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A First Assessment of Environment-Related Trade Barriers

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Abstract

International trade can affect the environment in different ways. This may justify the introduction of border measures by the importing countries. However, abuse of environmental arguments for protectionist reasons is likely. In order to disentangle protectionism from dispositions justified on the grounds of true environmental concerns, we systematically review notifications of all importing countries of the 5000 products traded at the world level. We find that 88% of world trade is potentially affected, while half of world imports potentially are subject to a protectionist use of such measures. Agriculture, the automobile industry, the pharmaceutical industry and many other sectors are concerned. LDCs' exporters are the countries most affected by these new trade policies.

JEL Classification: F130, F180, Q010

Keywords: Trade policy, Environment, Protectionism, SPS, TBT

Résumé

Le commerce international peut affecter l'environnement, justifiant la mise en place de mesures aux frontières. Mais l'utilisation protectionniste de telles mesures est probable. Afin de dissocier du protectionnisme ce qui relève de mesures justifiées, nous passons systématiquement en revue les mesures environnementales appliquées dans les différents pays du monde, pour l'ensemble des 5000 produits du commerce international. 88% du commerce mondial est potentiellement affecté par ce type de mesure et la moitié du commerce est potentiellement affectée par leur utilisation protectionniste. L'agriculture, mais aussi l'automobile, la pharmacie et bien d'autres secteurs sont concernés. Les PMA sont les exportateurs les plus exposés à cette nouvelle forme de protectionnisme.

Classification JEL: F130, F180, Q010

Mots clés: politique commerciale, environnement, protectionnisme, SPS, TBT

Summary

Multilateral trade liberalisation enhances world-wide access to less-polluting products and processes, as well as to pollution-control technologies. However, trade liberalisation may also have adverse effects on the environment: environmental problems will tend to exacerbate as countries intensify their pollution-intensive production in order to export. The potential negative impacts of free trade on environment are not restricted to the issue of polluting industries: deforestation, non-sustainable fisheries, greenhouse effect, human or plant health and agricultural techniques must be considered too. In total, liberalising international trade is welfare enhancing, as long as stringent environmental policies are enforced. This suggests addressing environmental issues using specific, i.e. first rank instruments; however, as illustrated by the example of agricultural products, implementing first rank policies might have unexpected impacts on trade since obstacles to trade could hamper the efficiency of resource allocation without improving the environment.

More generally, there are specific risks to international trade that public policies must tackle and which call for border measures. The challenge is to enforce these measures without creating unnecessary trade barriers.

We analyse the magnitude and the structure of environment-related trade barriers (ETBs), and thus draw a separating line between risk and environment management, on the one hand, and protectionist policies on the other. Here, we consider all barriers that have been introduced by importing countries to protect the environment, as well as the health and safety of wildlife, plants, animals and humans.

The paper is based on primary data derived from COMTRADE, the world's largest trade database maintained by the United Nations, and UNCTAD's database on trade barriers. The latter is derived from notifications by member countries. We adopt a positive rather than normative approach towards determining whether products are (perceived as) risky to the environment or not. Basically, products are considered as risky if they are subject to the (notified) environment-related trade barriers of WTO Members.

Significantly, for three-quarters of all products, accounting for 88 percent of 1999 world merchandise trade, at least one importing country has enacted ETBs. Exporters from LDCs are significantly more exposed to such barriers than those from any other group of countries.

The important issue is whether those measures at the border are protectionist barriers, or if they simply rely on elementary precautionary measures tackling biological and informational risks. We tackle protectionist practices on the basis of a simple and systematic criterion: when a limited number of countries enforce a measure on a given product, presumably these countries managed to raise barriers to trade. According to this definition, 1983 products out of 4917 are affected by environmental protectionism: up to five countries enforce a barrier, and half of world trade is potentially affected by environmental protectionism. Conversely, when at least one quarter of the countries enforce a measure, we consider the affected products as sensitive products: with the exception of chemicals and pharmaceuticals, only agro-food products are concerned.

Résumé long

La libéralisation commerciale multilatérale rend largement disponible des technologies et produits moins polluants, ainsi que les technologies de dépollution. Mais cette libéralisation peut également avoir des effets négatifs sur l'environnement: la pression sur l'environnement peut se relâcher dans les pays abandonnant les secteurs polluants, mais avec pour contrepartie une pollution accrue dans les pays se spécialisant à l'exportation sur les productions concurrentes. Il convient de souligner que l'impact négatif potentiel du commerce sur l'environnement ne se limite pas à cette question des industries à cheminées: la déforestation, les pêcheries non soutenables, l'effet de serre, la santé humaine et végétale, enfin les techniques agricoles doivent également être pris en considération. La libéralisation commerciale pourrait augmenter le bien-être si des politiques environnementales correctrices étaient mises en place, ce qui suggère de mobiliser des instruments de premier rang. Mais comme l'illustre bien l'exemple agricole, utiliser de tels instruments peut également avoir des effets inattendus dans la mesure où les réglementations mises en place peuvent faire obstacle à une allocation efficace des ressources sans pour autant réellement préserver l'environnement.

Plus généralement, les politiques publiques doivent s'intéresser à certains risques à caractère spécifique, de nature biologique ou du fait d'asymétries d'information. Mais les « mesures à la frontière » associées à la gestion de ces risques ne risquent-elles pas alors de se transformer en barrières aux échanges ?

Pour répondre à cette question, nous traçons la ligne de partage entre gestion du risque ou préservation de l'environnement d'une part, et protectionnisme d'autre part. Nous le faisons en prenant en compte toutes les barrières motivées par l'environnement au sens strict, mais aussi la sécurité et la santé des hommes, des animaux, des plantes, ou encore la préservation de la vie sauvage.

Les données de base sont dérivées de COMTRADE (Nations Unies), constituant la base de données d'échanges la plus complète, et de la compilation des barrières aux échanges réalisée par la CNUCED, sur la base des notifications des pays membres. Nous adoptons une approche positive, plutôt que normative, pour déterminer si les produits sont ou non associés à un risque environnemental perçu. Simplement, les produits sont considérés comme présentant un risque pour l'environnement si les membres de l'OMC notifient des barrières environnementales à leur échange.

On observe que pour les trois quarts des produits échangés, représentant 88% du commerce mondial de biens en 1999, au moins un pays a notifié une mesure environnementale. Les exportateurs des PMA sont les plus exposés à ces obstacles. La question essentielle est de savoir si de telles pratiques peuvent être qualifiées ou non de protectionnistes. Nous adoptons là encore un principe simple: lorsqu'un nombre réduit de pays impose une mesure environnementale sur un produit donné, la présomption de protectionnisme est forte. Sur la base de cette définition, les échanges de 1983 produits, sur 4917, sont affectés par un protectionnisme environnemental: au plus cinq pays imposent une barrière environnementale. Ce protectionnisme révélé affecte des produits représentant la moitié du commerce mondial en valeur. Réciproquement, quand le quart des pays impose une mesure environnementale sur un produit, il s'agit de produits sensibles: à l'exception des produits chimiques et pharmaceutiques, les produits concernés relèvent du secteur agricole et alimentaire.

A First Assessment of Environment-Related Trade Barriers

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INTRODUCTION

Trade and environment: these two notions are at the epicentre of the globalisation debate. However, the complexity of the interrelation between trade and environment in terms of explanatory models and the scarcity of empirical evidence undermines the ground for solid debate.

Multilateral trade liberalisation firstly offers to the whole world population an access to less-polluting products and processes, as well as to de-polluting technologies, 90% of which are today concentrated in OECD countries (OECD, 2000-a).

However, multilateral trade liberalisation might also adversely affect the environment. Accordingly, two hypotheses are generally addressed. First, the factor proportion theory suggests that polluting industries, that are generally relatively capital intensive, should be located in developed countries. And since these countries are technologically advanced, they should rely on environment-friendly technologies. In contrast, the alternative so-called « pollution-haven » hypothesis considers that low-income countries paying limited attention to the environment would attract those polluting industries, thanks to weak environmental regulations.

In total, is there a case for free trade benefiting to the environment? The answer must combine three impacts: scale effect, technical effect and composition effect (Grossman & Krueger, 1991). The scale effect and the technical effect are generally combined in an environmental Kuznets curve: above a critical level of income per capita, technological progress dominates scale effects, and accordingly growth benefits to the environment. The composition effect, defined as the environmental impact of the specialisation of countries, remains of a rather limited magnitude in comparison with the two previous ones. A one-percent increase in income per capita associated with trade liberalisation would translate into a one-percent drop in the concentration of polluting substances according to Antweiler, Copeland & Taylor (1998). As far as the recent experience is concerned, the impact of the Uruguay Round in terms of emission of polluting substances can be evaluated using a combination of three tools: CGE modelling of trade liberalisation; matrix of sectoral emissions of polluting substances; estimation of a Kuznets curve at the world level. Accordingly, Cole *et al.* (1998), on the basis of McDonald & Nordström CGE-results, find that the technical effect is larger than the composition or scale effects for various polluting substances (sulphur dioxide, carbon monoxide, ...) as far as Europe, Japan and the U.S. are concerned. However, at the world level, this favourable outcome is overcompensated by the

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induced specialisation of countries located on the « bad side of the Kuznets curve ». At the world level, emissions of polluting substances could increase by 0.1% to 0.5%.

More generally, as stressed by WTO, the potential negative impacts of free trade on environment are not restricted to the issue of polluting industries *stricto sensu*: deforestation, non-sustainable fisheries, greenhouse effect and agricultural techniques must be considered too (Nordström & Vaughan, 2000). In total, liberalising international trade would be welfare enhancing, conditional to the enforcement of corrective environmental policies; conversely, obstacles to trade could hamper the efficiency of resource allocation without improving the environment. This conclusion suggests addressing environmental issues using first rank instruments; however, as illustrated by the example of agricultural products, implementing first rank policies might have unexpected impacts on trade.

The potentially harmful impact of trade liberalisation on environment is indeed a challenging issue in agriculture, and this issue raises growing concerns (OCDE, 2000-b). The greenhouse effect, the emissions of transport-related activities, the adverse effects of intensive processes based on irrigation and various chemical inputs and the introduction of allogenic species translate into environmental losses that compensate for efficiency gains associated with free trade. One must however carefully tackle those issues: since the initial situation is already a second best, the impact of trade liberalisation can be ambiguous. The initial situation, before liberalising trade, was characterised by large subsidies and the environmental impact of such policies should also be taken into consideration in the balance. In total, the environmental pressure could well be relaxed in countries where prices would fall as a result of liberalisation, while increasing in other countries intensifying their production in order to export. If the techniques mobilised in the latter are less intensive in environmental resources, the impact of liberalisation will be beneficial. Two additional outcomes will lead to dramatic changes in the agri-food sector in the future: the dynamics of the world population and the limits to the extension of arable land surfaces. These outcomes will lead to profound changes in the sector, in comparison of which the impact of trade liberalisation *per se* is certainly limited, according to the simulations realised by OECD with *AGLINK*.

Does the latter conclusion lead to a benign neglect attitude? Certainly not. Notwithstanding the impacts referred to above, there are specific risks to international trade that public policies must tackle. These risks are twofold: biologic and informational. The former risk corresponds to the introduction of allogenic species, predators and diseases. The informational risk is associated with the behaviour of the exporter (asymmetry of information, moral hazard). In order to tackle these risks, « measures at the border » can be necessary: quarantine, inspections, etc. The challenge is to implement these « measures » without rising barriers to trade. According to the OECD: (OECD, 2000, p. 39):

« Governments can restrict free trade in order to protect human and animal health, or to preserve plants, as far as enforced restrictions are transparent, rely on a scientific evaluation, provide a protection level compatible with international norms, or with scientific assessments, and offer to imports as a whole national treatment ».

The separating line between « measures at the border » and barriers to trade is accordingly difficult to draw.

This article aims at analysing the magnitude and the structure of environment-related trade barriers (ETBs), and thus to draw this separating line. Indeed, whereas a dramatic reduction of non-tariff barriers to trade –such as quotas- has been recorded, the number and the extent

of notified ETBs is impressive. Should this pace be maintained, environmental barriers would become one of the most controversial issues in terms of world trade management.

To what extent have environmental concerns become a serious determinant of international trade barriers? What share of trade barriers is enforced by importing countries on the basis of environmental considerations? Which countries make most intensive use of ETBs? Which are the sectors and exporting countries most affected? Is there a North-South divide in terms of usage of, and exposure to, ETBs? What types of trade barriers are most commonly used? Which countries have performed best in exports of environment-friendly products in terms of their current position and in terms of growth? All these issues are tentatively addressed here. This paper does not aim at conducting a general equilibrium approach of gains and losses associated with the implementation of such barriers to trade. Neither does it aim at quantifying the amount of « missing trade » that those barriers could be responsible for. The objective is more limited: we focus on the statistical treatment of all available data on trade barriers justified on environmental concerns. We try to identify whether « notified measures » are used in a protectionist way, or limited to their original environmental objective. We examine motivations of the countries enforcing this environmental measures and quantify the share of world trade that is potentially –and effectively – affected by such obstacles.

The analysis is based on primary data derived from COMTRADE, the world's largest trade database maintained by the United Nations, and UNCTAD's database on trade barriers. The latter is derived from notifications by member countries. The remaining of the paper is organised as follows. Section 2 derives an original methodology authorising to *reveal* environmental risks as perceived by the importing countries and drawing the separating line between measures at the border and barriers to trade. Section 3 highlights that the bulk of traded products are affected by such measures: in total, 88% of world imports are potentially affected. Section 4 concludes.

METHODOLOGY

Importers perception of environmental risks.

An empirical assessment of the importance and structure of environment-related trade barriers requires a classification of traded products by their impact on the environment. Such a classification should be inter-subjective, sufficiently detailed to capture the large variety of internationally traded products and it must be compatible with the international standard for reporting trade, namely the Harmonized System or any of its derivatives. This is a tall order, in particular if such classification is to be defined *a priori*.

The present paper tackles this problem by taking a descriptive or positive rather than normative approach towards determining whether products are (perceived as) risky to the environment or not. Basically, products are considered as risky if they are subject to the (notified) environment-related trade barriers of WTO Members. Hence, the approach is based on the *perceptions* of importing countries as reported by these countries in their notifications. To put it differently, we focus on barriers to trade and harmfulness of products as they are revealed by member countries policies.

This indirect approach steers clear of the multiple potential pitfalls of classifying products directly by environmental impact, in particular the frequent lack of evidence, and the inevitable lack of consensus on whether or not a product is harmful to the environment at

the different stages of its life cycle. The impact of processes, and not only products, should also be stressed;

These advantages come at a price. First, notified motives for environment-related trade barriers may not necessarily reflect true motives. Countries may hide behind ETBs to protect domestic industries. The purpose of this exercise is accordingly to make a tentative estimate of the extent to which environmental concerns are hiding true protectionist motives. How widespread is this camouflage? A rough idea may be gathered from the frequency of product-specific ETBs across countries. If only a single country, or a very limited number of countries, enforce an ETB, it is more likely that these countries have simply enforced a non-tariff barrier. However, when a sizeable proportion of international trade is affected by such regulations, it is clear that there is a wider consensus on the negative impact of the product concerned on the environment or the magnitude of risks for health or safety.

This first questioning leads to a second difficult issue: at what point is a product considered to be affected by ETBs? What should be this threshold ? Is it sufficient, if one importing country introduces a barrier? Should the share in the world trade value directly affected by ETBs be used as a criterion, or the number of countries that enforce a given barrier ? In the former case, what would be an appropriate value to be considered as a reliable threshold above which an hindrance to world trade is ascertained ? In the latter case, facing a small or large country that enforces a given measure is not indifferent, the share of world trade potentially affected being different in the two cases accordingly. Lastly, does it make sense considering in a similar way an obstacle raised by a rich or low-income country, given that the degree of environmental concern in these two categories of countries is very different ?

In response to this multi-faceted questioning, the paper takes a closer look at how the importance of ETBs changes as a function of how strictly they are defined. Four different levels are distinguished:

- *Non-affected products*, i.e. products for which none of the 137 importing countries has notified an ETB;
- *Affected products*, i.e. products for which at least one of the 137 importing countries has notified an ETB;
- *Widely-affected products*, i.e. products for which at least 25 percent of world imports in terms of value are directly affected by notified ETBs (irrespective of the number of importing countries applying such measures).
- *Sensitive products*, i.e. products on which at least 25% of importing countries have enforced and notified an ETB, notwithstanding their share in world trade.

An ETB will be considered in this analysis if and only if it is notified on a regular basis by the importing country: the criterion used here is a continuous notification of this barrier throughout the period 1995-99. Our results must therefore be considered as a lower bound of the reality.

A broad definition of environmental obstacles to trade

There is a growing consensus that environmental concerns need to be defined broadly in the debate on trade and environment. Technical Barriers to Trade (TBT) and Sanitary and Phyto-Sanitary regulations (SPS) measures are systematically included in relevant studies. A recent WTO study shows, for instance, that “in the WTO, the majority of trade-related

environmental measures have been notified under the TBT Agreement. Since the entry into force of the Agreement, on 1 January 1995, about 2300 notifications have been received, of which some 11 percent are environment-related.” (Nordström & Vaughan, 1999). An important question is whether there is a strong horizontal spread or “contagion” effect: if one country introduces an ETB for a so far non-protected product, will others follow? Put differently, are national perceptions of whether a product is considered risky to the environment influenced by perceptions in other countries? If the answer is positive, the share of world trade directly affected is likely to increase rapidly in the future.

Against this background, environmental concerns are defined here in a broad sense. Six different categories of importing country motivations for ETBs have been taken into consideration, namely:

- Protection of the environment;
- Protection of wildlife;
- Protection of plant health;
- Protection of animal health;
- Protection of human health;
- Protection of human safety.

Hence, ETBs in this article cover all barriers that have been introduced by the importing country to protect the environment, as well as the health and safety of wildlife, plants, animals and humans. It will be highlighted below that environmental concerns, in the restrictive sense, account for only a minor part of the related barriers.

Typology of environment-related trade barriers

WTO Members *must* notify non-tariff trade barriers. These notifications are captured and analysed by UNCTAD in conjunction with the maintenance of UNCTAD’s database, TRAINS, on trade barriers. For each trade barrier, the notifying (i.e. importing) country is captured, the product is determined (in terms of the Harmonised System code) and the barrier is classified. UNCTAD distinguishes 7 broad types of non-tariff measures (Appendix 1):

- para-tariff measures (customs surcharges, additional charges, internal taxes levied on imports);
- price control measures (administrative pricing, VERs, antidumping, countervailing measures);
- finance measures (advance payment requirements, multiple exchange rates, transfer delays, etc.);
- automatic licensing measures (automatic license, prior surveillance);
- quantity control measures (non-automatic licensing including prior authorisations; quotas, prohibitions, export restraint arrangements, enterprise specific restrictions);
- monopolistic measures (single channel for imports, compulsory national services);
- and technical measures (technical regulations, pre-shipment inspection, special custom formalities, obligation to return used products, obligation on recycling).

ETBs may fall into all these categories with the exception of price control measures. Finance measures, for instance, may refer to a refundable deposit for sensitive products to protect the environment and a quota to protect environment according to the Montreal protocol

would fall under « quantity control measures ». In total, 115 measures potentially affect international trade for environmental concerns, however only 43 measures are effectively enforced by importing countries, on which we will concentrate hereafter.

ENVIRONNEMENT-RELATED TRADE BARRIERS ARE AFFECTING THE FULL RANGE OF TRADED PRODUCTS

To begin, consider all exporters, all markets and all products: how far have ETBs spread?

Figure 1 draws an overview of the impact of environment-related trade barriers on world trade. For instance, using a 25% threshold in terms of potentially affected world imports, 742 products are concerned, amounting to US\$ 989 billion, among which 494 billion imports are effectively subjugated, that is a 50% subjection ratio. Detailed information is provided in Table 1.

-- Figure 1 about here --

Only 1,171 products, out of the 4,917 products considered here, do not face any barrier anywhere. Total world imports for these products amounted to US\$ 669 billion. Conversely, the 3,746 remaining products do face barriers in at least one importing country. These 3,746 products accounted for 88 percent of 1999 world merchandise trade (see Table 2).

-- Table 1 about here--

Hence, taken together, the world's leading 137 importing countries have introduced ETBs for the vast majority of traded goods. For three-quarters of all products defined at the six-digit level of the Harmonised System, at least one importing country has enacted an ETB. According to the above definition, *the vast majority of international trade consists of products potentially affected by ETBs.*

This does not imply that 88 percent of world trade is directly facing such barriers: US\$ 679 billion or 13 percent of world trade is directly affected by ETBs. As far as the 3,746 products are concerned, 86 percent of the value of world exports bypasses these barriers, since exporters prefer focusing their shipments on markets free of restrictions.

-- Table 2 about here --

The protectionist use of environmental measures is ascertained

Are measures at the border and other environmental obstacles to trade protectionist barriers, or do they simply rely on elementary precautionary measures tackling the biological and informational risks referred to above?

A micro-economic analysis of a given obstacle, on a given destination market, would certainly authorise to answer. However, given the level of analysis we are considering here, such research strategy is irrelevant. Thus, we will tackle protectionist practices on the basis of a very simple and systematic criterion. When a limited number of countries enforce a measure on a given product (a given HS position), presumably this country manages to raise barriers to trade. We will therefore tackle the situations in which a single country, or alternatively up to five countries, enforce a measure, for each HS6 position.

The number of affected products, world imports in the corresponding HS positions, and imports subject to the notified measures (imports in the countries notifying a measure) are reported in Table 3. According to our definition of revealed protectionist practices, 1983 products out of 4917 are affected by environmental protectionism: up to five countries enforce a barrier, and the corresponding restricted trade amounts to US\$ 110 billion, to be compared with a total of 2,700 billion world imports in these products. The very low coverage ratio, 4%, proves the effectiveness of these measures, inducing an endogeneity bias: countries import limited amounts of restricted products. A different presentation could underscore that *half of world trade is potentially affected by environmental protectionism* (US\$ 2,700 billion out of 5,400 in 1999).

Certainly, one should challenge the criterion of five countries, as being too embracing. Accordingly, we have calculated the number of products and the corresponding trade affected by a measure enforced by a single country in the world. One can hardly be the single country advocating that a product is risky. Hence, enforcing any isolated measure is suspect. We find that 529 products are concerned, corresponding to US\$ 900 billion imports, of which 1% are effectively subjugated to the measure: accordingly, only US\$ 11 billion of world imports cope with the requested criterions and manage to enter the protected markets.

-- Table 3 about here --

Conversely, when at least one quarter of the countries (34 countries) enforce a measure, we will consider the affected products as *sensitive products*. These products are identified by importers as embodying an environmental risk. The corresponding list of 185 traded products affecting the environment is provided in Appendix 6. World imports in these products amounts to US\$ 286 billion, of which 49% of the total value are affected by ETBs. The distribution by HS chapter of these products is clear-cut (Table 4): with the exception of chemicals and pharmaceuticals, only agro-food products are concerned, especially meat and cereals.

In the same way, *highly sensitive products* can be identified: 11 products are notified by more than 50 countries, for which US\$ 21 billion imports under ETBs are concerned. By decreasing order of importance we find Bovine cuts boneless, fresh or chilled; Cut flowers & flower buds for bouquets or ornamental purposes, fresh; Bovine, live except pure-bred breeding; Bovine cuts boneless, frozen; Dressings & similar articles, impreg. or coatd. or packaged for medical use, nes; Eggs, bird, in shell, fresh, preserved or cooked; Animals, live nes; Bovine cuts bone in, frozen; Bovine edible offal, frozen nes; Cuttings and slips, unrooted; Bulbs, tubers, corms etc in growth or in flower & chicory plants & roots. This is clearly a list of products raising concerns on environmental or human health grounds.

-- Table 4 about here --

The peaks of environment-related protection have become significant

Table 2 shows as well that there is a significant number of products which are widely protected. There were, for instance, 44 products at the HS 6-digit level for which 90 percent or more of world trade was directly affected by ETBs. These products accounted for US\$ 41 billion, i.e. a similar magnitude to all Finnish exports or half of Irish exports. Similarly, there were 258 products for which more than half of world trade was subject to ETBs with a combined trade value of US\$ 238 billion or 4 percent of world trade in 1999.

Peaks of ETB protection were found in particular for food items (Table 2). Bovine meat, fish, ham meat and other animal products such as bones or items or for human consumption are concerned, as well as plants, bulbs and cut flowers (Appendix 3). For all these products, at

least 90 percent of world trade was subject to ETBs in 1999. More specifically, below are listed the products among those most affected by environment-related trade barriers. These barriers have affected at least 90 percent of world imports in the corresponding HS positions over 1995-99. This list illustrates the diversity of products, markets and exporters affected by such trade restraints:

- *Ossein and bones treated with acid, unworked, defatted or simply prepared.* (HS code 05 06 10). The leading markets are Japan, United-Kingdom and Germany. The leading exporters facing ETBs are Belgium (world market share 54%), India (39%) - United Kingdom (3%). This is the most protected item in the world.
- *Animal products nes and dead animals of Chapter I unfit for human consumption.* HS code 05 11 99. The leading markets are USA, Germany and Japan. The leading exporters are USA (18%), Canada (11%) and Germany (10%).
- *Horse, mule or hinny meat, fresh, chilled or frozen.* HS code 02 05 00. The leading markets are Belgium, France and Italy. The leading exporters are Belgium (26%), Argentina (17%) and Canada (14%).
- *Reptile skins, raw.* HS code 410320. The leading markets are Singapore, France and Italy. The leading exporters are Singapore (29%), Columbia (20%) and USA (17%).
- *Caviar and caviar substitutes prepared from fish eggs.* HS code 16 04 30. The leading markets are Japan, France and USA. The leading exporters are Korea (23%), Denmark (11%) and Iran (10%).

More generally, protection is not limited to agricultural products, but is spread to manufacturing products also, as pointed out in Figure 2. This figure plots on the left vertical axis intervals of frequency of ETBs: for instance, Bovine cuts boneless, the product indicated in this first range, belong to the interval [90-100%] of trade affected by ETBs. On the right vertical axis, the affected trade is reported. This information corroborates that given in Table 2, which emphasises that US\$ 5.2 billion worth of imports were affected out of US\$ 5.4 billion. Hence a coverage ratio of 97 percent. This is the most affected individual product in this range of affected trade, as well as in total world trade. On the horizontal axis, products are classified within each range by decreasing value of affected international trade.

Within the second group of products [80-90%], automobiles play a key role. Large automobiles (>3000cc) are the first non-agricultural product appearing in our ranking. They account for a very large amount of restricted trade: US\$ 57 billion out of US\$ 81 billion, corresponding to an 82 percent ratio. The automobile industry appears four times in total since trucks (< 5t), automobiles (1500-3000cc) and lastly motor vehicles parts lead respectively the [70-80%], the [50-60%] and the [10-20%] groups.

A heteroclit list of products is obtained elsewhere, such as lumber coniferous, natural gas, footwear, medicaments and telephones. The list of the 90 selected products belonging to ranges of restrictiveness larger than 10% is provided in Appendix 2 to the interested reader.

-- Figure 2 about here --

Incidence of ETBs by objectives and types of measures

Environmental concerns identified by the methodology used here are characterized in Figure 3. Environment strictly accounts for only a limited amount of restrictive measures; human health and safety concerns are associated with ETBs affecting a much larger number of products and a much larger value of world trade, while corresponding to similar levels of restrictiveness (similar proportion of affected trade). In contrast, plant and animal health are of more limited concern. Lastly, it must be underscored that the protection of wildlife, although concerning a limited number of affected products, is associated with the highest degree of restrictiveness (Appendix 4).

-- Figure 3 about here --

How the different types of ETBs affect international trade is shown in Table 5. *Technical barriers* defining specific characteristics for imported products affect trade for 3,314 items. This is by far the most frequent type of measure. US \$675 billion world imports were affected by such technical constraints in 1999. Although the latter figure is very large, it must be kept in mind that the proportion of affected trade is limited. The second type of measure, by decreasing order of affected trade, is the *authorisation*. US\$ 642 billion of imports are affected, accounting for a proportion of 21 percent of the corresponding imports of 2,677 products. Technical barriers such as *testing, inspecting* and *quarantine*, as well as *prohibition* follow. In both cases more than US\$ 500 billion are affected.

Not surprisingly, the proportion of trade in the 1,359 products affected by prohibition is the highest at 30 percent. Regarding the remaining 70 percent, the reader may ask, how is it possible to trade prohibited products? The answer lies in the fact that prohibitions are limited to certain importers and/or origin countries, the remaining US\$1,200 billion were imported by countries not implementing such prohibitions, or by other countries from exporters escaping the prohibition. *Eco-labelling*, generally considered as the fashionable way to protect consumers, is the last sizeable ETB: up to 1,500 products are affected, accounting for US\$ 251 billion in restricted trade. Lastly *packaging, prior surveillance, quotas, finance measures* and *monopolistic channels* may be somehow restrictive but affect a limited number of products and a limited value of world trade. The same information is provided in Appendix 5 for environment-specific ETBs: authorisations and product characteristics are the most frequently enforced measures.

--Table 5 about here --

LDCs are the most exposed countries

The degree of exposure to ETBs is quite similar for exporters based in developed market economies, transition economies and developing countries in general (Figure 4). However, the number of exported products affected by ETBs in importing countries differ, with 3,629 products for developed market economies, 3,212 for developing countries and 2,677 for transition economies. In contrast, Least Developed Countries (LDCs) exports are characterised by a very specific pattern. On one hand, only half of LDC exports consist of products potentially affected by ETBs, on the other hand, among these products 40 percent are directly affected. The implication is clear: exporters from LDCs are significantly more exposed to ETBs than those from any other group of countries. This peculiar pattern is an important concern for LDCs, which may have to face in the future a mushrooming development of such ETBs as a result of growing environmental concerns world-wide. This is especially the case for agricultural products that are among the most exported products by these countries.

-- Figure 4 about here --

Use of ETBs by importing countries

Figure 5 shows how the leading importing countries in the world economy use ETBs. Countries are rated by the increasing share of affected imports. Notice that a ranking by increasing number of affected products would produce different results. For instance, Thailand and Australia restrict imports in a similar number of products. However, the share of restricted imports is twice as large in Australia. How to interpret the use of ETBs differs accordingly. There is a strict control of largely imported products in the Australian case, an outcome that could reveal protectionist practices. In contrast, Thailand might perceive a risk for numerous products, without affecting too much imports in this country. Noticeably, an alternative interpretation could be that barriers enforced by Thailand are really binding: only an endogeneity bias would then explain why a limited amount of imports is subjugated.

The second result is that European countries, not surprisingly, share the same external trade policy and hence enforce restrictions on the same number of items.

It is finally worth stressing that non-European main exporters of agricultural products raise number of environment-related barriers: Brazil, Argentina, New-Zealand or the U.S..

It may be the case that certain countries have notified their obstacles more systematically than other, but this is certainly not the only source of the observed differences. All WTO members should have reported properly their practices. There is however a doubt concerning China, since reported notifications correspond to the negotiation phase of the accession to the WTO.

-- Figure 5 about here --

CONCLUSION

This paper proposes a first systematic assessment of environmental trade barriers, using all environmental-related notifications to the WTO for 1999, and international trade data at the 6 digit level.

Free trade can be beneficial for the environment, thanks to the diffusion of environmental-friendly products as well as technologies for environment management.

Free trade can also have adverse effects on the environment. Three impacts are generally identified: scale effect, technical effect and composition effect. The latter, associated with the specialisation of countries, may be negative, but may also be offset by the combination of the two former effects. Whatever the combined result of these three effects is, it may well be limited in comparison with two major issues: world population dynamics and the catching up of emerging countries. Accordingly, the most interesting issues are associated with the specific risks of free trade that have to be tackled by public policies: biologic risk as well as informational risk.

Facing such risks, the first rank instrument often remains border measures, although this does not necessarily mean a barrier to trade. The generalised control at the border for meat should not come as a surprise. In contrast, finding 529 products, that is one traded product out of ten, subject to environmental measures imposed by a single country, raises question marks. In the latter situation, we conclude that a protectionist measure has presumably been imposed. Some US\$ 900 billion imports are potentially affected by environmental

protectionism, of which only one percent of world trade manage to reach the requested standards. If one relaxes this tight criterion and draws the boundary between environmental concern and protectionism using the “up to five countries” criterion, we find that *half of world trade is potentially affected by environmental protectionism*.

Hence, within the 88% of world imports potentially affected by environmental measures at the border, managing the environmental threats is not the unique motivation of policy makers. Our analysis points out that there is a risk of a new set of protectionist tools, justified on environmental grounds which are increasingly popular within industrialised countries. Numerous sectors are affected, and noticeably the automobile industry, even if agro-food products as a whole are the most affected.

Environmental barriers to trade are often justified on the grounds of collective preferences: rich countries should pay more attention to environmental issues, such as biodiversity, endangered species, etc. If it were the case, environmental barriers to trade should be concentrated in these countries. This is not the case however, and this is the second important result of this paper. Argentina or Brazil enforce more measures than the U.S. or Japan. And the share of affected national imports is above 45% in the two former countries as compared with less than 30% in the U.S. Similarly, the number of barriers enforced by Mexico is four times as large as in Europe. We have in addition checked that the environment *stricto sensu*, or the preservation of wildlife, are not the most frequent justifications: human safety and health are dominating, and motivations behind these justifications appear at times questionable.

Noticeably, LDCs are the most exposed to this new protectionist threat: whereas only 15% of developed, transition and developing countries' exports are concerned on average, 40% of LDCs exports are subject to ETBs. LDCs should therefore be the first victims of a generalisation of those protectionist pressures.

ACKNOWLEDGEMENTS

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Table 1
Coverage ratio of environment-related trade barriers, 1999

Percentage world imports subject to ETBs	Number of affected products	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (2)/(1) (%)
≥0	3746	4,732,130	679,793	14
≥1	2862	2,993,322	675,207	23
≥2	2577	2,661,320	671,167	25
≥3	2336	2,426,664	665,849	27
≥4	2158	2,192,770	658,429	30
≥5	2016	2,076,473	653,367	31
≥10	1547	1,726,319	629,966	36
≥15	1198	1,480,166	599,374	40
≥20	947	1,208,662	546,785	45
≥25	742	989,537	494,083	50
≥30	582	804,125	438,801	55
≥35	456	638,738	381,291	60
≥40	375	543,904	343,698	63
≥45	310	350,885	255,293	73
≥50	258	315,548	238,304	76
≥60	191	272,997	215,263	79
≥70	137	215,964	178,131	82
≥80	87	141,617	121,523	86
≥90	44	41,345	39,556	96
≥95	24	21,386	20,897	98

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Table 2
Distribution of environmental measures by decreasing importance of affected world imports, 1999

Percentage world imports subject to ETBs	Number of affected products	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (2)/(1) (%)
90 to 100	44	41	40	96
80 to 90	43	100	82	82
70 to 80	50	74	57	76
60 to 70	54	57	37	65
50 to 60	67	43	23	54
40 to 50	117	228	105	46
30 to 40	207	260	95	37
20 to 30	365	404	108	27
10 to 20	600	518	83	16
>0 to 10	2,199	3,006	50	2
Sub-total	3,746	4,732	680	14
>0 to 100				
0	1,171	670	0	0
Total	4,917	5,402	680	13

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Table 3

Distribution of environmental measures by increasing number of enforcing countries, 1999

Number of countries notifying an ETB	Number of affected products	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (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
Of which:				
> 33 countries	185	286	140	49
> 50 countries	11	21	18	86
= 1 country	529	908	11	1

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Table 4
Environment-related protection for the 185 sensitive products, grouped by HS2 chapter, 1999

	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (2)/(1) (%)	Distribution of potentially affected imports
Live animals	6,321,914	5,256,796	83	2.21
Meat and edible meat offal	29,112,661	25,282,053	87	10.17
Fish & crustacean, mollusc & other aquatic invertebrate	23,900,682	19,116,204	80	8.35
Dairy prod; birds' eggs; natural honey; edible prod nes	20,273,866	4,852,170	24	7.09
Products of animal origin, nes or included	3,008,756	2,557,565	85	1.05
Live tree & other plant; bulb, root; cut flowers etc	5,897,757	5,459,096	93	2.06
Edible vegetables and certain roots and tubers	9,915,963	3,722,301	38	3.47
Edible fruit and nuts; peel of citrus fruit or melons	11,985,400	3,520,527	29	4.19
Coffee, tea, maté and spices	11,085,038	2,345,968	21	3.87
Cereals	32,476,680	12,811,448	39	11.35
Prod mill indust; malt; starches; inulin; wheat gluten	1,375,917	172,000	13	0.48
Oil seed, oleagi fruits; miscell grain, seed, fruit etc	4,626,281	1,298,875	28	1.62
Lac; gums, resins & other vegetable saps & extracts	146,719	72,470	49	0.05
Vegetable plaiting materials; vegetable products nes	135,086	85,282	63	0.05
Animal/veg fats & oils & their cleavage products; etc	499,616	404,928	81	0.17
Prep of meat, fish or crustaceans, molluscs etc	10,458,918	5,385,053	51	3.66
Prep of cereal, flour, starch/milk; pastrycooks' prod	14,705,885	11,006,931	75	5.14
Miscellaneous edible preparations	1,153,691	782,506	68	0.40
Residues & waste from the food indust; prepr ani fodder	6,650,176	3,887,843	58	2.32
Pharmaceutical products	89,068,471	31,112,301	35	31.13
Miscellaneous chemical products	3,203,076	1,013,075	32	1.12
Raw hides and skins (other than furskins) and leather	138,723	60,120	43	0.05
TOTAL	286,141,274	140,205,512	49	100.00

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

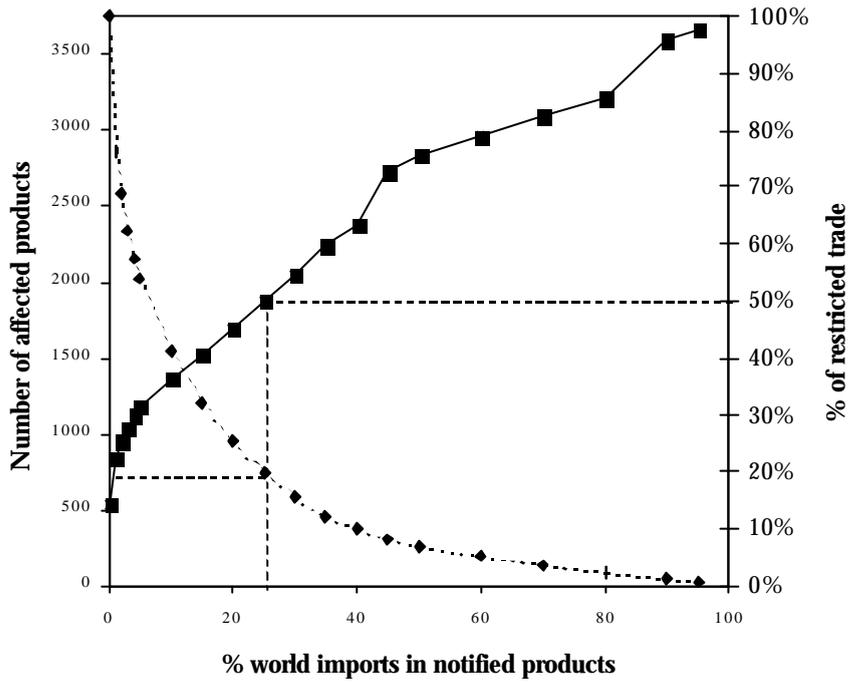
Table 5
Impact of environment-related measures, by type, 1999

Type of measure	Number of affected products	World imports	Affected imports	Coverage ratio	
		(mn US \$) (1)	(mn US \$) (2)	(2)/(1) (%)	
Autorisation	2,677	3,017,522	642,558	21.29	
Prohibition	1,359	1,727,602	528,945	30.62	
Prior surveillance	41	31,500	7,485	23.76	
Quota	14	4,827	1,287	26.67	
Financing	19	47,644	6,765	14.20	
Monopolistic distribution	7	5,244	414	7.9	
Technical Barriers	Marketing	24	18,035	5,097	28.26
	Labelling	1,489	1,662,667	251,612	15.13
	Packaging	248	295,125	84,637	28.68
	Test, insp. & quarantine	2,085	2,607,613	557,066	21.36
	Product char.	3,314	4,095,105	675,471	16.49

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

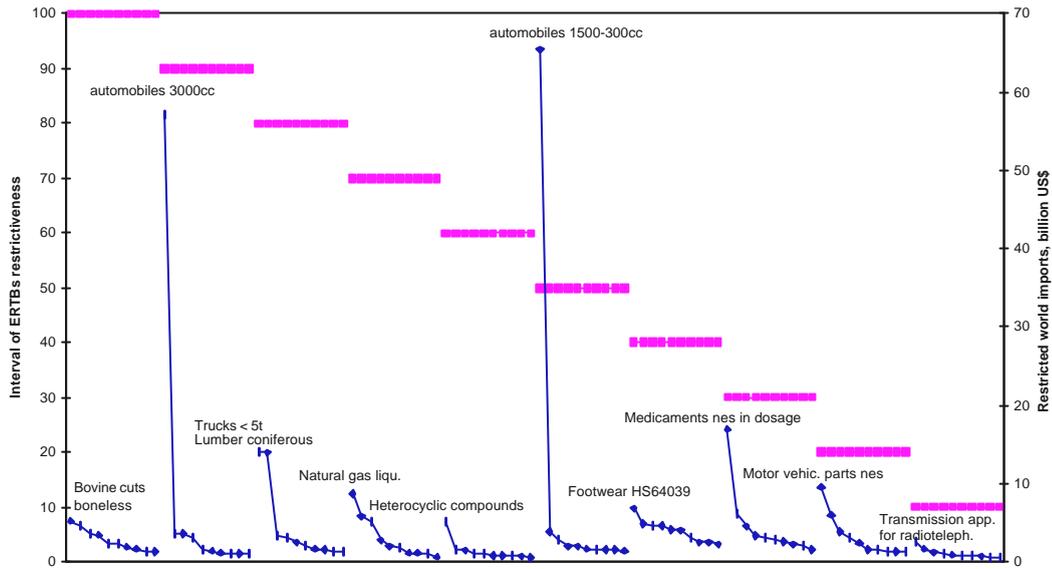
Figure 1

World trade affected by environment-related barriers



Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

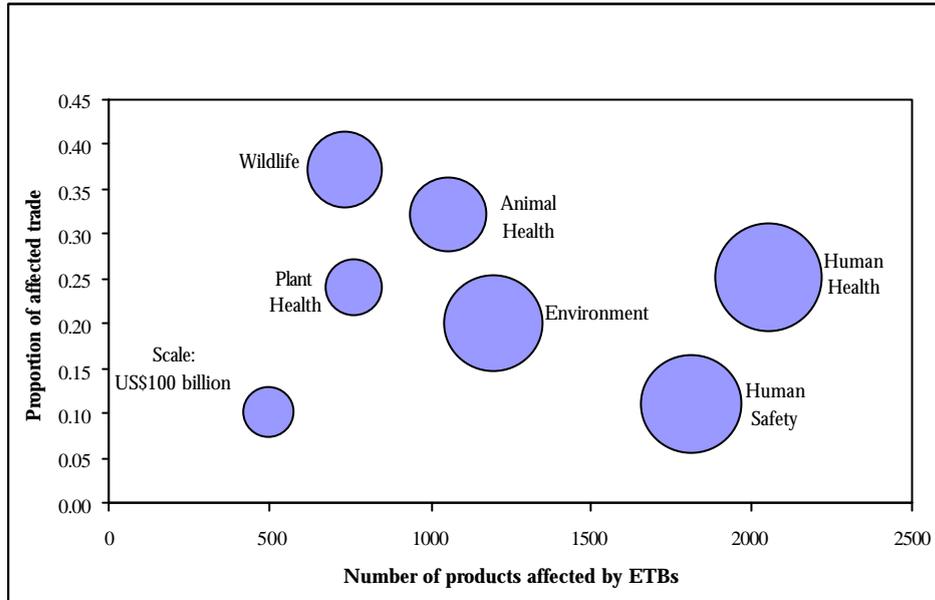
Figure 2
Most affected products by range of restricted trade (1999)



Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Figure 3

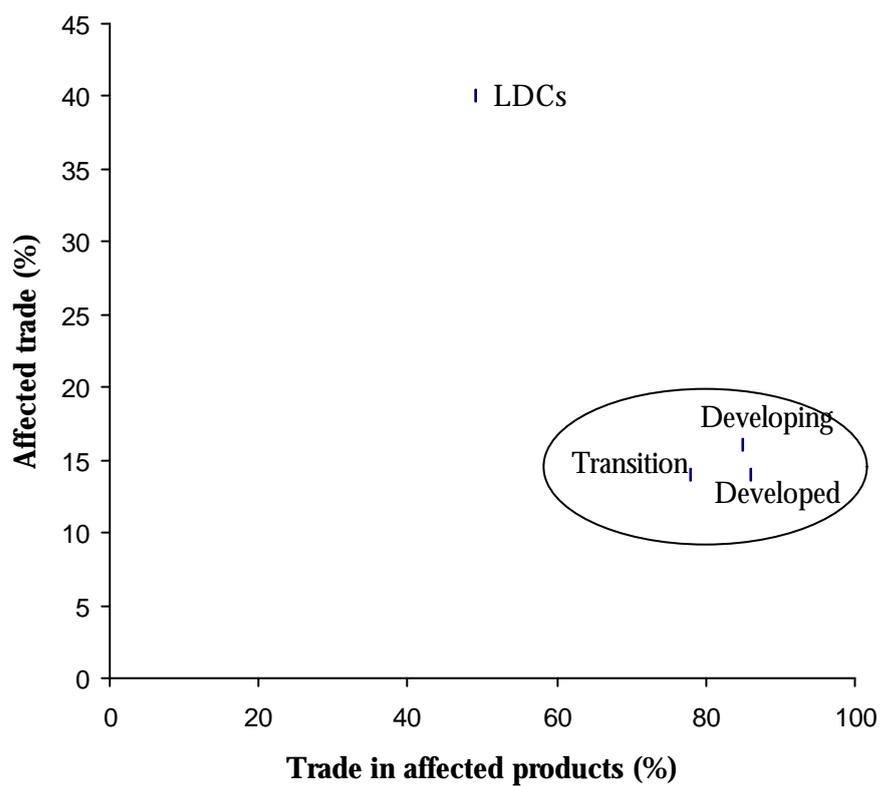
World trade affected by ETBs (share of world imports and number of products), by type of measure, 1999



Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Figure 4

Degree of exposure to ETBs by country-group, 1999

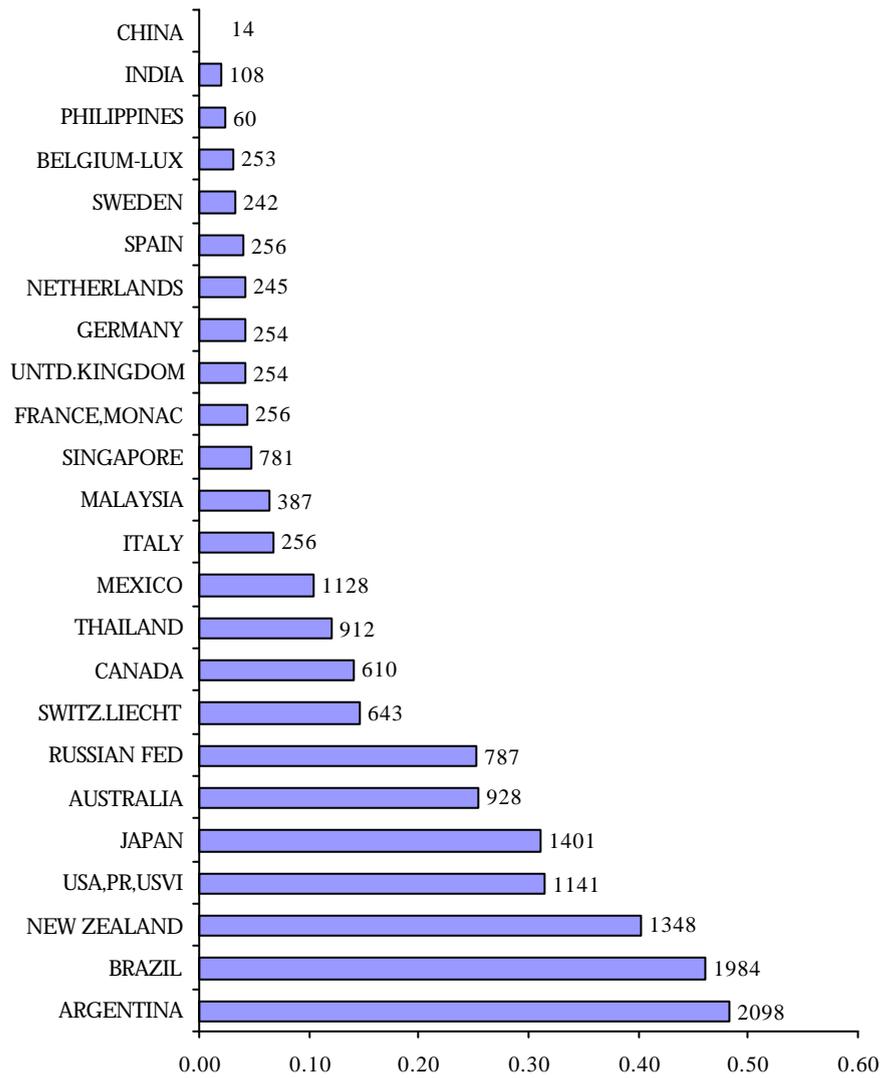


Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

Graphique 5

Enforcement of ETBs by selected importing countries, 1999

(Share of affected national imports on the horizontal axis, and number of affected products)



Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

APPENDIX 1

UNCTAD Classification of environmental trade barriers

<i>code</i>	<i>Description</i>
<i>CNUCED</i>	
<i>Finance measures</i>	
4174	refundable deposit for sensitive product to protect environment
<i>Surveillance</i>	
5271	Prior surveillance to protect human health
5274	Prior surveillance to protect environment
<i>Authorisation</i>	
6171	Autorisation to protect human health
6172	Autorisation to protect animal health
6173	Autorisation to protect plant health
6174	Autorisation to protect environment
6175	Autorisation to protect wildlife
6177	Autorisation to ensure human safety
<i>Quotas for sensitive product</i>	
6271	Quota to protect human health
6274	Quota to protect environment (Montreal Protocol)
<i>Prohibition</i>	
6371	Prohibition to protect human health
6372	Prohibition to protect animal health and life
6373	Prohibition to protect plant health
6374	Prohibition to protect environment
6375	Prohibition to protect wildlife
6377	Prohibition to ensure human safety
<i>Monopolistic measures</i>	
7171	Single channel for imports to protect human health
<i>Technical measures (related to product characteristics requirements)</i>	
8111	Product characteristics requirements to protect human health
8112	Product characteristics requirements to protect animal health and life
8113	Product characteristics requirements to protect plant health
8114	Product characteristics requirements to protect environment
8115	Product characteristics requirements to protect wildlife
8117	Product characteristics requirements to ensure human safety
<i>Technical measures (related to marketing requirements)</i>	
8121	Marketing requirements to protect human health
8123	Marketing requirements to protect plant health
8124	Marketing requirements to protect environment
8127	Marketing requirements to ensure human safety
<i>Technical measures (related to labelling requirements)</i>	
8131	Labelling requirements to protect human health
8132	Labelling requirements to protect animal health and life
8133	Labelling requirements to protect plant health

8134 Labelling requirements to protect environment

8135 Labelling requirements to protect wildlife

8137 Labelling requirements to ensure human safety

Technical measures (related to packaging requirements)

8141 Packaging requirements to protect human health

8142 Packaging requirements to protect animal health and life

8147 Packaging requirements to ensure human safety

Technical measures (related to testing, inspection or quarantine requirements)

8151 Testing, inspection or quarantine requirements to protect human health

8152 Testing, inspection or quarantine requirements to protect animal health and life

8153 Testing, inspection or quarantine requirements to protect plant health

8154 Testing, inspection or quarantine requirements to protect environment

8155 Testing, inspection or quarantine requirements to protect wildlife

8157 Testing, inspection or quarantine requirements to ensure human safety

Source: TRAINS, CNUCED

APPENDIX 2

The 9x10 main affected products, by range of ETB restrictiveness

Group	HS6 code	Affected	Group	HS6	Affected	Group	HS6	Affected
90^100	020130	5.214669	60^70	271111	8.721432	30^40	640399	6.811769
90^100	030420	4.620723	60^70	030613	5.801572	30^40	100190	4.810323
90^100	060310	3.634897	60^70	950390	5.173403	30^40	611020	4.647282
90^100	010290	3.445797	60^70	230990	2.743877	30^40	620342	4.630446
90^100	020120	2.329376	60^70	950349	1.983354	30^40	293390	4.050097
90^100	020319	2.311942	60^70	640610	1.833596	30^40	620462	3.986879
90^100	030269	1.903676	60^70	900410	1.175278	30^40	120100	3.025436
90^100	020312	1.637847	60^70	440890	1.154614	30^40	620520	2.501454
90^100	030410	1.350229	60^70	950380	1.056323	30^40	300420	2.46938
90^100	160419	1.339064	60^70	210410	0.65324	30^40	300210	2.253921
80^90	870324	57.16297	50^60	293490	5.137379	20^30	300490	16.9598
80^90	440320	3.582449	50^60	420310	1.570381	20^30	870829	6.103105
80^90	190590	3.535051	50^60	410121	1.467381	20^30	870840	4.538577
80^90	020329	3.173903	50^60	440920	1.018476	20^30	870120	3.408479
80^90	440122	1.488076	50^60	120500	0.994602	20^30	611030	3.095014
80^90	050400	1.377924	50^60	441219	0.870201	20^30	610910	2.829661
80^90	030614	1.123526	50^60	870821	0.825052	20^30	210690	2.584126
80^90	440910	1.097292	50^60	950430	0.739029	20^30	870839	2.217303
80^90	030490	1.039677	50^60	110710	0.695011	20^30	090111	2.038151
80^90	950330	1.01381	50^60	870710	0.612504	20^30	870210	1.636311
70^80	870431	14.09138	40^50	870323	65.43132	10^20	870899	9.577738
70^80	440710	13.94953	40^50	100590	3.826359	10^20	271121	6.015043
70^80	020230	3.320376	40^50	080300	2.796384	10^20	870322	3.882352
70^80	950341	3.05662	40^50	640391	1.950871	10^20	870421	3.068395
70^80	190530	2.463589	40^50	284420	1.949248	10^20	870422	2.40212
70^80	640359	2.083865	40^50	610510	1.656749	10^20	901890	1.564535
70^80	030379	1.651323	40^50	440799	1.594131	10^20	040690	1.497982
70^80	950370	1.545535	40^50	410431	1.49644	10^20	230400	1.343033
70^80	900319	1.376225	40^50	293100	1.49478	10^20	870321	1.28907
70^80	190190	1.300413	40^50	950210	1.378454	10^20	520100	1.268272

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

APPENDIX 3

The most affected products, 1999

Products for which at least 90% of world trade is affected by ETBs, and accounting for world imports above US\$ 500 million de US\$, 1999

HS code	Product	Affected world imports, US\$ billion
020130	Bovine cuts boneless, fresh or chilled	5.2
030420	Fish fillets frozen	4.6
060310	Cut flowers & flower buds for bouquets or ornamental purposes, fresh	3.6
010290	Bovine, live except pure-bred breeding	3.4
020120	Bovine cuts bone in, fresh or chilled	2.3
020319	Swine cuts, fresh or chilled, nes	2.3
030269	Fish nes, fresh or chilled excl heading No 03.04, livers and roes	1.9
020312	Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled	1.6
030410	Fish fillets and other fish meat, minced or not, fresh or chilled	1.3
160419	Fish nes, prepared or preserved, whole or in pieces, but not minced	1.3
021019	Swine meat cured, nes	1.0
030349	Tunas nes, frozen, excluding heading No 03.04, livers and roes	1.0
020110	Bovine carcasses and half carcasses, fresh or chilled	1.0
020311	Swine carcasses and half carcasses, fresh or chilled	0.9
060110	Bulbs, tubers, tuberous roots, corms, crowns and rhizomes, dormant	0.7
030791	Molluscs nes, shelld/not, and aquatic invertebrates nes, live, fr/chilled	0.7
051199	Animal prods nes&dead animals of Chapter I unfit for human consumption	0.6
020410	Lamb carcasses and half carcasses, fresh or chilled	0.5
060491	Foliage, branch & pts of plant w/o flo/bud, grass, for bouquets & orn purp, fr	0.5
030239	Tunas nes, fresh or chilled, excluding heading No 03.04, livers and roes	0.5

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on trade barriers.

APPENDIX 4

Impact of ETBs, by objective, 1999

Objective: Protection of ...	Number of affected products	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (2)/(1) (%)
Environment	1,198	1,786,557,949	357,646,649	20
Wildlife	737	570,871,985	212,550,403	37
Plants health	761	504,026,912	122,340,214	24
Animal health	1,059	693,311,290	220,778,920	32
Human health	2,054	1,753,550,358	432,571,487	25
Human safety	1,816	3,428,194,981	379,218,770	11

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

APPENDIX 5

Impact of environment-specific ETBs, by objective, 1999

Type of measure	Number of affected products	World imports (mn US \$) (1)	Affected imports (mn US \$) (2)	Coverage ratio (2)/(1) (%)	
Authorisation	1,019	1,110,889,945	128,580,380	11.57	
Prohibition	233	726,137,360	243,048,161	33.47	
Prior surveillance	1	572,569	195,443	34.13	
Quota	13	3,697,794	376,229	10.17	
Finance	19	47,644,073	6,765,371	14.20	
Monopolistic	-	-	-	-	
Technical obstacles	Marketing	3	330,606	8,252	2.50
	Labelling	31	41,213,901	8,816,022	21.39
	Packaging	-	-	-	-
	Test, inspection, quarantine	437	176,598,200	35,309,640	19.99
	Products characteristics	787	1,168,048,397	258,029,818	22.09

Source: Authors' calculations on the basis of UNSD COMTRADE trade data and UNCTAD data on barriers

APPENDIX 6

List of the 185 sensitive products, 1999

HS6	Number of countries	World imports	Affect. imports	Cov. Ratio	HS6	Number of countries	World imports	Affect. imports	Cov. ratio
010119	50	783752.3	681072	86.90%	030110	41	245910.8	220626.5	89.72%
010210	43	329744.3	134801.5	40.88%	030199	39	395161.5	216717	54.84%
010290	61	3661840	3445797	94.10%	030219	36	53931.82	51828	96.10%
010410	45	463366.6	351779.3	75.92%	030269	46	2085683	1903676	91.27%
010420	39	67837.79	43339.02	63.89%	030329	43	51263.09	33821	65.98%
010511	41	390913.2	168391	43.08%	030349	36	1042326	1026550	98.49%
010519	35	83071.76	42115.25	50.70%	030379	48	2344078	1651323	70.45%
010600	64	541388.3	389501.2	71.94%	030410	45	1375366	1350229	98.17%
					030420	49	4859627	4620723	95.08%
020110	46	1006296	993378.5	98.72%	030490	47	1178834	1039677	88.20%
020120	48	2365849	2329376	98.46%	030510	38	12028.84	8387.624	69.73%
020130	52	5367102	5214669	97.16%	030530	34	264387.7	256105.6	96.87%
020210	43	205814	39892	19.38%	030549	43	122885.4	113577	92.43%
020220	51	640037	320527.3	50.08%	030559	39	563775.3	119812.9	21.25%
020230	55	4514795	3320376	73.54%	030613	34	8450958	5801572	68.65%
020311	39	893417	860843	96.35%	030799	43	854464.9	701578.1	82.11%
020312	37	1650758	1637847	99.22%					
020319	47	2349664	2311942	98.39%	040120	36	1925335	75135.7	3.90%
020321	37	242427	32871	13.56%	040130	35	976840.5	85946.5	8.80%
020322	44	285443	164526.5	57.64%	040210	38	2742576	858764.8	31.31%
020329	50	3876109	3173903	81.88%	040221	36	3170084	1018800	32.14%
020410	38	555026.5	531357	95.74%	040291	36	756412	88683.25	11.72%
020422	43	292223.1	277569.3	94.99%	040299	37	358675.3	55381	15.44%
020423	35	110394	100942.3	91.44%	040390	35	450621.3	80487.38	17.86%
020430	41	112813.7	65284.25	57.87%	040490	35	324183.3	181819.3	56.09%
020441	39	42431.86	26255.19	61.88%	040620	34	399825.6	77661.63	19.42%
020442	46	656994.8	547029.3	83.26%	040630	34	1106677	166024.3	15.00%
020443	40	329371	289145.8	87.79%	040690	35	6966481	1497982	21.50%
020610	39	331267	327904	98.98%	040700	53	936231.8	635033.4	67.83%
020621	42	344238	336768	97.83%	041000	37	159921.8	30450.83	19.04%
020622	44	131531.6	97410.98	74.06%					
020629	52	495949.2	309097.4	62.32%	050400	44	1592016	1377924	86.55%
020630	35	42921	39516	92.07%	050590	37	43176.62	20012.98	46.35%
020641	35	29961	18774	62.66%	050690	34	125709.4	117176	93.21%
020649	44	349831.8	153241	43.80%	050800	36	81431.24	66210.15	81.31%
020690	40	40459.67	29546	73.03%	051000	37	109679	76579	69.82%
020890	47	342016.3	313976	91.80%	051110	34	143358	76549	53.40%
020900	47	126324	113384	89.76%	051191	40	274830.5	208528	75.88%
021011	44	98769.64	82354	83.38%	051199	48	638555.4	614585.9	96.25%
021019	47	1060127	1037064	97.82%	060110	50	782415	745244.3	95.25%
021020	36	52219.94	46330	88.72%	060120	51	79352.75	69233	87.25%
021090	48	170078.5	138954	81.70%	060210	56	202866.4	187227.3	92.29%
					060220	41	117435	35393	30.14%

	060310	54	3897638	3634897	93.26%
	060390	47	161802.8	155099	95.86%
	060491	37	540595	520166.3	96.22%
	060499	45	115652.5	111836	96.70%

APPENDIX 6 (cont.)

070110	37	489477.5	184323.8	37.66%	160100	42	1144827	251910	22.00%
070190	42	1362822	224856.8	16.50%	160239	34	1323275	469521.3	35.48%
070200	37	2806054	1070170	38.14%	160241	34	545493.1	212071	38.88%
070310	40	1013536	521056.4	51.41%	160249	35	550713.9	137669.9	25.00%
070320	40	530806.8	298146	56.17%	160250	38	941404	352540.6	37.45%
070990	39	1054795	394296.2	37.38%	160290	49	55305.66	45640.5	82.52%
071090	35	373784.1	101076.3	27.04%	160300	45	133622.5	95079	71.15%
071290	36	648386	349283.3	53.87%	160414	36	2314133	859001.1	37.12%
071310	41	616790.3	149881.6	24.30%	160419	46	1419029	1339064	94.36%
071331	34	156818.1	100526.3	64.10%	160420	50	814647.3	641536	78.75%
071333	36	655881	249457.5	38.03%	160430	41	259782.2	242135	93.21%
071339	36	206811.9	79227.47	38.31%	160590	48	956684.9	738884.4	77.23%
080211	34	94111.76	4271.75	4.54%	190110	47	1173725	538558.5	45.88%
080212	34	867568.8	157020	18.10%	190190	44	1717979	1300413	75.69%
080510	36	2125242	570361.8	26.84%	190211	39	241839.4	204052	84.38%
080610	38	2698554	1102953	40.87%	190219	40	1261125	951923	75.48%
080620	37	743021.8	248756.9	33.48%	190220	41	409768.9	365110	89.10%
080810	40	2882710	699809.6	24.28%	190230	39	510239.1	303269	59.44%
080820	38	1093954	361945.3	33.09%	190410	40	1449087	1008134	69.57%
081090	38	1480238	375408	25.36%	190490	38	261626.2	161410	61.69%
090111	36	9776555	2038151	20.85%	190530	42	3152614	2463589	78.14%
090121	34	1308484	307817.5	23.52%	190540	39	213582.4	175420.7	82.13%
100110	36	2708988	1337764	49.38%	190590	43	4314299	3535051	81.94%
100190	39	13568590	4810323	35.45%	210410	42	951884.7	653240	68.63%
100510	38	900733.8	452087.5	50.19%	210420	42	201806	129266	64.05%
100590	36	8773839	3826359	43.61%	230110	37	490163.7	275142	56.13%
100620	34	914802.9	301940.5	33.01%	230120	35	1819240	868824	47.76%
100630	40	4804601	1374097	28.60%	230990	40	4340772	2743877	63.21%
100700	35	805124.8	708878	88.05%	300110	36	32670.85	27878.6	85.33%
110100	37	1375917	172000.1	12.50%	300120	39	102859.8	79638.25	77.42%
120220	35	796353.8	301746.6	37.89%	300190	36	697966.1	314062.6	45.00%
120600	37	1202584	117702	9.79%	300210	45	5304350	2253921	42.49%
120799	35	126927.5	48309	38.06%	300220	44	2241940	931601.5	41.55%
120919	34	16698.44	3510.5	21.02%	300290	50	1139623	386935.5	33.95%
120929	43	253349.5	96880.5	38.24%	300310	36	280868.8	43054	15.33%
120991	41	1139145	407411.6	35.76%	300320	42	667093.2	289894.3	43.46%
120999	44	205420.6	96103.75	46.78%	300339	37	140782.1	33293.53	23.65%
121190	36	885801.4	227211.4	25.65%	300390	45	2843325	805355.1	28.32%
130190	34	146718.6	72470	49.39%	300410	45	1417421	351063.7	24.77%
140490	37	135085.5	85282.25	63.13%	300420	46	5827848	2469380	42.37%
150410	37	40607.5	34641.25	85.31%	300431	41	1438653	435638	30.28%
150420	37	312693.5	260132.2	83.19%	300432	41	978535.6	227885	23.29%
150600	37	68738	53429	77.73%	300439	39	6123621	2223455	36.31%
					300440	43	1284046	432631.5	33.69%
					300450	44	1529256	593503.7	38.81%
					300490	45	51712737	16959804	32.80%
					300510	36	1193567	274232	22.98%

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151610	43	77576.61	56725.38	73.12%	300590	53	1129407	911320.8	80.69%
					300610	36	891480.9	220609.2	24.75%
					300620	34	204355.6	47421.5	23.21%
					300630	35	1155009	608949.1	52.72%
					300660	36	731054.1	190773.5	26.10%
					380810	37	2579952	874226.5	33.89%
					380890	34	623123.8	138848.3	22.28%
					410390	35	138723.3	60120	43.34%

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List of acronyms

ETBs	Environment-related trade barriers
HS	Harmonised System
ITC	International Trade Centre (UNCTAD-WTO)
LDCs	Least advanced countries
mn	million
Bn	billion
UNCTAD	United Conference for Trade and Development
UNSD	United Nations Statistics Division
WTO	World Trade Organisation