	**Agriculture**	Land
China	Paddy rice	Skilled labour
Japan	Wheat	Unskilled labour
ASEAN	Cereal grains	Capital
Rest of Asia	Vegetables, fruit, nuts	Natural resources
ACP countries	Oil seeds	
LDC countries	Sugar cane, sugar beet	
EU-25	Plant-based fibers	
EU candidades	Crops nec	
Rest of european countries	Bovine cattle, sheep and goats, horses	
Euromed countries	Animal products nec	
Turkey	Vegetable oils and fats	
India	Raw milk	
United States	Wool, silk-worm cocoons	
Canada	Forestry	
Mexico	Fishing	
Argentina	Bovine meat products	
Brazil	Meat products nec	
Chile	Dairy products	
Rest of Latin America	Processed rice	
No WTO	Sugar	
	Food products nec	
	Beverages and tobacco products	
	Manufactures	
	Minerals	
	Textile sector	
	Wood products	
	Paper products, publishing	
	Petroleum, coal products	
	Chemical, rubber, plastic products	
	Other manufacturing	
	Metal products	
	Motor vehicles and parts	
	Electronic equipment	
	Services	
	Water	
	Construction	
	Trade	
	Communication	
	Transport services	
	Financial	
	Other services	

Since the paper focuses on the EU, Japan and the US protection structure, the regional aggregation aims to highlight the most relevant regions for the bilateral trade policies of these countries. The product aggregation is as detailed as possible, taking into account the estimates available for the scale economies and the tariff equivalents. As a consequence, the largest number of products refer to the primary sector, but this is an interesting feature of the model, since these products present the highest levels of tariff protection (Bureau and Salvatici, 2004).

A number of changes have been introduced into the model in order to update the baseline from 2001 to 2004. Furthermore, we decided to include some policy changes already decided, but that are going to be implemented after 2004, such as the sugar sector reform or the EBA initiative in the case of the EU. More specifically, GDP, population, labour force and total factor productivity were shocked taking into account the changes between 2001 and 2004. Concerning the policy shocks, particular consideration was given to the Common Agricultural Policy, which has undergone significant modifications over this period: the residual implementation of the "Agenda 2000" reform, and the Fischler reform of 2003 (Bach et al., 2000; Brockmeier et al., 2001; van Meijl and van Tongeren, 2002). Moreover, the enlargement of the EU, and the related extension of the CAP to ten new members was taken into account by removing import tariffs between the EU and the CEECs, and through the alignment of export, output and input subsidies or taxes. Finally, a set of shocks was introduced into the model to take into account the change in the preferential policy pursued with the EBA framework, allowing all imports from the LDC countries to access the EU market duty free from 2009.

Concerning reduction of intervention prices in the sectors of rice, sugar, cereals and dairy products[5] their changes were approximated through changes in the corresponding import taxes. With regards to the Fischler reform, given the model's characteristics, it was only possible to consider the decoupling of direct payments, i.e. their switch to non-crop-specific payments. This measure, which is considered the most important among those introduced by the 2003 reform, is represented in the model through a homogeneous subsidy to land use, captured by an additional variable, whose level is determined endogenously on the basis of the expenditure arising in the baseline from the granting of crop-specific subsidies. It is worth mentioning that in order to have a proper modelling of the CAP, the previous shocks have been implemented distinguishing among the old (EU15) and the new (EU10) members of the EU: only at the end of the baseline creation procedure, a new aggregation (EU25) was created in order to compute the protection indexes for the enlarged EU.

Concerning other countries' policies, some of the provisions of the 2002 FSRI Act were included in the baseline, following mostly Bouët *et al.* (2005b). A reduction in land productivity was introduced to take into account the increase in the acreage conservation program; output subsidies were increased for cereals and dairy products, but decreased in the case of soybeans.

Also the decoupled payments of the PROCAMPO program in Mexico have been increased in 2004, taking into account the rates applied for farmers with more and less than five hectares of land (FAO,

[5] For raw milk, output quota were modelled by setting production exogenously at the level of the base period, and checking after each step undertaken in building the 2004 baseline, that this limit was effectively binding. This prevents the quota from acting as a minimum rather than a maximum constraint on output

2005) through a weighted average increase based on sizes reported by Eastwood *et al.* (2004). Finally, the recent introduction of direct payments in 13 provinces of China was also taken into account (FAO, 2005) as an *ad valorem* subsidy to land use in cereals, rice, and oilseeds, taking into account of the share of the relevant provinces in total arable land.

Finally, the integration of China into the WTO has been implemented by updating the level of tariffs to 2004, based on data from the TRAINS database. In order to be coherent with the GTAP database, the tariffs introduced into the model are weighted by trade flows.

4. Mercantilistic trade restrictiveness index

In order to take into the trade impact of protection, one could simply calculate a bilateral trade-weighted average. As it is known, however, this would underestimate the protection effect, because of the endogeneity bias: actual trade is much lower with high tariffs than it would be with lower tariffs. On the other hand, using an "equivalence-based" index with a behavioral underpinning such as the MTRI, the weights depend on import volumes evaluated at world prices (Anderson and Neary, 2005).

The MTRI relies on the idea that trade policy can be evaluated using trade volume as the reference standard, by considering the extent to which trade distortions limit imports from the rest of the world. The policy aggregation procedure answers the following question: what is the equivalent uniform tariff that, if imposed to a country's imports, would leave its aggregate imports *unchanged?* Therefore a uniform tariff τ^{μ} is defined, that yields the same volume (at world prices) of tariff-restricted imports as the initial vector of (non-uniform) tariffs. This can be expressed through the import demand functions *M*, holding the balance of trade function at level B^0 constant, according to:

$$(1) \qquad \tau^{\mu} : M\left[p^{*}\left(1+\tau^{\mu}\right), B^{0}\right] = M^{0}\left(p^{0}, p^{*}, B^{0}\right), \text{ with } p^{\mu} \equiv p^{*}\left(1+\tau^{\mu}\right).$$

where p^{*} denotes a vector of international prices (p_k^{*}) of *N* goods *k = (1,…,N)*, M^0 is the value of aggregate imports (at world prices) in the reference period, and p^0 is the initially distorted price vector. Define the scalar import demand as

$$(2) \qquad M\left(p, p^{*}, B\right) \equiv \sum_{c=1}^{r}\sum_{k=1}^{N} p_{c,k}^{*} I_{c,k}^{m}\left(p, B\right)$$

where $I_{c,k}^{m}$ denotes the uncompensated (Marshallian) import demand function of good *k* from country *c*. Accordingly, the MTRI uniform tariff τ^{μ} would lead to the same volume of imports (at world prices) as the one resulting from the uneven tariff structure, denoted by the *N-r* bilateral tariffs matrix *T* whose elements are $t_{c,k}$:

$$(3) \qquad \sum_{c=1}^{r}\sum_{k=1}^{N} p^{*}_{c,k} I^{m}_{c,k}\left[p^{\mu}, B^{0}\right] = \sum_{c=1}^{r}\sum_{k=1}^{N} p^{*}_{c,k} I^{m}_{c,k}\left[p^{0}, B^{0}\right]$$

The previous definition focuses on the overall distortion imposed by a country's trade policies on its import bundle. However, we focus on the calculation of a bilateral version of the MTRI uniform tariff, in order to obtain the level of trade restrictiveness imposed on exports of each country *c*. Following Kee et al. (2005) and Antimiani and Salvatici (2005) we compute the MTRI uniform tariff bilaterally, to capture the trade restrictiveness that countries impose on each other. Accordingly, in equation (2) we only sum over *k*, rather than over *k* and *c*, in order to obtain a bilateral uniform tariff MTRI (τ_c^{μ}), defined as follows:

$$(4) \qquad \tau_c^{\mu} : M_c\left[p^{*}\left(1+\tau_c^{\mu}\right), B^{0}\right] = M_c^{0},$$

where $M_c^{0}\left(p^{0}, p^{*}, B^{0}\right) \equiv \sum_{k=1}^{N} p^{*}_{c,k} I^{m}_{c,k}\left[p^{*}_{c,k}\left(1+t_{c,k}\right), B^{0}\right]$ is the value of aggregate imports (at world prices) from country *c* in the reference period.

In this bilateral protection index, trade restrictiveness is the product of the structure of protection and the trade flows product specialization. Even if the importing country would apply MFN bound tariffs to all exporters, the impact would be differentiated: trade would be more restricted for countries whose exports face the highest tariffs. In order to show the structure of protection we compute a separate MTRI uniform tariff for each of the three main sectors in the economy: agriculture, industry and services. In order to compute the *ith* sectoral MTRI uniform tariffs ($\tau_c^{\mu i}$), equation 4 is modified as follows:

$$(5) \qquad \tau_c^{\mu i} : \sum_{k=1}^{Ni} p^{*}_{c,k} I^{m}_{c,k}\left[p^{*}_{c,k}\left(1+\tau_c^{\mu i}\right), B^{0}\right] \equiv \sum_{k=1}^{Ni} p^{*}_{c,k} I^{m}_{c,k}\left[p^{*}_{c,k}\left(1+t_{c,k}\right), B^{0}\right],$$

where *Ni* is the number of products included in each sector (Table 1).

Finally, in the standard definition prices are assumed to be fixed in world markets. Anderson and Neary (2003), argue (footnote 8) that "there is a rationale for a ceteris paribus trade restrictiveness index that fixes world prices even when these prices are in fact endogenous". Such a rationale may be represented by the fact that, by keeping world prices constant, one focuses on the component of protection explained by national policies, rather that by the degree of market power of the country.

In our case, though, we need to recast the definition of the MTRI to make it consistent with the model used for its computation, since, the GTAP model is global and calculates world prices endogenously. Therefore, in order to compute the MTRI taking into account the terms of trade impact, we need to redefine the uniform tariff equivalent relaxing the small country assumption. The vector of world prices *p**, then, is a function of the tariffs *T*. To accommodate this, the definition of the MTRI [see equation (4)] is modified as follows

(6) $$\tau_c^w : M_c\left[\left(1+\tau_c^w\right)p^*(T), B^0\right] = M_c^0,$$

where (τ_c^w) is the bilateral MTRI uniform tariff with endogenous world prices.

In the case of τ^μ, totally differentiating (1) to derive the effects of tariff changes, holding p^* and B^0 fixed, gives:

(7) $$\frac{d\tau^\mu}{1+\tau^\mu} = \frac{M_p^0 dp^0}{M_p^\mu p^\mu}.$$

With endogenous world prices ($dp = p^* dt + t dp^*$), totally differentiating equation (1) we get

(8) $$\frac{d\tau^w}{1+\tau^w} = \frac{M_p^0 p^* dt^0}{M_p^w p^w} + \frac{M_p^0 dp^*}{M_p^w p^w}\left(t^0 - \Phi\tau^w\right), \text{ where } \Phi \equiv \frac{M_p^w dp^*}{M_p^0 dp^*}.$$

ϕ is a correction factor which is needed because the import volume function is evaluated at two different points (denoted by superscripts): the initial tariff-distorted price vector p^0 and the uniform-tariff-equivalent price vector $p^w \equiv p^*\left(1+\tau^w\right)$. Comparing (7) and (8) it appears that τ^w could be either larger or smaller than τ^μ.

The computation of MTRI is performed through the definition of either a new variable, *tr(r,s)* which represents the product-generic tariff levied on imports from region *r* into region *s* (EU25, US and Japan), or three variables corresponding to the sectoral indexes. Then we run the model, starting from our counterfactual baseline, assuming that all trade policies (i.e., tariffs and export subsidies) with respect to a specific region *s* are removed. In the closure, *tr(r,s)* is set endogenous, while aggregate imports at world prices from region *s* into the EU are exogenized. Alternatively, we fix the three aggregate sectoral imports, endogenizing the respective uniform tariffs. In conclusion, we ask the model to compute the uniform tariff(s) that would eliminate all incentives to increase or decrease the volume of imports from the region/country under consideration.

5 Results

Table 2 presents all the results we obtained for the MTRI bilateral uniform tariffs.

Table 2 - Uniform tariff (MTRI)* of USA, Japan and EU25 with respect to some countries/areas

	usa				Japan				Eu25			
	tr1	tr2	tr3	tr	tr1	tr2	tr3	tr	tr1	tr2	tr3	tr
Rest of Europe	9.8	0.8	22.9	4.0	13.3	0.8	28.3	8.2	9.3	0.0	21.6	1.8
EU candidates	11.8	3.6	20.1	11.3	9.1	2.4	23.1	16.7	10.4	-0.7	19.2	1.8
LDC	1.8	3.4	24.1	3.9	62.9	0.2	25.5	15.9	0.0	0.0	20.1	0.8
ACP	9.4	4.6	21.1	6.1	105.5	0.3	23.8	25.3	45.2	0.2	18.7	11.4
Australia&New Zealand	5.5	1.2	22.4	6.1	121.7	0.2	24.1	26.3	15.7	0.6	19.6	9.5
Euromed countries	2.4	2.4	21.3	9.0	7.9	3.9	22.6	15.0	39.1	0.0	18.1	5.9
China	2.6	3.7	38.5	5.5	92.5	3.2	32.4	10.7	25.9	3.5	25.5	7.5
ASEAN	2.8	2.6	25.3	3.4	63.1	0.7	30.4	6.5	15.1	2.9	27.8	7.3
Rest of Asia	0.7	12.3	26.4	12.5	6.8	4.7	27.7	9.3	5.7	7.8	22.0	9.0
Rest of Latin America	3.0	4.4	17.8	4.4	129.4	0.4	22.4	65.9	35.8	0.0	16.7	15.9
Japan	3.5	1.6	24.8	2.0	-	-	-	-	10.2	3.3	26.1	6.1
India	1.2	3.9	25.5	4.9	151.8	1.4	35.2	72.7	48.8	4.1	26.7	17.6
Canada	1.2	0.0	19.2	0.0	81.9	0.5	27.7	36.2	7.5	1.0	21.7	8.8
USA	-	-	-	-	67.7	0.2	25.4	16.5	12.1	1.6	21.4	7.9
Mexico	0.3	0.0	22.7	0.0	54.0	1.7	23.2	34.6	8.4	0.1	19.6	5.1
Argentina	9.3	1.5	15.5	4.6	57.1	0.3	21.3	34.7	13.1	1.4	16.9	10.8
Brazil	9.1	2.2	23.5	3.7	13.1	0.4	32.9	6.8	52.2	0.8	25.6	28.9
EU25	4.0	1.3	23.7	5.1	69.0	1.8	27.8	18.3	-	-	-	-
NoWTO	2.4	1.1	23.9	2.0	19.6	0.2	27.1	2.1	5.7	0.7	21.6	2.1
Turkey	7.8	6.3	25.7	9.8	4.5	2.0	22.3	15.9	23.1	0.2	19.8	8.1
Chile	1.8	1.2	21.5	2.2	35.5	0.1	23.4	15.6	9.4	0.1	18.7	3.3
Coefficient of variation	0.80	0.95	0.20		0.77	1.08	0.15		0.81	1.50	0.16	

Source: GTAP simulation

*tr: overall MTRI; tr1: MTRI agricoltural sector; tr2: MTRI industrial sector; tr3: MTRI services sector

Total MTRI tariff values, reported in the columns under the heading "tr", show that the overall border protection is generally higher in Japan, and lower in the case of the US. Table 3 summarizes the degree of reciprocity in market access between US, EU and Japan. There are large imbalances in the case of Japan, since both the EU and the US face a much higher protection (3 and 8 times, respectively) than the one they impose on Japanese exports. On the contrary, bilateral protection rates among EU and US are of the same order of magnitude.

Table 3 - Reciprocal market access between USA, EU and Japan

Exporter/importer	EU25	Japan	USA
EU25	-	18.3	5.1
Japan	6.1	-	2.0
USA	7.9	16.5	-

Source: GTAP simulation

Comparing the bilateral protection indexes faced by the exporting countries or regions in the EU, Japan and the US markets, we notice that only for one group ("Rest of Asia") the American market is the most protected; in two cases ("ASEAN" and Brazil) this happens with reference to the European market; all remaining exporters face the highest protection in the Japanese market.

There are large differences in the geographical structure of protection of the three countries. Table 4 presents the correlation and rank correlation (Spearman's rho) between the results in Table 2. None of the pair wise correlation indexes regarding the US is statistically significant: this country, then, follows a geographical pattern quite different from the other two. On the other hand, EU and Japan have five countries or regions in common between the seven most protected sources of imports – India, "Rest of America", Argentina, Australia and New Zealand, "ACP countries" – while the

exporters facing the highest barriers in the US market are “Rest of Asia”, Bulgaria, Croatia and Romania (“EU candidates”), Turkey and the “Euromed countries”.

Table 4 - Correlation coefficient and rank correlation coefficient among MTRIs uniform tariffs

	r	rho
EU-Japan	0.409*	0.451*
EU-US	-0.034	0.183
Japan-US	-0.189	0.018

Source: GTAP simulation * significant at 10%

Notwithstanding the fact that developing countries benefit from preferential access as a result of several trade initiatives (see Section 2), our results show that they still face significant barriers. The overall bilateral MTRI uniform tariffs are negatively correlated both with exporters’ GDP and per capita GDP (Table 5): the higher is a country’s GDP, the lower the trade barriers imposed by the EU, the US or Japan on its exports. In most cases the absolute value of the correlation is quite low, but one would have definitely expected a direct relationship as far as developed countries policies are concerned. This finding is consistent with other recent results (Kee, Nicita and Olarreaga, 2005), but it is certainly at odds with the preferential access rhetoric.

Table 5 - Correlation coefficient between MTRI uniform tariffs and GDP values

	Total GDP	Per capita GDP
EU	-0.052	-0.100
US	-0.178	-0.395
Japan	-0.118	-0.018

Source: GTAP simulation

An explanation for this is that the incidence of nontariff measures in a number of OECD countries tends to be disproportionately high on products that developing export – especially agricultural products (World Bank, 2005). An implication is that nontariff measures matter, as they tend to reduce the effective value of the preferential access granted through tariff exemptions. Thus the higher MTRIs against low-income countries may reflect the product composition of imports – developing countries happen to export the goods most affected by nontariff measures.

However, we do not want to emphasize too much this explanation here, since the MacMAP database only includes a few of all the existing nontariff barriers (section 3). Accordingly,

additional explanations should be provided for the fact that trade policies of high-income countries imply higher MTRI uniform tariffs on imports from low income countries.

In order to shed some light on these apparently puzzling results, we computed the MTRI uniform tariffs at the sectoral level: results are reported under the headings "tr1", "tr2", "tr3" in Table 2. As it could have been expected, protection levels for services (*tr3*), which were introduced into the model through the estimate of the *ad valorem* equivalents, are quite homogeneous across exporters. In the case of goods, agriculture (*tr1*) and manufactures (*tr2*), protection levels are much more uneven, as it is shown by the values of the coefficient of variation (Table 2). However, it appears that protection levels are much higher in agriculture, where the multilateral liberalization process only started in 1994 at the end of the Uruguay Round, in comparison with the other goods that have come a long way since the creation of the GATT in 1947.

The fact that the existence of preferential policies does not show up in the overall bilateral indexes of protection, then, is mostly due to the distribution of tariffs across activities. Most intra-OECD trade is in manufactures, while developed countries' tariff profiles are heavily biased against agricultural imports. As a consequence, developing countries still face an overall level of protection higher than developed countries, especially in the case of middle income countries, which do not benefit from preferences granted to the poorest countries.

It is also interesting to check the extent to which trade policies of the US, the EU and Japan show some consistency in the structure of preferences across sectors. Table 6 presents the correlation and rank correlations between the results for the EU.

Table 6 - Correlation coefficient and rank correlation coefficient among EU bilateral MTRI uniform tariffs in different sectors

	r	rho
tr1-tr2	-0.037	0.083
tr1-tr3	0.142	0.066
tr2-tr3	0.0561*	0.669**

Source: GTAP simulation

* significant at 0.05

** significant at 0.01

The geographical distributions of agricultural barriers does not seem to have any connections, neither in terms of intensity nor in terms of ranking, with the access granted in the case of manufactures and services. On the contrary, the protection granted to these two sectors seems to follow a common geographical pattern: the bilateral values are directly related and the countries

getting a preferential access for their industrial products in several cases are the same that benefit from a better access in terms of services.

We do not present the results in terms of correlation and rank correlation for the US and Japan, since they are not significantly different from zero. This implies that there is no significant correlations among the levels of protection faced by each exporter. Since the US and Japan trade policies determine a different geographical pattern of protection in each sector, the countries facing the lowest barriers in one sector are not necessarily the same as those benefiting from a preferential treatment in another.

Looking at the agricultural MTRI tariff values, it appears that the most restricted countries in their agricultural trade with the EU are some developing countries – such as Brazil and India – and even the ACP countries, a group with a long tradition of (supposedly) preferential access into the EU market. The LDCs benefit from the implementation of the EBA initiative, while it is remarkable that the countries still waiting to be accepted as WTO members, such as Russia, seem to enjoy quite a favourable treatment.

In the case of the US, the highest barriers in agriculture are faced by non-EU European countries, as well as by Latin-American countries – such as Brazil and Argentina, while Canada and Mexico benefit from the implementation of the NAFTA. Finally, Japanese agricultural protection is relatively high vis-à-vis India, Oceania and China; while Middle-east and North African countries enjoy more favourable access conditions.

It is worth emphasizing three somehow unexpected results. Firstly, the LDCs enjoy a strong preferential access only in the EU market; it should be recalled, however, that in this case the elimination of all restrictions on LDCs' exports following the implementation of the EBA initiative was explicitly introduced in the baseline.

Secondly, the countries which are not WTO members do not seem to be worse off in terms of the trade barriers they face, a finding that may cast doubts on the (real) reasons for joining the "WTO club". There is some evidence, indeed, that countries belonging to the GATT/WTO do not show very different trade patterns compared to outsiders (Rose, 2004).

Thirdly, the ACP countries which are not included in the LDCs group face significant protection levels in all exporting markets considered. Such a result is particularly surprising in the case of the EU, since these countries benefit from one of the most generous trade preference scheme. However, despite a number of beneficiaries increasing over time, the share of EU imports from the ACP in total EU imports decreased from 6.7% in 1976 to 3.11% in 2002 (Manchin, 2005), and the European Commission itself expressed serious doubts on the benefits of the ACP preferential regime during the design of the Cotonou agreement (Bureau and Matthews, 2005a).

To better understand the difficulties faced by some countries in accessing the agricultural markets of three of the most important developed countries, it is worth recalling that a significant share of imports are MFN duty free in the QUAD countries (Canada, EU, Japan, US). On the other hand, all of the QUAD countries deny preferential access on some imports subject to positive MFN duties (Low et al., 2006).[6] In the following tables (Tables 7,8, and 9) we show the contributions of the most relevant agricultural products to the total agricultural uniform tariff for each importing country.

[6] For example, in the case of the EU agro-food imports under a non zero MFN duty from developing countries represent 18% of total agro-food imports (Bureau and Matthews, 2005b).

Table 7 - Decomposition of EU agricultural MTRIs by sector

Uniform tariffs	ACP	Argentina	ASEAN	CHINA	India	Brazil	Japan	LDC	North Africa	NoWTO	USA	Rest of Europe	EU candidates	Australia&New Zealand	Rest of Asia	Canada	Mexico	Turkey	Chile	Rest of Latin America
Weighted average	**15.1**	**11.3**	**11.7**	**15.0**	**7.8**	**20.4**	**7.3**	**0.0**	**10.4**	**4.3**	**8.8**	**6.3**	**11.0**	**9.2**	**4.3**	**6.1**	**4.7**	**12.4**	**9.0**	**20.8**
MTRI	**45.2**	**13.1**	**15.1**	**25.9**	**48.8**	**52.2**	**10.2**	0.0	**39.1**	**5.7**	**12.1**	**9.3**	**10.4**	**15.7**	**5.7**	**7.5**	**8.4**	**23.1**	**9.4**	**35.8**
paddy rice	0.0	0.0	**0.8**	**0.1**	**2.5**	0.0	**0.2**	0.0	0.0	**0.2**	**0.6**	0.0	0.0	**0.2**	**1.0**	0.0	0.0	0.0	0.0	0.1
wheat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	**0.2**	0.0	0.1	0.0	0.0
cereal grains	0.0	**0.7**	0.0	0.1	0.0	**0.2**	0.0	0.0	0.0	**0.1**	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
vegetables	**2.3**	**1.4**	**0.1**	**7.5**	**0.1**	**0.2**	**0.1**	0.0	**2.3**	**0.5**	**0.4**	0.0	**0.5**	**0.6**	**0.2**	0.1	**1.0**	**0.4**	**4.6**	**14.3**
sugar cane	0.0	0.0	0.0	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	0.1	0.0	0.0
sugar	**26.3**	**0.1**	**0.1**	**0.1**	**1.1**	**1.4**	**0.1**	0.0	0.1	**0.3**	0.1	0.1	0.1	0.0	0.1	0.0	**4.2**	**0.6**	0.0	**14.5**
oils&fats	0.0	0.0	**0.8**	0.0	0.1	0.0	**0.2**	0.0	**15.6**	**0.2**	0.1	0.0	**0.3**	0.0	0.0	0.0	0.0	**4.3**	0.0	0.0
cattle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
crops	0.1	**0.2**	**0.5**	**0.2**	**0.4**	**0.5**	**0.5**	0.0	0.1	**0.4**	**1.6**	**0.1**	**0.3**	0.0	**2.5**	**0.4**	**0.3**	0.0	0.0	0.0
animal products	0.0	0.0	0.1	**0.2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0
fishing	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.1**	0.0	0.0	0.1	0.0	0.0	0.0	**0.1**	0.0
meat	**15.2**	**5.0**	0.1	0.0	**37.4**	**44.4**	**0.5**	0.0	**20.1**	**0.7**	**0.8**	**2.2**	**1.7**	**0.9**	0.0	**0.7**	0.0	**10.7**	0.0	**6.2**
meat products	0.1	**0.7**	**5.7**	**0.6**	**0.2**	**2.5**	**1.2**	0.0	0.0	**0.4**	**1.7**	**0.2**	**1.0**	**0.2**	0.0	**0.6**	**0.9**	**4.2**	**1.4**	0.0
beverages&tobacco	**0.4**	0.1	**0.2**	**0.3**	0.1	0.0	**0.3**	0.0	0.1	0.1	**0.6**	**0.7**	**1.0**	**0.4**	0.1	0.1	**0.2**	0.0	**1.3**	0.0
food	**0.8**	**4.9**	**3.1**	**2.6**	**1.1**	**3.2**	**3.3**	0.0	**0.3**	**1.5**	**3.6**	**2.0**	**1.5**	**0.4**	**0.8**	**2.8**	**1.7**	**0.2**	**1.8**	**0.3**
dairy	0.1	**0.1**	0.0	0.0	0.0	0.0	**0.6**	0.0	0.1	**1.4**	**0.7**	**4.7**	**0.7**	**12.8**	0.0	**2.5**	0.1	**2.5**	0.1	0.0
processd rice	0.0	0.0	**3.8**	**14.2**	**5.9**	0.0	**3.3**	0.0	**0.9**	**0.3**	**1.8**	0.0	0.0	0.1	**1.1**	0.0	0.0	**0.1**	0.0	**0.5**

Source: GTAP simulation

Table 8 - Decomposition of Japan agricultural MTRIs by sector

Uniform tariffs	ACP	Argentina	ASEAN	Brazil	India	USA	China	LDC	Euromed countries	NoWTO	EU25	Rest of Europe	EU candidates	Australia&New Zealand	Rest of Asia	Canada	Mexico	Turkey	Chile	Rest of Latin America
Weighted average	**33.0**	**15.6**	**19.4**	**8.6**	**5.1**	**37.4**	**21.0**	**5.0**	**6.8**	**5.8**	**29.9**	**7.2**	**7.3**	**52.7**	**6.5**	**50.1**	**35.6**	**3.6**	**10.1**	**5.7**
MTRI	**105.5**	**57.1**	**63.1**	**13.1**	**151.8**	**67.7**	**92.5**	**62.9**	**7.9**	**19.6**	**69.0**	**13.3**	**9.1**	**121.7**	**6.8**	**81.9**	**54.0**	**4.5**	**35.5**	**129.4**
paddy rice	0.0	0.0	**15.8**	0.0	0.0	**32.4**	0.1	0.0	0.0	**10.9**	**22.9**	0.0	0.0	**15.2**	0.0	**5.8**	0.0	0.0	0.0	0.0
wheat	**61.8**	0.0	0.0	0.0	**25.4**	**3.5**	0.0	0.0	0.0	**4.7**	**0.7**	0.0	0.0	**25.4**	0.0	**36.2**	0.0	0.0	0.0	0.0
cereal grains	**2.4**	**5.1**	0.0	**1.3**	0.0	**0.2**	0.0	0.0	0.0	**1.0**	0.0	0.0	0.0	**1.9**	0.0	**1.3**	0.0	0.0	0.0	0.0
oilseeds	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
vegetables	**0.3**	**2.0**	**0.6**	**0.4**	**0.1**	**2.0**	**1.9**	0.1	**0.3**	**0.5**	**0.2**	0.0	0.0	**0.3**	**0.4**	**2.2**	**0.4**	**0.4**	**0.4**	**0.7**
sugar	**39.4**	**35.8**	**5.4**	**4.5**	**6.0**	**5.3**	0.0	**1.9**	**1.0**	**0.7**	**4.2**	**0.2**	0.0	**12.7**	**0.3**	0.0	0.0	0.0	**0.4**	**1.3**
oils&fats	0.0	**0.2**	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
cattle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	**0.2**	0.0	0.0	0.0	0.0	0.0	0.0
crops	0.0	0.0	**0.1**	0.0	**0.2**	**0.3**	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	**1.5**	0.0	0.0	0.0	0.0	0.0
animal products	0.0	**0.1**	0.0	0.0	0.0	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
wool	0.0	0.0	0.0	**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
fishing	**0.2**	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	**0.4**	0.1	0.1	**0.4**	0.0	0.0	**0.2**	0.0	0.0
meat	**0.2**	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	**9.4**	**0.7**	**0.1**	0.0	**13.8**	0.0	**3.0**	**1.6**	0.0	**5.6**	**2.0**
meat products	0.0	**0.2**	**1.2**	**3.0**	0.0	**3.6**	0.0	0.0	**2.1**	**19.0**	**28.9**	**5.1**	**3.5**	**1.2**	0.0	**32.2**	**51.6**	**0.2**	**16.0**	**0.1**
beverages&tobacco	**0.3**	**1.8**	**0.4**	0.1	0.1	**0.2**	**0.1**	0.1	0.1	**0.6**	**1.8**	**0.1**	**1.6**	**0.2**	0.1	**0.2**	0.1	**0.2**	**0.5**	0.1
food	**0.9**	**1.5**	**3.7**	**2.8**	**1.2**	**4.1**	**0.9**	**5.8**	**2.7**	**2.0**	**2.7**	**4.6**	**2.2**	**2.1**	**4.2**	**0.8**	**0.3**	**1.3**	**2.2**	**1.1**
dairy	0.0	**10.5**	**5.9**	**0.4**	**0.3**	**0.3**	0.0	0.0	**13.2**	**1.5**	**5.9**	**2.8**	**1.7**	**4.6**	0.0	**0.2**	0.0	**2.2**	**9.5**	0.1
processd rice	0.0	0.0	**29.9**	0.0	**118.4**	**40.6**	**59.8**	0.0	0.0	**17.5**	**1.0**	0.0	0.0	**44.2**	0.0	0.0	0.0	0.0	0.0	**124.0**

Source: GTAP simulation

Table 9 - Decomposition of US agricultural MTRIs by sector

Uniform tariffs	ACP	Argentina	ASEAN	Brazil	China	India	Japan	LDC	Euromed countries	NoWTO	EU25	Rest of Europe	EU candidates	Australia&New Zealand	Rest of Asia	Canada	Mexico	Turkey	Chile	Rest of Latin America
Weighted average	**5.7**	**7.0**	**2.4**	**6.9**	**2.6**	**1.1**	**3.2**	**2.3**	**2.3**	**2.0**	**3.3**	**6.7**	**7.0**	**4.8**	**0.7**	**1.1**	**0.3**	**6.7**	**1.5**	**2.3**
MTRI	**9.4**	**9.3**	**2.8**	**9.1**	**2.6**	**1.2**	**3.5**	**1.8**	**2.4**	**2.4**	**4.0**	**9.8**	**11.8**	**5.5**	**0.7**	**1.2**	**0.3**	**7.8**	**1.8**	**3.0**
paddy rice	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
wheat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oilseeds	**0.2**	**0.7**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
vegetables	0.0	0.1	0.0	0.1	**0.3**	**0.2**	0.0	0.0	**0.4**	0.1	0.1	0.0	**0.1**	0.0	**0.1**	0.0	0.1	**0.2**	**0.5**	0.1
sugar	**7.4**	**1.2**	**0.7**	**3.9**	0.1	**0.2**	**0.4**	**0.8**	**0.2**	**0.7**	**0.1**	0.1	0.1	**1.0**	0.0	0.1	0.0	0.1	0.0	**2.5**
oils&fats	0.0	**0.3**	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
crops	**0.8**	**1.3**	**0.8**	**3.1**	**0.4**	**0.2**	0.1	**1.7**	0.0	**0.4**	**0.3**	**0.7**	**1.4**	0.0	**0.2**	0.0	0.0	**6.0**	0.1	**0.3**
meat	0.0	**1.2**	0.0	**0.5**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	**0.1**	**3.0**	0.0	0.0	0.0	0.0	0.0	**0.2**
meat products	0.0	0.0	**0.1**	0.1	**0.2**	0.0	0.1	0.0	0.0	0.1	0.1	0.1	**0.1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
beverages&tobacco	0.1	**0.1**	0.0	0.0	**0.1**	0.0	**0.2**	0.0	0.1	0.1	**0.3**	0.0	**0.3**	**0.3**	0.0	0.0	0.0	0.1	**0.3**	0.0
food	**0.7**	**1.4**	**1.0**	**1.2**	**1.5**	**0.4**	**2.5**	0.1	**0.6**	**0.9**	**1.1**	**1.5**	**0.6**	**0.2**	**0.3**	**0.9**	**0.2**	**0.1**	**0.5**	**0.2**
dairy	**0.2**	**3.1**	0.1	**0.1**	0.0	0.0	0.1	0.0	**0.9**	**0.1**	**2.2**	**7.6**	**9.1**	**1.0**	0.0	**0.3**	0.0	**1.3**	**0.5**	**0.4**
processd rice	0.0	0.0	0.1	0.0	**0.3**	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

Source: GTAP simulation

Table 7 confirms what are the "usual suspects" for the European protection. In the case of Brazil, the main difficulties are with the meat sector; while the dairy sector is responsible for most of the protection imposed on Australia and New Zealand agricultural exports, and "vegetable oils & fats" (such as olive oil) raises the largest difficulties for the Middle East and North Africa region.

As far as developing countries are concerned, the most troubling sector is certainly sugar, which accounts for almost two thirds of the EU protection towards the ACP countries. These countries are subject to tariff rate quotas granting a preferential access up to a certain volume of imports. However, if the quota is binding, the level of protection reported in the database employed equals the out-of-quota tariff rate (section 3). Accordingly, the high level of protection denoted by the MTRI indicates that sugar regime "at the margin" is quite constraining and the exporters may benefit from a liberalization in this sector[7].

Table 8 shows that Japanese agricultural protection is much more concentrated in terms of sectors. Processed rice is by far the most protected product, and the protection is spread over several potential exporters. Wheat from Australia and New Zealand, and Canada, meat products from Mexico and Chile, and sugar from the ACP countries and South America are the other most protected sectors.

As far as the US agricultural protection is concerned (table 9), the dairy sector stands out as the more protected one across several exporters. ACP and Latin American countries face the most significant protection in the case of sugar; while the processed food sector is the most protected in the case of Asian countries, such as Japan or China.

Finally, Table 10 compares the results for the MTRI, and a more traditional indicator, the import-weighted average tariff, in the case of the agricultural sector. We chose this sector because it includes the highest number of goods in our aggregation, and because it is the most relevant in terms of protection. Table 10 presents the correlation and rank correlations between the 20 bilateral results obtained for each of the three importers considered.

[7] This result, which may be credible for the aggregated country group included in this analysis, needs to be detailed further by (i) considering individual ACP countries, whose situation varies considerably depending on the production costs and production scale, (ii) by considering the overlapping between the ACPs and the LDCs which are going to be involved in the EBA initiative, and (iii) by modelling more explicitly the Tariff Rate Quotas available to each country.

Table 10 - Correlation coefficient and rank correlation coefficient among bilateral MTRI uniform tariffs and trade-weighted averages in the agricultural sectors

	r	rho
EU	0.723**	0.833**
USA	0.962**	0.962**
Japan	0.433	0.388

Source: GTAP simulation

** significant at 0.01

The MTRI uniform tariffs are always positively correlated with the trade-weighted averages, but the two indexes are almost identical only when protection is rather low. The correlation gets lower in the case of the EU, and it is not even statistically significant in the case of Japan.

These results are in line with the findings of Anderson and Neary (2003) and Bach and Martin (2001), showing that the trade-weighted average tariff is a linear approximation to the tariff aggregator based on the expenditure function. Anderson and Neary (2003) also prove that the MTRI uniform tariff is more likely to be higher than the trade-weighted average, the more elastic is the demand for the tariff-constrained imports. In our case, the trade-weighted average consistently underpredicts the MTRI uniform tariff in the case of the EU and the US, and even more clearly in the case of Japan. Despite the MTRI uniform tariff and the trade-weighted index tend to move together on average, it should be emphasized that a purely statistical average does not provide a reliable approximation, especially when there are very high tariffs, as in the case of Japan.

6 Conclusion

In order to compare the trade policies implemented by the EU, Japan and the US (section 2) we computed the overall protectionist impact at the bilateral level using a modified version of the GTAP model (section 3). The index chosen in order to assess the overall level of protection is the MTRI, that is the uniform tariff equivalent of the different trade policy instruments observed for a country that would generate the prevailing level of bilateral trade (section 4).

The main conclusion of this study may be summarized as follows:

- Notwithstanding all the rhetoric about trade preferences, we show that developing countries still appear to be substantially restricted in their trade with the EU, Japan, and the US.
- Even if we work at a much higher level of aggregation than some recent literature investigating the relationship between per capita incomes of trading partners and tariff rates (Clark and Bruce, 2006), our results are broadly consistent with the suggestion that rates are lower for the poorest

and richest countries, and higher for countries in the middle of the income distribution such as Brazil, India or Argentina.

- The structure of protection across sectors appears to be fairly homogenous among the EU, Japan, and the US. In particular, agricultural products coming from the largest exporters among the developing countries appear to be face an higher overall protection than developed exporters, such as Australia and New Zealand.

Certain observations about the limitations of our analysis are in order. Our estimates pertain only to the preference schemes included in the MacMap-HS6 (version 1) database, with the addition of a few schemes that are going to be implemented in the next future, such the EBA initiative. When all of the agreements mentioned in Section 2 will have been implemented, the actual protection faced by developing countries, or at least some of them, may be significantly lower.

Nonetheless our results, which are generally consistent with other recent analyses (Kee, Nicita and Olarreaga, 2005), call for more careful considerations of the effective value of preferential trade schemes for the promotion of growth and development. When protection is measured assessed using a theoretically sound methodology, the actual tariff structures may still represent a serious limit to growth prospects of several developing countries.

On the other hand, this does not certainly imply that actual preferential schemes are useless or totally ineffective. Our findings show that industrial nation tariffs tend to implicitly discriminate against products of export interest to developing countries: if one assumed away preferences – i.e., only MFN tariffs were applied – many developing countries would confront (even) higher protection than other countries.

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