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Sanitary and Phytosanitary Norms and Technical Barriers to Trade: what impacts on the international trade of agricultural products?

Within the Agreements on Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT), the World Trade Organization allows member countries to adopt measures in order to protect human, animal and plant health as well as the environment, wildlife and human safety. These non-tariff barriers (NTBs) may play an important role in the course of international trade negotiations; developing countries regularly protest against the increasing use of NTBs by developed countries for protectionist purposes. The statistical analysis of the impact of SPS and TBT measures on agricultural trade shows that they may have a significant negative impact on the imports of OECD countries, even if they also lead to normalisation and certification, which makes trade-flows easier. The assessments by groups of exporting countries show that trade flows between developed countries are not affected in a significant way by technical, sanitary and phytosanitary regulations but that these are a major obstacle to the exports of developing countries towards developed countries.

Agreements on sanitary and phytosanitary (SPS) and technical barriers to trade (TBT)

In force since 1995, the SPS Agreement allows WTO member countries to adopt measures in order to protect human, animal and plant health as well as the environment, wildlife and human safety. Developing countries have a transitory period of 2 years (five years for the least advanced ones) before complete implementation of the agreement.

In order to avoid hindering trade needlessly, the SPS Agreement stipulates that the norms adopted by countries must be scientifically founded. Moreover, countries are encouraged to base their measures on the international norms when they exist (in particular, those drawn up by the Codex Alimentarius Commission (CAC), the International Office of Epizooties (OIE) and the Secretariat of the International Plant Protection Convention (IPPC)). The agreement also emphasizes that these measures must not create any arbitrary or unjustifiable discrimination between countries where similar or identical conditions exist. Furthermore, every country must publish the SPS norms in force on its territory and an information point must be created in order to inform partner countries.

Being an integral part of the Agreement establishing the WTO, the TBT Agreement is a revised form of the same Agreement concluded in 1979. It includes the technical measures and norms as well as the testing and certification procedures not included in the SPS Agreement. These technical prescriptions may be implemented for health or safety reasons but also to standardize products, guarantee their quality or notify consumers. Unlike the SPS Agreement, scientific elements are only one of the components to be taken into account when assessing risks prior to the adoption of measures. For instance, the planned processing techniques or end uses may also be taken into account.¹

Like the SPS Agreement, one of the purposes of the TBT Agreement is for the measures to be adopted by countries not to create any needless barrier to trade and not be a source of arbitrary or unjustifiable discrimination between countries. In order to do so, countries are encouraged to use the international norms when they exist and acknowledge as equivalents the technical regulations and assessing procedures of conformity from other WTO member countries, even if these rules differ from theirs, provided that the aforesaid rules and procedures fulfil the objectives of their own rules and procedures in a suitable way. Last, the notified measures must be published and a national information point must be created.

The SPS and TBT Agreements contain measures regarding the technical assistance and special and differentiated treatment which can be granted to some countries, in particular to developing countries. Despite these measures, it often remains difficult for these countries' exporters to meet the requirements set down by importing countries.

So, in view of the difficulties encountered by developing countries, the increasing number of notifications and the multiplication of trade disagreements on the matter, here we study the impact of SPS and TBT measures on the

¹For instance, if we consider the norms related to fruits, a measure on the treatment of imported fruits to prevent the spread of parasites will refer to the SPS Agreement. On the other hand, a measure defining the quality, grading or labelling of imported fruits will refer to the TBT Agreement.

international trade of agricultural and agrifood products; two main reasons explain this choice: on the one hand, agricultural products are very much concerned by SPS and TBT Agreements; on the other hand, these products represent a major fraction of North-South trade.

More than half of world imports are concerned by SPS and TBT measures

In order to draw a descriptive inventory of the SPS and TBT norms in force covering the agricultural products included in our sample (see frame 1), we calculate a coverage ratio: for each product concerned by one or more measures, we calculate the ratio of imports from the notifying countries to world imports. This coverage ratio corresponds to the share of imports affected by an SPS or TBT norm. If this ratio is high, it means that there is a consensus between importing countries as regards the negative impact of the product considered on the environment or health. However, this type of index may be affected by a statistical bias: if it is a very stringent norm, the trade flows in the notifying countries will be lower and the coverage ratio will be low.

Among the 154 importing countries in the database, 92 notify measures. In total, there are 42 different measures listed in our sample. Of the 690 products in the inventory, only 4 do not face any measures (wool grease, crude; jojoba oil and fractions; raw beaver fur skins; raw musk-rat fur skins). All the other products face at least one measure from at least one importing country; the average coverage ratio is 45%. 260 products have a coverage ratio above 50%: more than half of world imports regarding these products face one or several SPS or TBT measures.

The measures most frequently notified by importing countries are the technical measures regarding the required characteristics of a product. Next, there are the licences and technical measures related to testing, inspection or quarantine. The protection of human health is the concern most often put forward by countries to justify the adoption of measures. Then, ranked in decreasing order, come the protection of animal health, plant health, human safety, wildlife and last, environmental protection.

Our data also allow us to observe which agriculture and food products are the most affected by norms. There are three main criteria: (i) number of notifying countries, (ii) coverage ratio and (iii) value of imports affected. We list below the three most affected products in each case. The criterion value is in brackets.

- (i) *Number of importing countries notifying a measure*: animals live, except farm animals (78); cut flowers and flower buds for bouquets (73); bovine cuts boneless, frozen (73).
- (ii) *Coverage ratio (%)*: swine hams, shoulders and cuts bone in, fresh or chilled (98.21); swine edible offal, fresh or chilled (97.76); swine cuts, fresh or chilled (97.11).
- (iii) *Value of imports affected by a norm (billions of dollars)*: Wheat except durum wheat, and meslin (9.2); Soya beans, even crushed (8.9); other food preparations neither named nor included elsewhere (5.1).

A clear geographical distinction between importing countries notifying SPS and TBT measures and exporting countries affected by them

A comparison of measures notified by importing countries can also be drawn. Table 1 gives an account of this comparison for OECD countries. A great variance is observed: while nearly all the agricultural and food imports from Australia are affected by one or several SPS or TBT norms, 58% of the agricultural imports from the United States are concerned by such measures. Conversely, this ratio is only 23.5% for Japan and is only 11.75% on average for the EU countries. The deviations observed between EU countries (not copied in table 1), are limited and due to differentiations between the importing structures of these countries; the highest coverage ratio (18.5%) is noted for Denmark and the lowest (6.5%) for Hungary.

The countries' imports from one of its partner countries correspond to the bilateral exports of the latter. The inventory method may also be used to study the countries for which agricultural and food exports are the most affected by SPS or TBT measures. In terms of coverage ratio, the exporting countries most affected are the developing ones. In terms of number of products, the ones most affected by norms are the industrialised countries because of the diversity of their export supply (see table 2).

An econometric analysis of the impact of SPS and TBT norms on trade

The inventory of SPS and TBT measures does not give any information about the effective impact of the norms on trade. They may make market access more difficult for the country which implements them for imports from its partner countries. In this way, they may have a negative impact on trade. This point is frequently mentioned in the literature. But these measures may also make trade easier because they inform the consumer that products are safe. Without this information, trade could be slower or even inexistent. So SPS and TBT measures may have a positive impact on trade. Measuring the effective impact of these measures on trade flows can only be done through an econometric approach.

In order to measure the effect of the SPS and TBT measures on trade, we estimate a so-called gravity equation (see frame 2). Norms are introduced among the explanatory variables of the model. The question is to know in which form to integrate them. Some works use a dummy variable (equal to one in the presence of a SPS and TBT measure on a product and null otherwise) or a frequency index, which represents the proportion of products for which a SPS or TBT measure is notified in relation to the total number of products.

Beyond these indicators, we introduce *ad valorem* equivalents (AVEs) of the SPS or TBT measures, directly comparable with customs duties. Several methods were used to calculate these AVEs. The first is a direct one. AVE is calculated as the difference between the domestic price of the imported product affected by a SPS or TBT measure and the world price of the same product. But the inadequacy of the data makes us prefer the indirect method adopted by Kee, Nicita and Olarreaga (2006). These authors base themselves on the comparative advantage approach

developed by Learner (1990) and estimate the quantity impact of non-tariff barriers on trade flows. To do so they predict the countries' imports according to their allocation in factors, then observe the variation between these predictions and the effective imports in the presence of non-tariff barriers. These impacts on quantity are then converted (using import demand price-elasticities) into AVEs. In order to differentiate the particular effect of SPS and TBT measures from that of customs duties, next to these AVEs, we introduce data on tariff barriers from the MAcMap database (Market Access Map) developed by the International Trade Centre and the CEPII.

For lack of sufficient and coherent data as regards importing countries, our estimates only concern OECD countries. As regards exporting countries they concern all the countries. Our estimates cover 2004.

Norms which have little effect on trade between OECD countries but slow down imports from developing countries

Our results show that taken as a whole, SPS and TBT measures restrict agricultural imports from OECD countries. This result is confirmed irrespective of the indicator used to take into account the presence of such measures (dummy variable of the presence of measures, frequency index or *ad valorem* equivalents). However, the effect is variable according to the origin of import, in particular when we distinguish OECD countries and developing countries. The estimates differentiating these two groups of exporting countries indicate that the SPS and TBT measures do not significantly affect the trade between OECD countries, while their negative impact on the exports of developing countries towards OECD countries is evident. These results shed light on the dual effect of such measures: they may have no impact or even make trade easier when exporters are able to fulfil the prerequisites: however, they may reduce trade flows if exporting countries do not succeed in fulfilling the importing countries' requirements.

In order to evaluate more specifically the impact of the SPS and TBT measures adopted by the European Union countries, we re-estimate our gravity equation on the

imports of these countries alone. European imports seem to be much more restricted by these measures than by other OECD countries' measures. This result is as valid for imports from developing countries as for imports from other OECD countries (the estimated coefficient value is higher than before). In this last case, the estimated coefficient is negative and significant at a level of 10% when an *ad valorem* equivalent of the SPS and TBT measures is used and at a threshold of 1% if it is a frequency index.

Do SPS and TBT measures have a harmful influence on agricultural and food trade?

Our estimations show a differentiated impact of SPS and TBT measures on exports of agricultural products: non-significant on trade between developed countries but negative and significant on exports from developing countries towards developed countries. Furthermore, though less numerous, the measures implemented by the European Union reduce more trade flows than those adopted by the other OECD countries. Therefore, these measures particularly reduce the impacts of trade preferences (low or inexistent customs duties) that the European Union and other developed countries grant on account of the development policy.

Should we conclude that SPS and TBT measures have a harmful influence on trade? Theoretically not necessarily, if exporting countries can easily reach the safety level required by these measures. Nevertheless, our analysis shows that in international agricultural trade, there is still a long way to go to integrate developing countries better and in particular the least developed countries in international agricultural trade.

So in the years to come, the technical and financial assistance granted to these countries, on the one hand to help them satisfy the requirements enforced by SPS and TBT measures and on the other hand to increase their participation in the international organisation for standardization (the Codex Alimentarius Commission, the International Office of Epizootics and the Secretariat of the International Plant Protection Convention), will have to be at the heart of the priorities of the WTO and other member countries.

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For further information

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Frame 1: Pinpointing SPS and TBT norms and international agricultural and food trade flows

Our initial data are the notifications of norms made to the WTO by importing countries: Six different reasons may be invoked to justify these measures: the protection of human, animal and plant health as well as the environment, wildlife and human safety. Compulsory for WTO countries, these notifications are collected, completed and analysed by the United Nations Conference on Trade and Development (UNCTAD). The present available data are the measures notified until 2004. For each importing country adopting a measure, we have information on the product considered at a refined level of classification (six-digit level of the harmonized system of classification) and on the type of measure. With very rare exceptions, the SPS and TBT measures have no bilateral dimension and apply to all exporters: exporting countries will be more or less affected according to the geographical and/or products structure of their exportations.

First, we draw up a descriptive list of the SPS and TBT measures by merging the information on notifications with the data on the trade flows considered. These data cover 2004 and come from the BACI database developed by the *Centre d'Etudes Prospectives et d'informations internationales* (CEPII). The trade flows concern 690 agricultural and food products, 154 importing countries and 183 exporting countries. In our sample, the European Union (EU) countries are considered individually. Within the EU, the principle of mutual acknowledgement is applied for SPS and TBT norms. De facto, any country which exports towards another member country is not compelled to fulfil the conditions imposed by the latter, but must only prove that the measures in force in its own country are equivalent. Therefore, the respective obligations of the member countries and non-member countries of the EU differ greatly. So in order to avoid all bias in our analysis, we leave the intra-European trade flows out of our sample.

Frame 2: The gravity equation in trade

Based on an analogy with the Newton law, the gravity equation applied to trade is one of the most robust empirical relationships in economics. The Dutch economist J. Tinbergen is often considered as the first to have developed this approach in 1962; however, it is right to specify that as early as 1954, Isard and Peck suggested explaining trade flows through forces of gravity. In its most simple form, this equation makes trade (F_{ij}) between two partner countries i and j depend on their respective economic size (M_i and M_j) and on the geographical distance separating them (D_{ij}). This distance used as an approximation of the transaction costs which affect the trade relationship is usually measured between the main economic centres or the capitals of the countries considered.

$$\ln F_{ij} = \alpha \ln M_i + \beta \ln M_j - \theta \ln D_{ij}$$

Different variables are usually added to this basic formulation, in particular in order to capture certain specificities of the bilateral relationship such as the sharing of a land border, a common language or the existence of old colonial links, to name the commonest ones. In this survey, it is among these complementary variables that the indicators capturing the SPS and TBT effects on trade are introduced.

For a long time, the lack of theoretical foundation was the main criticism levelled against the gravity equation. Nevertheless, several recent works attempted to show that this equation could be derived from several theoretical frameworks (the Ricardian model, Heckscher-Ohlin, model of monopolistic competency with transport costs and so on.).

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ISSN 1778-4379 N°3 - June 2008

Table 1: SPS and TBT notifications of OECD countries (2004)

Country	Coverage ratio (%)	Number of products affected	Country	Coverage ratio (%)	Number of products affected
Australia	97.07	568	Canada	42.53	380
Mexico	96.27	594	Iceland	27.42	143
New-Zealand	82.24	526	Japan	23.52	87
Norway	81.16	486	European Union	11.75	118
United States	58.27	410	South Korea	0	0
Switzerland	48.18	346	Turkey	0	0

Note: the coverage ratio of each country is calculated as the ratio between its imports of products for which it adopted SPS or TBT measures and all its imports.

Table 2: The ten exporting countries most affected by the SPS and TBT measures notified by all the WTO member countries (2004)

Countries	Coverage ratio (%)	Number of products affected	Countries	Number of products affected	Coverage ratio (%)
<i>Classification criterion: coverage ratio</i>			<i>Classification criterion: number of products affected</i>		
Guinea-Bissau	98.71	3	United States	663	46.91
Bhutan	98.41	21	France	641	38.43
New Caledonia	96.75	60	Germany	633	48.92
Nepal	88.93	130	The Netherlands	612	45.49
Byelorussia	88.54	337	Australia	610	38.89
Afghanistan	86.67	85	China	607	33.86
Bolivia	86.18	173	India	601	43.19
Burma	84.53	137	Italia	590	35.63
Cambodia	84.23	78	South Africa	583	24.55
Armenia	79.04	92	Spain	574	54.05

Note: the coverage ratio of each country is calculated as the ratio between its exports for which SPS or TBT measures exist and the whole of its exports.

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ISSN 1778-4379 N°3 - June 2008