

**Economic Implications of the Doha Development Agenda for  
Latin America and the Caribbean: Non Tariff Measures**

by

Jean-Christophe Bureau<sup>a,b</sup>, Sophie Drogué<sup>a</sup>, Maria Priscila Ramos<sup>a,c</sup><sup>1</sup>

*Paper prepared for the second CEP-II-IDB "Economic Implications of the Doha Development Agenda for Latin America and the Caribbean", October 6-7 2003, Inter-American Development Bank, Washington D.C.*

DRAFT, do not quote

---

<sup>1</sup> a: Unité Mixte de Recherches en Economie Publique, INRA-INAPG (Institut National de la Recherche Agronomique et Institut National Agronomique Paris -Grignon), Paris;

b: CEP-II (Centre d'Etudes Prospectives et d'Informations Internationales), Paris;

e: EHESS (Ecole des Hautes Etudes en Sciences Sociales), Paris

## **Economic Implications of the Doha Development Agenda for Latin America and the Caribbean: Non Tariff Measures**

Developing countries and transition economies have considerable expectations regarding trade liberalization in the agricultural sector. This is particularly true for Latin American, and (in a lesser extent) for Caribbean countries. Argentina and Brazil, in the debates prior to the 2003 Ministerial meeting of the World Trade Organization (WTO), have indicated that there would be no agreement if significant trade liberalization in agriculture was not achieved. They see agriculture as a major potential source of exports, and therefore of much needed foreign currency. In particular, a decrease in agricultural tariffs in the European Union (EU), which is the destination of three quarters of the Argentina agricultural exports, is seen as an essential objective.

There are however several reasons why a fall in EU agricultural tariffs might not be the panacea that Latin American countries believe in. First, a considerable share of these countries' exports (coffee, soybean), already face very low tariffs in the EU. Second, for commodities that face little technical barriers, such as sugar, prospects of export earnings are sometimes overestimated.<sup>2</sup> More important, perhaps, for several other commodities, tariffs are only one of the many trade obstacles. Non Tariff Barriers (NTBs) also matter. Even with a large reduction in EU tariffs for meat and dairy products, for example, it is uncertain that Latin America would gain a considerable share of the EU market.

In this paper, we try to assess the extent in which NTBs could hamper Latin American exports, and, perhaps, make the hopes of large gains from a decrease in agricultural tariffs somewhat illusory. In section 1, we assess what would be the products that would experience larger increases in exports if there was no NTB, or if NTBs were removed simultaneously with tariffs. In section 2, we describe the fears and complaints from Latin American exporters against EU regulations that might act as a barrier to trade. In section 3, we discuss some methods that could be used to quantify non tariff barriers. In section 4, we present our own point of view for deciding whether controversial regulations that affect trade should be treated as NTBs. The goal is, eventually, to define a way in which trade barriers could be distinguished from genuine protection of consumers, animals and plants. This seems particularly useful in the framework of bilateral negotiations on technical issues, such as standards and mutual recognition, under the EU-Mercosur dialogue.

### **1. Potential Latin American exports to the EU under trade liberalization**

***Latin America and access to the EU market.*** Latin America is one of the few regions in the world that do not benefit from a significant preferential EU market access for agricultural products. Indeed, the EU has preferential agreements with all but 9 of the 146 WTO members. Roughly 70% of EU agricultural imports come from countries that benefit from preferential access, and more than a third of the value of agricultural imports enter under a preferential

---

<sup>2</sup> If sugar is potentially a considerable market due to the high level of protection in the EU, trade diversion between developing countries (between Brazil and the Caribbean in particular) will take place, and not everybody will be a winner. In addition, even low-cost Brazil and Caribbean countries will be put in competition with other would-be suppliers of the EU, in case of multilateral tariff reduction, such as Australia, Thailand, and some African countries (which are experiencing significant investment in the sugar sector, in view, in particular of access to the EU market under the "Everything but arms initiative"). Note also that the expectations of Brazil and other sugar exporting countries might run into the fact that the EU demand for sugar is unlikely to increase, and that the supply elasticity of sugar production, at the world level, is very high (prices are unlikely to increase a lot even if EU production was declining).

tariff (Gallezot, 2003): Given the fact that very large imports such as coffee beans, tropical products and soybeans enter with a zero or very low tariff, for the remaining products, preferential agreements, such as the Africa Caribbean Pacific (ACP) agreement, account for a very large share of foreign supply of the EU market.

In this set of preferences, Latin American countries look like the "parents pauvres", even though Caribbean countries benefit from a much more favorable treatment than Southern America, because of the ACP agreements and, for some countries, the Everything but arms initiative. Because some of the goods that Latin America produces compete directly with local production, they are the ones that face the highest tariffs in the EU (sugar, dairy, beef, see Bureau, 2002)

The only preferences to which South American countries such as Brazil and Argentina are eligible are a few tariff rate quotas, and the Generalized System of Preferences (GSP).<sup>3</sup> However, the GSP only allows preferences only to a limited set of products.<sup>4</sup> Several reasons explain that the benefits granted under the GSP scheme are limited in agriculture:

- Temperate zone agricultural products have been largely excluded from preferential treatment or received it only within tight quotas, and for unprocessed tropical products, the generally applicable developed country tariffs are zero or relatively low anyway.<sup>5</sup>
- Granting tariff preferences or duty-free market access does not automatically ensure that the trade preferences are effectively utilized by beneficiary countries. Preferences are conditional upon the fulfillment of an array of requirements which, in many instances, developing countries may not be able to comply with. Typically, the rules of origin are among the main obstacles, together with sanitary and phytosanitary measures. The rules of origin in the EU GSP are particularly stringent regarding "cumulation", especially compared to the rules of origin under the ACP agreement.
- Under the GSP (unlike most other unilateral preferential schemes), country eligibility is affected by "graduation". Graduation of a given product or of full country' exports can be implemented when this country is no longer assessed as needing preferential treatment to be competitive.<sup>6</sup> Countries such as Brazil and Argentina are considered as having a sufficient degree of competitiveness in the production of a particular product

---

<sup>3</sup> The GSP scheme was initiated by UNCTAD and first implemented by the EU in 1971. It was subsequently adopted by other countries, including the United States and Japan. The GSP provides tariff preferences for developing countries, on a non-discriminatory and non-reciprocal basis. An exception had to be granted under the GATT rules to the MFN principle, since normally GATT/WTO members cannot discriminate between imports from different sources. The 1979 "Enabling Clause" made the GSP compatible with the non-discriminatory nature of the MFN principle under the GATT. The WTO has added new focus in 1996 and 1997. Recent revisions in several GSP schemes have substantially improved benefits for developing countries, and in particular those of the "Least Developed Countries" group (LDCs). The 2001 EU "Everything but arms" initiative, that grants unrestricted access with zero duties to LDCs exports to the EU, is formally part of the EU GSP scheme.

<sup>4</sup> The range of products eligible to the GSP is much larger for Least Developed Countries (LDCs), in the EU and Japanese GSP schemes, in particular.

<sup>5</sup> Sugar and meat are exceptions to this rule, however. See Bureau (2002) for the EU tariffs on sugar, meat and dairy products.

<sup>6</sup> Graduation or the withdrawal of GSP preferences rests on the argument by preference-giving countries that preferences comprise special treatment that should be reserved only for the most needing developing countries.

or sector, and therefore had their GSP benefits terminated for that product or sector, in the EU and US (their exports run into the "lion's share" clause, see Castilho et al 2001).

Overall, the combination of the list of eligible products and the graduation system leads to the exclusion from GSP of Argentinean exports of live animals, meat, processed meat, beverages, skins and leather (i.e. chapters 01,02, 4, 16 to 23 and 41). The situation is even worse for Brazil, since coffee, tobacco, and resins (i.e. chapters 01,02,09,13, 16 to 23, 24, 41) are also excluded.<sup>7</sup> This shows that most exports from these countries face the high bound tariffs applied under the MFN regime. These tariffs are particularly high for processed products, suggesting that there is some protection of the value added.

***Potential impacts of trade liberalization.*** Because Latin America is largely excluded from the present set of EU preferential agreements, there is a considerable interest in a EU-Mercosur agreement. Nevertheless, negotiations have only progressed at a slow pace (largely because of agriculture). Therefore, Latin American countries have put a lot of hope in the Doha round of multilateral negotiations. They believe that a significant cut in tariffs, such as the one suggested in the Cairns Group proposal to the WTO, would lead to large market access for Latin American products in the EU.

Intuition suggests that trade liberalization would lead to large exports of sugar, pork and perhaps orange juice as well as other fruits and vegetables from Brazil to the EU, while other Latin American countries would increase their exports in beef, wheat and dairy products (Argentina).

It is nevertheless difficult to assess precisely what would be the level of these exports, even under the assumption that tariffs are the only barriers. Indeed, the magnitude of trade diversion is uncertain. EU imports from African and Pacific countries under preferential agreements that would be replaced by EU imports from Latin America, but also competition from other Cairns group countries that would deprive Latin America from gaining a large market share in the EU. In addition, the effect of domestic demand in Latin America, following trade liberalization that, would (arguably) lead to an increase in (some) incomes, is unclear (would a growing market in Brazil absorb Argentina exports of dairy products ? Would Brazil beef production still be directed for 90% towards domestic market ?). Uncertainty also surrounds the changes in world prices that would follow large liberalization scenarios, in particular because the production potential of many countries is unknown (margins of technical progress, possible increase in productivity following a land reform, cultivating new areas, etc.). The impact of multilateral trade liberalization is even more ambiguous for Caribbean countries, that might suffer from both an erosion of their preferences and an increase in the prices of some of their food imports.

In order to assess the effect of a fall in tariff, the most satisfactory, albeit imperfect, instruments are large scale models of international trade that include a detailed production sector. Large scale Computable general equilibrium (CGE) models are a useful tool.

Scenarios of trade liberalization, either in a bilateral framework (EU-Mercosur agreement) or multilateral agreement, give relatively contrasted results (Teixeira et al, 2002; CEI, 2002; Monteagudo and Watanuki, 2002; Fontagné et al 2002, Bouët et al 2003a, 2003b). Indeed, it appears that, in addition to the removal of tariffs, the export gains from Latin America depend

---

<sup>7</sup> Regarding coffee, this would not be a problem, since coffee beans face a zero duty, if there was no tariff escalation. A recent (unpublished) study by Bureau for the Common Fund for Commodities shows that Brazilian exports face a considerable degree of tariff escalation in both the EU and the US.

on the measures taken to remove EU subsidies to production, but also support in the rest of the world.

CGE results show that there is a large uncertainty about the increase in sugar exports from Brazil, Argentina and Paraguay to the EU. Either they seem either perplexingly low in the simulations (Teixeira et al, 2002), or the increase in percentage is very sensitive to some relatively arbitrary elasticities. When applied to initial flows that are very limited, this uncertainty on some parameters provides little reliable information on the future flows (Fontagné et al, 2002). The uncertainty on the increase in exports is magnified by the widespread use of an Armington assumption with rather low elasticities of substitution, which is hardly satisfactory for products that are highly substitutable across origins, such as sugar.

Most CGE models, however, confirm the intuition that Latin American exports of sugar and dairy to the EU would increase dramatically, should EU tariff go down. In general, though, a regional EU-Mercosur freer trade area appears to generate larger exports than a multilateral decrease in bound tariffs. Simulations also suggest an increase in the exports of fruits, wheat, corn, beef, poultry, as well as dairy products. Nevertheless, Mercosur exports would largely take the place of US and ACP exports. There would however be some tough competition even between American countries, and some trade diversion between Argentina and Brazil.

A constant feature of these models is that they fail to account with precision of non tariff barriers, i.e. of sanitary, phytosanitary and technical regulations that hamper trade. These barriers are limited in some sectors such as sugar. But they might be considerable for fruits, because of the fear of invasive species and insect dissemination, and for meat and dairy products, because of sanitary reasons.

## **2. The political economy of EU regulations that limit trade**

Even with a large fall in tariffs, Latin American exports to Mercosur might not increase as much as predicted by empirical models. Non-tariff measures could be to be a major obstacle. There are four main reasons for that. Some of them (phytosanitary fears, and protection of consumers) are legitimate. Others, referring to political economy motivations, is less defensible. The last reason presented in this section, clearly refers to plain protectionism, but could nevertheless impose a significant limitation to Latin American food exports to the EU.

*A genuine need for stricter regulations in the phytosanitary area.* Regulations that impose barriers to imports are often depicted as "non tariff barriers". Nevertheless, the term is subjective, since some of these measures are motivated by genuine concerns, rather than hidden protectionism.

Not all epidemics, epizooties and spread of pests are linked to trade (tourism is an increasing source of dissemination of pathogens). However, there are some negative externalities to trade in agricultural products, at least in the unprocessed form. The costs at stake are enormous. In the United Kingdom alone, the cost of the (import borne) Foot and Mouth Disease(FMD) epizooty in 2001 amounted to some 9 billion pounds (UKNAO, 2002).

Insects could cause considerable harm. The *Diabrotica Virgifera* (originating from Latin America) that has invaded the United States, and from there Europe (through exports of corn to the Balkans) has reached France in late 2002. Fighting *Diabrotica* requires amounts of pesticides that are incompatible both with the environmental requirements and a positive gross margin of producers in France. The whole corn production is endangered.

Overall, the costs of plagues, invasive species and imported diseases are so high that one cannot depict border measures as simple protectionist instrument. Recall that in the US, the costs of invasive species have been estimated at 138 billions of dollars a year (Pimentel et al

2000), and some other authors find this estimate conservative because there are indirect costs not taken into account (such as disturbance regimes, i.e. grass that favors flood or fires). Estimates of the costs of the longhorn beetle (*Anoplophora glabripennis*, an insect that traveled in wooden pallets and now destroys trees) for the US economy range up to 140 billion dollars. This insect was found in France in 2003. The single *zebra mussel*, that colonized the water system of electric plants and sewages cost more than 5 billion dollars to the economy. Dissemination of the Nile virus, often caused by imports is also a cause of serious concern. So is the dissemination of predators, which is one of the most serious causes of reduction in biodiversity.

Neither the zebra mussel nor the longhorn beetle originated from Latin America, and mosquitoes spreading Nile virus do not only lay eggs on agricultural imports, but also on car tyres and other containers. Nevertheless, agricultural trade plays a special role in the dissemination of pathogens.

It is unlikely that quarantine and inspection measures become more lenient in the future. An unwanted indirect effect might be to limit the effect of tariff cuts for exports of fruits, meat or dairy products from Latin America, among others.

Our point of view is nevertheless that dissemination of parasites is a genuinely serious concerns implying formidable costs, and one cannot dismiss border measures taken as being pure protectionism. There are many reasons to believe that controls, quarantines and phytosanitary restrictions to imports are far below what would be economically efficient, in Europe (Mumford, 2002; Bureau and Gozlan, 2002). Reinforcing controls in the EU might restrict trade, but is nevertheless desirable and even necessary.

***The political economy of food safety standards in the EU.*** Consumers pressure for tight food safety control make it difficult for policy makers to ease sanitary requirements for trade products. In Europe, but also in the US, medias have emphasized the risks for human health of foodborne disease, in cases implying imported products, even though there is no statistical evidence that imports are more often tainted than domestic production. The result is a very narrow margin of action for public regulators. They simply cannot afford the political risk of an epidemic that would be tracked to imported food.

For example, the EU regulation that has led to ban East African seafood products for several years at the end of the 1990s, has been very controversial because of its dramatic effects on local economy, and the questionable nature of the epidemic (the decision seemed to have been based on an isolated case of cholera rather than an endemic contamination). The regulation on aflatoxins, which, according to a World Bank study could cause a 70% fall in exports of African groundnuts to the EU for almost no health incidence is also very controversial (see Otsuki et al 2000, and Cato et al 2001 and Henson et al 2001 for the previous example). Nevertheless, any decision maker is likely to have nightmares about the political consequences of even a single case of death by cholera linked to imported fish, or by of a proven link between a surge in liver cancers and the softening of aflatoxin standards, should this be taken as a target by British tabloids...

In the EU, objective science is only one of the component of the decision making. Political economy plays a significant role. The weight of consumer groups, sometimes manipulated by vested interests, must be taken into account. Demands for increased regulation have followed a number of highly-publicized outbreaks of food-borne diseases (e.g. *E. Coli*, *Salmonella*, *Campylobacteria* or *Listeria*). New production methods driven by technology have added to

consumer unease, fuelled by a growing mistrust of science and its interpretation in terms of food regulation. It sometimes makes it necessary to regulate even imaginary food risk.<sup>8</sup>

Other sociological factors explain a move towards stricter sanitary standards. The EU population has become predominantly urban, and because of modern consumption habits, such as catering, ready to cook and convenience food, consumers are more dependant on public authorities for food safety than in traditional rural societies. International trade has put on the shelves many new products, that consumers feel less familiar with. Moreover, as incomes rise, consumers are more prepared to pay for a regulatory regime that provides higher standards and minimize risks.

All the above reasons explain that authorities cannot afford to be seen as "lenient" on food safety standards, especially when imported products are involved. Again, the pressure is against less stringent standards for food imports. Latin American exports might could be affected, among others.

***EU regulations at odds with international standards.*** A significant share of the problems faced by exporters, including Latin American ones, is the EU bureaucracy and tight administrative regulations. Indeed, in Europe, there are many regulations on product quality that do not deal only with consumer health, but with the protection of denominations, know-hows and very specific quality attributes. Some of the barriers to trade come from the fact that EU standards address specific needs, that differ from those in the rest of the world.

There is considerable disagreement on quality attributes between countries, such as the nutritional content, taste, production methods and authenticity of products, that are relevant and on the extent to which they may legitimately be the subject of regulation. Some countries consider that the soil, climate and traditional know-how that exist in a region have a decisive influence on product quality, others do not. "Authenticity", which has inspired the 1992 EU legislation on food quality labeling, is a concept that is not shared by the rest of the world.<sup>9</sup> Definitions based on taste or traditional know-how receive little support at an international level. These notions of product quality are ill-matched to the approach adopted internationally. The stance of the WTO agreements is to take into consideration only a single quality attribute, namely sanitary quality. International Standardization Office (ISO) labels, which could become *de facto* standards regulating international trade, do not include all the quality dimensions of European regulations, which are based to a considerable extent on a product's organoleptic qualities (taste) and authenticity.

EU regulations, even though they are at odds with international standards, benefit from a strong public support, for those aspects that go beyond food safety. This is the case of protection of denominations of origins, of traditional products, but also of quality attributes that appear more and more important to citizens and consumers: animal welfare compliance, labor standards, environmental standards, and in a lesser extent, human rights (child labor) standards. Not all these standards are in fact public regulations. Some of them are increasingly driven by private self-regulation (for example, the UK retailers increasingly impose animal

---

<sup>8</sup> See the measures taken for the bogus contamination of Coca Cola in Belgium in 1999, without any scientific evidence, which can be seen as consequence of the Bovine Spongiform Encephalopathy (BSE) crisis, and the contamination of animal feed with dioxin in 1999.

<sup>9</sup> The term "authenticity" is used to translate the concept of "typicité", which is the base of all French and Italian quality labeling system, meaning that a product must be "typical" –i.e. representative- of a particular area, in addition to be produced with premium raw materials and, often, traditional techniques.

welfare standards; many large processors impose that their suppliers be certified ISO14000; French retailers impose more and more some environmentally friendly practices, etc.). While some countries have anticipated future new requirements (the New Zealand producers of beef, which voluntarily try to comply to the most stringent retailers standards on animal welfare), some other exporters, including Latin American countries, might eventually find in these standards some obstacles to their exports.

***Standards as a substitute for tariff protection.*** The fourth reason for possible restrictive standards faced by Latin American exports to the EU is also a political economy issue, but a simple one: plain protectionism.

Clearly, there will be some temptation, if tariff protection is reduced, to use non tariff barriers as a way to limit the "flood" of agricultural products in the EU. Some countries have already set examples. Typically, the "low tariff, no imports" policy of Australia is followed with a lot of attention by agricultural ministries in some EU member countries as a possible source of inspiration.

It is well known that, in a negotiation, one should not try to put himself in the other party's position. The risk of understanding the other parties' constraints and point of view could lead to soften your bargaining position. Let us however consider the political constraints faced by EU policy makers.

In the fruits and meat sectors, EU decision makers are subject to a considerable social pressure. While the French sugar sector, for example, is typically a lobby of powerful, but rather limited number of relatively well-off producers, the EU beef sector includes hundreds of thousands of relatively poor farmers. The fruit sector is also politically sensitive because of the narrow margins and the costs of labor that make profitability highly dependant of fluctuating output price.

In both cases, there is a genuine social problem if EU producers face a sudden surge in competition from Latin American countries. The political pressure for looking for means to alleviate competition is likely to draw the attention on technical barriers on imports. In the fruit, poultry and beef sector, the nature of the product and the risk of pathogens provide more opportunities than in other sectors (sugar, wheat) for imposing technical and SPS standards. The mix of genuine concerns and politically motivated regulation aiming at protecting a large number of producers in a poor financial situation will be difficult to unravel.

### **3. Trade impeding standards and regulations faced by Latin American exporters to the EU**

CGE models allow to identify those products that should benefit most from a fall in tariff but provide little information on the impact of SPS and technical regulations on trade flows.<sup>10</sup> In the following sections, we list some of the EU regulations that are often criticized by Mercosur countries, and which could, perhaps, limit some of the trade flows predicted by tariffs cuts simulations.

The few existing studies on SPS and technical issues suggest that the products on which EU NTBs impose significant constraints on Mercosur exports are meat, dairy products, tobacco, live animals, fruits and vegetables, seafood and cereals. These measures rely on frequency indexes (Castilho et al 2001, Castilho, 2002, Fontagné et al, 2001).

---

<sup>10</sup> Francois et al (2003) include administrative of "trading costs" barriers for the services sector in their CGE model, but they estimate them with a relatively crude gravity equation, and capture many other factors that might explain a difference between actual flows and those predicted by the gravity prediction.

**Ability to export to the EU.** Among the products that are supposed to be exported in Regarding sanitary barriers, Mercosur exporters complain about administrative barriers, in particular the habilitation of exporting firms. Officially, EU regulations specify that controls are not discriminatory between EU and foreign suppliers, but some Mercosur institutions (namely the Argentina SENASA, National Service of Agricultural Sanity and Quality) believe that the requirements on production standards are more stringent for Latin American industrial plants than for the EU ones. It is difficult to assess the impact of such measures on potential trade flows, but the technical requirements imposed by the EU regulations for slaughterhouses (and fisheries) could indeed limit food exports to the EU.

**Animal diseases.** Mercosur countries complain that, when they are declared free of Foot and Mouth Disease (FMD) by the International Office of Animal Health (OIE), the EU doesn't immediately recognize this declaration and restrict its market's access to exports of bovine and porcine meats with bones and cut down. They also complain that the EU imposes a double standard in the production of meat which makes the adaptation to the sanitary EU standards expensive for Mercosulin producers. Mercosur countries also complain that pork and poultry producers face similar problems regarding swine fever and the Newcastle disease. Finally they complain about the regionalization policy of the EU and that it results in restricted access for meat coming from regions or countries free of the particular pest.

International agreements allow trade restrictions when a country is not declared free of some particular animal diseases by the OIE. Vaccination may also be used as a reason to forbid imports because of the difficulty of identifying those antibodies that result from the vaccination and those from contamination by the virus or bacteria. Box 1. provides some elements on the present international status of Latin American countries for FMD. It is noteworthy that there are some resilient outbreaks of FMD in Argentina, and that this could be used as motivation for restricting imports by the EU. Pork products from Argentina are presently not allowed in the EU market for sanitary reasons, for example (Brazilian pork is nevertheless allowed, in spite of the presence of the Aujeszky disease).

**Box 1. The status of Latin American countries regarding Foot and Mouth Disease**

The sanitary bovine meat situation in Latin-American countries has recently changed. The OIE certify that Chile is free of foot-and-mouth disease without vaccination, according to OIE Code (chapter 2.1). The Latin-American regions that are free of foot-and-mouth disease without vaccination are the north of Argentina (north of parallel 42) and east states of Brazil are classified as "free of foot-and-mouth disease with vaccination" region. However the qualification of "free of foot-and-mouth disease with vaccination" for the Argentina has been suspended by the OIE in the north of this country, because of the presence of the virus in pig production. This suspension has not been applied to all the country, and the south Argentinean region conserve the qualification of "free foot-and-mouth disease without vaccination" region. The Paraguay is a risky country in sanitary aspects, because the foot-and-mouth disease is an epidemic bovine disease. The Uruguay country is classified as a "free foot-and-mouth disease with vaccination" country.

If tariffs were lowered, it is possible that meat exports be hampered by the persistence of some animal diseases in the country of origin, under a combination of genuine fear of dissemination in the EU, and as a good excuse for protectionism, in the case of an import surge.

**Traceability.** Mercosur countries complain that the EU has adopted measures against the BSE impose additional costs for beef producers. These countries claim that the EU measures restrict access to its market even if the countries of the South cone were always free of this disease. This could explain some of the decrease in the Brazilian beef exports to the United Kingdom (De Paula and Faveret Filho, 2001).

Indeed, in the beef sector, and in an increasing number of sectors, the EU imposes also technical requirements on labeling, traceability and labeling of origin. Most Latin American beef comply to some requirements such as the ban on meat meal in feedstuffs, but certification and traceability could inflate production costs. This could impede some exports predicted by econometric models, if Latin American countries prove unable to implement a reliable traceability and certification system.<sup>11</sup>

**Phytosanitary barriers.** Mercosur countries complain that the EU imposes phytosanitary barriers that limit their exports in some products from particular regions. Citrus fruits exports for example face restrictions because of the presence of various pests (such as *Xanthomonas axonopodis* and *Guignardia citricarpa*, *Trifritidos*). Exporters consider that these bans are not supported by scientific evidence. Potatoes also face a ban that, according to Mercosur countries, is not justified by FAO standards nor EU risk analyses. There are also complaints about the lack of a uniform method for analyzing fruits between the Mercosur and EU, that leads to import rejection.

Phytosanitary barriers could easily be made stringent enough to limit imports of fruits and vegetable, if the EU decided to go beyond standard practices. Again, examples of the use of phytosanitary regulations for protectionist purpose are given by Japan, Australia and New Zealand. Nevertheless, in this area, the international standards are well defined and Latin American countries could take the case to the Dispute Settlement Body of the WTO (remember that the Japanese policy in this area was successfully challenged by the US, and that the Australian SPS policy is presently questioned under the WTO by the EU).<sup>12</sup>

A possible consequence of SPS regulations could be a bias in the pattern of trade, so that Latin American countries export more processed products (less likely to be opposed by phytosanitary measures) and less raw fruits and vegetable than predicted by models. The recent surge in Brazilian exports of orange juice to the EU might be an answer to the SPS requirements facing fruit exports. Obviously, this effect would be even larger if the existing tariff escalation was reduced.

**Residuals and toxins.** The EU legislation limits the residuals and toxins, in general in a way that is consistent with international standards. In some cases, however, the EU regulation is more stringent than the international ones, such as for hormonal growth activators and aflatoxins. In the meat sector, presence of some residual of prohibited substances residuals

---

<sup>11</sup> Note however that the argument of "extra costs" is questionable. The EU is presently imposing increasing requirements to its own producers in terms of traceability, so that the production costs are likely to be inflated in the same way on both sides of the Atlantic. Regarding traceability and certification, the EU has long recognized local certification of Argentinean organic products, which also involve traceability.

<sup>12</sup> In addition, there are some measures taken by Latin American countries that could make it easier to avoid trouble in this area. Argentina, for example, has a certification program for fruits exports that aims to fill phytosanitary requirements of third countries, and has taken some severe prevention and control measures against *Xanthomonas axonopodis* in the north-west region, so as not to suspend citrus fruits exports to the EU. Moreover, the two citrus fruits regions of Argentina (north-east and north-west) have recently implemented traceability systems to prevent plagues on fruits.

(hormones), veterinarian medicines (antibiotics) and pollutant substances residuals (pesticides, dioxins, hard metals) can lead to an import ban.<sup>13</sup>

Could the EU regulations on residuals and toxins be used to impede imports from Latin American countries? Hormonal growth activators are banned in beef production in the EU, but are allowed in Argentina. Nevertheless, the tradition of importing high quality beef under tariff rate quotas suggests that Argentina and other South American countries benefiting from a quota manage to segment their production between hormone treated and hormone free beef. In addition, it would seem that a good strategy for Argentina, Uruguay and Paraguay to use their present image of quality beef (extensive agriculture, natural feeding techniques) and to export hormone free beef than to tarnish their image by exporting under the lowest standards (rBGH/somatotropin in milk production and beef raised with growth promoting hormones).

**Animal welfare standards.** Latin American countries fear that the EU standards on animal welfare could hamper their exports of meat products (Pineiro et al, 2003). Such fears include a possible (although not on the EU agenda, to our knowledge) regulation on iron branding, for example, and on animal transportation.

Could these regulations be a problem for Latin America exports? GATT rules severely limit the possibility of imposing restrictions on process and production methods, and bringing the issue to the WTO is always a possibility. In addition, it seems that for some of the regulations presently imposed in the EU (size of hen cages, constraints on pigs and calves production methods), Latin American countries comply “naturally” with the EU standards.<sup>14</sup> However, it would be preferable that bilateral agreements mention explicitly such technicalities.

**GMO labeling.** Mercosur countries complain about regulations concerning traceability and labeling of genetically modified organisms (GMOs). The EU requirements are considered as going beyond standard practices and impose difficulties for Mercosur exports (Pineiro et al, 2003).

The difficulties of Latin American countries to implement the whole system of segregation necessary for traceability could limit exportations of corn and soybean. Nevertheless, US producers that face similar difficulties, and UE producers are subject to similar rules. The EU system is likely to be challenged under the WTO (the complain by the US still targets the "moratoire" on approval, but could include the mandatory labeling in future steps of the procedure).

#### **4. Quantifying the effect of non tariff barriers**

**Defining non tariff barriers.** Hillman (1991) defines NTBs as all restrictions, other than traditional customs duties, which distort international trade. Precisely it is "Any governmental device or practice other than a tariff which directly impedes the entry of imports into a country and which discriminates against imports, but does not apply with equal force on

---

<sup>13</sup> Mercosur countries claim that some of these regulations have not been notified to the WTO (e.g. Directive 96/23/CE) or impose standards that exceed the international ones without the required risk analysis (e.g. aflatoxins, Regulation CE N° 1525/98 and Directive 98/53/CE). The same criticism applies to standards of microorganisms in food that, according to Mercosur countries, are more stringent than the international standards recommended.

<sup>14</sup> The small size of cages for hens is most of the time motivated by economies of fuel in Europe, while the problem in Brazil is more often an excessive temperature, therefore leading to more extensive production methods.

domestic production or distribution". Many authors endorse this concept and include standards of identity, measure, quality, SPS, and packaging measures.

Distinguishing NTBs from a legitimate regulation for protecting consumers can be difficult. This is the reason why some other authors consider that the term "barrier" to trade should not be used for measures that may have incidentally the effect of restricting trade, but whose principal objective is to correct market inefficiencies. On the basis of a definition of NTBs given by Baldwin (1970), who restricted the concept to the measures that decrease the world global revenue, they consider that trade restricting regulations that have overall positive welfare effects should not be considered as NTBs. Mahé (1997)'s definition of a NTB as a restriction other than tariffs that leads to a decrease in world welfare, falls into this category. The idea of qualifying as protectionist a standard if it differs from the one that would be chosen by a world welfare maximizing social planner also relies on the same idea. Other authors suggest using cost-benefit criteria to define whether a regulation that affects trade has some legitimacy.

A third definition of NTBs relies on the idea that a regulatory measure should be compared to the measure that would have been implemented if it had been designed for domestic purposes only (Maskus et al. 2001). Fisher and Serra (2000), for example, characterize a standard (in an open economy) as non-protectionist if it corresponds to the standard that the social planner would use if all firms were domestic. This makes it possible to account for the welfare enhancing effect of a standard in the presence of negative externalities.

In section 5., we will go back to this crucial issue, and give our (subjective) point of view on what should and should not be considered as a NTB. However, the various methods that are used to quantify the effects of "non tariff barriers" do not necessarily use the definition favored by the authors of this paper. Some of these methods are presented in the following sections.

***The price wedge method.*** Price wedge methods rely on the idea that NTBs can be gauged in terms of their impact on the domestic price in comparison to a reference price. The main use of this method is to provide a tariff equivalent. That is, the method is conceptually oriented toward measuring the trade impact of NTBs. The tariff equivalent of a regulation can be measured as a residue when the price difference is corrected for tariff, handling, and transportation costs and for product quality differences (Campbell and Gossette, 1994).

The US International Trade Commission (USITC) uses the method on a regular basis, The method was used in some studies specific to the agriculture and food sector. Calvin and Krissoff, (1998) estimate the tariff rate equivalents of the technical regulations in the apple sector.

***Inventory-type approaches*** can be used both in a quantitative perspective as well as in a qualitative perspective to assess the importance of domestic regulations as trade barriers. Three sources of information can be used: i) data on regulations, such as the number of regulations, which can be used to construct various statistical indicators, or proxy variables such as the number of pages of national regulations; ii) data on frequency of detentions; and iii) data on complaints from the industry against discriminatory regulatory practices, and notifications to international bodies about such practices. Quantitative estimates can rely on the catalogue of all technical barriers (identification and description) on the basis of datasets that list the various regulations in the sanitary, phytosanitary and technical area. Simple statistics, such as frequency type measures can be used to provide an indication of the frequency of occurrence of NTBs. Such measures may be unweighted, or may be weighted by imports or by production. Measures include i) the number of restrictions; ii) frequency ratios (number of product categories subject to a NTB, as a percentage of the total number of

product category in the classification); and iii) import coverage ratio, constructed as the value of imports of each commodity subject to a NTB, as a percentage of imports in the corresponding product category. More refined indicators can provide some extra information, albeit under somewhat tenuous assumptions. For example, the percentage of standards based on international ones can be an indication of the overall compliance of national standard with widely used international standards. Data on detentions at the border is also a relevant source of information, even though it is seldom available (except in the United States).

In the food sector, Otsuki et al. (2000) go further and employ a direct measure of the severity of food safety standards expressed in maximum allowable contamination. Fontagné et al. (2001) use a more sophisticated indicator for assessing the impact of environmental regulations and their potential use as trade barrier. The underlying idea is that when a barrier is set by only a limited number of countries, it is more likely to be used for protectionist purposes. On the basis of a large dataset, they use frequency statistics with different thresholds on the number of countries that have implemented a trade restrictive regulation for a given product.

Other studies have used data on border detention rather than regulations. Henson et al. (2000) have studied the import rejections by the United States for products coming from Africa, Asia, and Latin America, because of sanitary and technical reasons.

***Gravity based approaches.*** When trying to quantify NTBs, one can consider the foregone trade that cannot be explained by tariffs. A typical approach is to look at the residuals in economic regressions of trade flows on the various determinants of trade. In these approaches, gravity models are of particular interest since they have long been used as a way to estimate the "home bias" or the "border effect" in trade, a part of it reflecting national regulations that hamper trade. The basic principles of gravity models are summarized by Head (2000). Over time, empirical gravity approach have been given a theoretical foundation, in the presence of imperfect substitutability between goods, and further developments have shown that the gravity equation was consistent with situations characterized by monopolistic competition (Anderson, 1979; Bergstrand 1989; Deardorff 1998). These foundations have provided a regain of interest together with new developments in this approach (see Anderson and van Wincoop 2003 for most recent developments).

In the food and agriculture sector, an Otsuki et al. (2000) use the gravity equation method to explain trade patterns between countries and to determine the effect of European aflatoxin standards on African exports. Their results show that new (and more stringent) EU standards are likely to be a major barrier to African exports of dries fruits and nuts.

Nevertheless, all the approaches described above for quantifying NTBs suffer from drawbacks, that are presented with details in Beghin and Bureau (2002). In addition to data problems, technical difficulties, and the difficulty for distinguishing the various effects, there is a fundamental problem in measuring the effect of NTBs. It is that it is conceptually difficult to distinguish them from regulations that only have the indirect consequence of restricting trade, but that first aim at solving genuine market inefficiencies.

## **5. How to unravel genuine concerns and hidden protectionism?**

There is a considerable difficulty for sorting out which, among the measures imposed by the EU, correspond to non tariff barriers, mainly motivated by protectionist objectives, and those that correspond to genuine protection of citizen, animals, plants or biodiversity.

The 1994 Uruguay Round (UR) introduced constraining disciplines, which has worked efficiently in some cases, but not in others. For example, in the EU, the 1997 WTO panel on hormone treated beef is still considered as particularly infamous: it sanctioned a measure that

was not discriminatory (the ban on hormonal growth promoters is imposed to EU producers as well), a regulation that addressed consumers demand (the rejection of hormones is widespread in public opinion), and overall the decision of the panel was a flagrant violation of a country's sovereignty for protecting its own consumers (the hormone ban was a decision made by a democratically elected parliament). Even though the subsequent ruling of the Appellate body modified fundamentally some conclusions of the panel (see Bureau and Doussin, 2000 for an interpretation), the decision still appears as a threat to measures that aimed to protect consumers. It participated to the bad reputation of the WTO in the public opinion, triggered protestations against globalization, and played a significant role in the failure of the Seattle ministerial meeting.

Under the 1994 agreements, potential non-tariff trade barriers associated with food quality are addressed primarily through the Sanitary and Phytosanitary (SPS) Agreement and a strengthened Technical Barriers to Trade (TBT) Agreement. Barriers to imports must now be based on scientific grounds. However, enforcement of international rules based purely on science has resulted in some controversies. Countries differ in their culture as well in their technical skills and their ability to enforce regulations. Domestic regulations often result from history, correspond to specific demands from consumers, or are designed to cope with a specific legal system which provides particular incentives for firms as far as product quality is concerned. This raises the question of the setting of international rules that enhance the process of trade liberalization while ensuring an adequate level of protection for consumers. Finally, science is often inconclusive, and many standards rely on very limited scientific basis, even in the *Codex Alimentarius* and other international scientific bodies. Overall, the purely science based approach of the SPS agreement has proved frustrating and non satisfactory in many aspects (Bureau and Marette, 2000).

In this section, we use the Baldwin-Mahé concept of a NTB described in section 3, i.e. a non tariff barrier is not necessarily a regulation which restricts trade, but which results in a decrease in economic welfare. With this basis, economic analysis can provide a framework for assessing, on a case by case basis, whether or not a measure falls in the category of a non-tariff barrier. Consider for example the case of adverse selection described in Box 2 (this example focuses on hormone treated beef but the economic framework is valid for other credence goods, such as genetically modified, organic and irradiated foods; goods with an ethical content; etc.). It is possible to define thresholds for the parameters that represent the perception of quality by consumers, and the cost of production of the various qualities, so that the world welfare would increase or decrease with trade (Bureau et al 1998). That is, under a certain threshold, trade liberalization leads to a decrease in the world welfare.

#### BOX 2. A Possible Case of Trade that Reduces Consumption

The purpose of this example, drawn from Bureau, Marette and Schiavina (1998) is to illustrate a case where trade increases imperfect consumer information on quality, leading to a decrease in consumption, and possibly to multiple equilibria. Consider a simple one-period framework under vertical differentiation, with two qualities for a single good, and a competitive industry. Assume that good 2 (hormone free beef) is perceived by European consumers as of higher quality than hormone treated beef (denoted by subscript 1). Respective production costs are  $c_2$  and  $c_1$ , with  $c_1 < c_2$ . The aggregate supply function  $S_i(p)$  and aggregate surplus for producers of quality  $i$  products are  $S_i(p) = p/c_i$ , and  $PS_i = pq_i - \frac{1}{2}c_i q_i^2$ . Demand is represented by the classical framework introduced by Mussa and Rosen (1978). Consumers purchase one unit of the good, and have different preferences for quality, represented by a uniform unit distribution of a parameter  $q \in [0,1]$ . Consumers' willingness to pay for a quality  $k$ , is given by  $qk$ , and increases with  $q$  and  $k$ . The net utility of an individual

buyer with a preference for quality  $q$  is equal to  $qk - p$ . Aggregate demand depends on consumers' belief about the relative quality of the two types of meat, but also on consumers' information on the types of meat available on the market.

The parameter  $b$  measures the difference between the two perceptions of quality. That is, if  $b$  is close to zero, consumers see quality 1 as being much inferior to quality 2. If  $b$  is close to one, consumers perceive almost no difference between quality 1 and 2, i.e. between hormone-treated and hormone-free beef.

Under autarky, hormone prohibition is enforced in the domestic country. Consumers know with certainty the quality of the product. Their expected quality is therefore the perceived quality  $k_2$ . Demand is  $D_2(p) = 1 - p_2/k_2$ . Supply is  $S_2(p) = p_2/c_2$ , and equilibrium results in welfare  $W^A = k_2^2 / (2(c_2 + k_2))$ . Domestic producers benefit from the autarky situation, since they do not face competition from foreigners. Consumers suffer from the absence of choice between hormone-free goods and cheaper goods. Some consumers may prefer to buy quality 1 products at a lower price than quality 2 products, and under autarky the market is not covered.

Empirically, consumers who suffer from the ban are those who have little aversion to hormone-treated meat products, and who would buy these if they were cheaper than the goods presently available in the EU. The lack of product diversity limits domestic welfare in the autarky situation. On the other hand, there is no uncertainty on quality, and therefore none of the problems linked to adverse selection.

Opening borders to products whose quality is perceived as low by EU consumers may result in market inefficiencies if buyers are unable to determine the actual quality of the products they purchase. Consumers expect an average quality when both domestic and imported products are available on the market. Total supply  $S(p)$  includes domestic supply  $S_2(p)$  and imports  $S_1(p)$ . However, there is a single price clearing the market, at least if no label makes it possible to segment the market. Assuming rational expectation on quality, it is possible to determine the equilibrium price and to derive producer and consumer surplus. One can show that trade liberalisation has two opposite effects on the overall welfare. The first one is caused by imperfect information. Since consumers cannot differentiate between the two qualities, they expect an average quality  $\bar{k} < k_2$ . This results in a decrease both in price and demand for the domestic production. The second effect is a price decrease. One can show that if trade liberalisation involves a large decrease in the quality expected by consumers, and if the difference in production costs of imported production relative to domestic products is small, trade liberalisation can result in welfare losses for the domestic country. The parameter  $b$  which determines the perceived quality, plays a key role in the welfare changes resulting from trade liberalization.

As is often the case under imperfect information, trade may also result in multiple equilibria, as described by Wilson (1980). Bureau, Marette and Schiavina provide an example, with a slight change in the demand function for hormone free products, i.e.  $S_2(p) = (p - H)/c_2$ , where  $H > 0$  is a given constant. Consumers' demand is no longer linear in  $p$ , since it depends on the average quality  $\bar{k}$  perceived by consumers. Market clearing under free trade may result in two possible equilibria, in the sense that for the same value of the exogenous parameters  $c_1$ ,  $c_2$ ,  $b$  and  $H$ , there are two possible prices clearing the market. The determination of one equilibrium among many possible equilibria depends on many factors, and there is no reason for the optimal equilibrium to be selected. In this (theoretical) case, trade liberalization can result either in a loss or a gain of welfare in a somewhat random way, compared to the autarky situation, depending on which equilibrium is selected.

Imperfect information therefore has important empirical implications. First, trade liberalization may result in a situation where goods perceived as low quality products drive high quality products out of the market. When consumers are reluctant to eat the only goods supplied on the market, this is hardly a situation that is satisfactory from the public point of view. For particular values of the parameters, the aggregate welfare of the two countries could even be lower under free trade than under autarky, since the welfare losses of the importing country could exceed the welfare gains of the exporter. Second, the possibility of multiple equilibria caused by asymmetric information could increase uncertainty on the

market, and producers may not know which equilibrium price will prevail in the future. In theory, it is possible that trade liberalization involves either welfare gains or losses for a given country in a somewhat unpredictable way.

For the corresponding range of parameters, considering the ban on imports by the domestic country to be a NTB would be questionable, on the basis of the Baldwin-Mahé definition. In other cases, the positive effects of trade on welfare clearly provide a basis for promoting trade liberalization, even though the distribution of the welfare gains remains a problem.<sup>15</sup>

The use of an economic criterion for defining in which extent a given measure is, or is not a non tariff barrier can be compared to principles widely used in competition policy. Virtually all developed countries' competition policies are ultimately directed not at preserving and enhancing competition but at greater consumer welfare as the final objective. Consequently, most competition agencies are prepared to make certain trade offs.<sup>16</sup> In general then, competition agencies keep their eye on the ultimate objective and are prepared to apply a kind of cost-benefit analysis to arrangements which may appear somewhat anti-competitive. Competition agencies tend to apply rigid rules only where experience has shown that a certain practice has almost no potential to generate net advantages to consumers.

From an economist's point of view, the main legitimacy of international trade agreements lies in the effectiveness of trade in increasing the well-being of citizens. International trade rules are necessary to avoid problems of free riding, which would result in retaliation, so that citizens can enjoy the benefits of specialization according to comparative advantage. When trade involves some negative effects (dissemination of pathogens, decrease in consumption because of imperfect information on quality available in the market, etc.) that limit the positive consequences of trade liberalization deserve examination. Clearly, if international trade disciplines result in imposing measures that increase trade flows but decrease welfare, such a discipline would have no economic legitimacy.

## References

Anderson, J.E. (1979). "A Theoretical Foundation for the Gravity Equation." *American Economic Review*, 69, March 106-116.

Anderson, J.E., and van Wincoop E. (2001). "Gravity with Gravitas: A solution to the border puzzle." NBER, Working paper 8079, National Bureau of Economic Research, Cambridge, MA. Revised version published in the *American Economic Review*, 2003.

Arrow, K.J., Cropper M.L., Eads, G.C., Hahn R.W., Lave, L.B., Noll R.,G, Portney, P.R., Russell, M., Schmalensee, R., Smith, V.K. and Stavins, R.N. (1996)."Is there a role for benefit-cost analysis in environmental, health and safety regulation ?" *Science*, 272, 221-222.

---

<sup>15</sup> While the welfare criterion relies on the idea that there is a possibility for the gainers to compensate the losers, in practice, such compensation is seldom observed. Nor is compensation necessarily legitimate from a philosophical point of view.

<sup>16</sup> For example, if a number of competing, smaller grocers were to agree to pool their purchasing power this could tend to reduce the degree of competition prevailing among them at least on the purchasing side. Common purchasing might nevertheless be tolerated by competition agencies if they were convinced that the arrangement reduces competition to the minimum necessary to enable smaller retailers to be more efficient, hence more effective competitors for larger chain grocers. Another example could be found in the steps manufacturers might take to ensure that each of their dealers sells only in an assigned territory. Such exclusive territories virtually eliminate so-called intra-brand competition, but this might be necessary in order to facilitate a more than compensating increase in inter-brand competition.

- Baldwin, R. (1970). *Non tariff distortions in international trade*. Brookings Institution, Washington.
- Beghin J.C. et Bureau J.C. (2002). "Quantitative Policy Analysis of Sanitary, Phytosanitary and Technical Barriers to Trade". *Economie Internationale*, 87, pp 107-130.
- Bergstrand, J. (1989). "The Generalized Gravity Equation, Monopolistic Competition and Factor Proportions Theory in International Trade." *Review of Economics and Statistics*, 71, February. 143-53.
- Bouët A., Laborde D., Tarascou S. Yapaudjian-Thibault A. (2003a). The Cost of the FTAA for the European Union with and Without an Agreement with Mercosur. In *The Costs of Opting Out; The EU Mercosur Agreement and Free Trade Area of the Americas*, Edited by A. Valladao, Chaire de Mercosur Sciences Po, pp 95-129.
- Bouët A., Bureau J.C., Decreux Y., Jean S. (2003). "Is Agricultural Liberalization Beneficial to Developing Countries?". Forthcoming, Centre d'Etudes Prospectives et d'Informations Internationales, Paris.
- Bureau J.C. (2002). "The Agricultural Issue in EU-Mercosur Integration: Beyond the Gridlock". In P. Giordano (ed), *An Integrated Approach to the European Union-Mercosur Association*, pp 325-340, Chaire Mercosur de Sciences Po, Fondation Nationale des Sciences Politiques, Paris.
- Bureau J.C. et Gozlan E. (2002). "Agriculture, alimentation et environnement : les vrais risques de la mondialisation". *Risques*, 51, septembre, 85-91.
- Bureau J.C. et Marette S. (2000). "Accounting for Consumers Preferences in International Trade Rules". In *Incorporating Science Economics and Sociology in Developing Sanitary and Phytosanitary Standards in International Trade*. Board of Agriculture and Resources (ed), National Research Council, pp 170-198, National Academy Press
- Bureau J.C., Jones W., Gozlan E. et Marette S. (2002). "Issues in Demand for Quality and Trade". In B. Krissof, M. Bohman, J. Caswell (eds), *Global Food Trade and Consumer demand for Quality*, pp 3-33, Kluwer Academic Publishing, New York.
- Bureau, J.C. and Marette (2000). "Accounting for Consumers Preferences in International Trade Rules". In *Incorporating Science Economics and Sociology in Developing Sanitary and Phytosanitary Standards in International Trade*. Board of Agriculture and Resources (ed), National Research Council, pp 170-198, National Academy Press, Washington D.C.
- Bureau, J.C., S. Marette, and A. Schiavina (1998). "Non-tariff Trade Barriers and Consumers' Information : The Case of EU-US Trade Dispute over Beef". *European Review of Agricultural Economics*, 25,4, pp 437-62.
- Bureau J.C., Doussin J.P. (2000). "La portée pratique des règles du commerce international pour la protection des consommateurs". *INRA Sciences Sociales*, 1/00, Mai 2000, pp 1-4.
- Calvin, L., and B. Krissoff (1998). "Technical Barriers to Trade: A Case Study of Phytosanitary Barriers and U.S.-Japanese Apple Trade," *Journal of Agricultural and Resource Economics* 23, no. 2 : 351-366.
- Campbell, K., and R. Gossette (1994). "A Study of Canada's Non Tariff Trade Barriers : The Equivalents of Quantitative Import Restrictions." Research Branch, Canadian International Trade Tribunal.
- Castilho M. (2002). L'accès des exportations du Mercosur au marché unique dans la perspective d'un accord de libre échange. *Economie Internationale*, 89-90, pp. 281-313.
- Castilho M., Mulder N., Vialou A., David MB, Rodrigues M. (2001). La compétitivité de l'agriculture et de l'agroalimentaire dans le Mercosur et l'Union européenne dans une perspective de libéralisation commerciale. CEPII, CEPAL and IPEA.
- Cato, J.C., and C.A. Lima dos Santos (1998). "European Union 1997 Seafood Safety Ban : The Economic Consequences on Bangladesh Shrimp Processing." *Marine Resources Economics* 13, pp 215-227.
- CEI (2002). Alternativas de Integración para la Argentina : Un análisis de Equilibrio General. Centro de Economía Internacional, Ministerio de Relaciones Exteriores, Comercio Internacional y Culto de la República Argentina, Buenos Aires.
- De Paula and Favaret Filho (2001). Exportações de carne bovina: desempenho e perspectivas. BNDES Setorial 14, pp 27-46, Rio de Janeiro.
- Deardorff, A.V. (1998) "Determinants of Bilateral Trade : Does Gravity Work in a Neo-Classical Framework?." In J.Frankel ed, *The Regionalization of the World Economy*. University of Chicago Press, NBER Series, 7:32.
- Fisher, R., and P. Serra (2000). "Standards and Protection." *Journal of International Economics*, 52, 377-400.

- Fontagné L., Bchir H. , Decreux Y., Guerin J.L, Jean S. (2002). Les consequences d'un accord de libre échange entre l'UE et le Mercosur. Convention DP-DREE-CEPIL.
- Fontagné, L., F. von Kirchbach, and M. Mimouni (2001). "Une première évaluation des barrières environnementales au commerce international." Working Paper, UNCTAD and Université Paris I.
- Gallezot J. (2003). L'accès effectif au marché agricole de l'UE. Document de travail, INRA, UMR Economie Publique, Paris.
- Head, K. (2000). "Gravity for Beginners." Teaching note, University of British Columbia, Department of Economics, Vancouver.
- Henson, S.J., R. Loader, A. Swinbank, M. Bredahl, and N. Lux (2000). "Impact of Sanitary and Phytosanitary Measures on Developing Countries," Center for Food Economics Research, University of Reading, Reading, UK.
- Hillman, J.S. (1991). *Technical Barriers to Agricultural Trade*, Westview Press, Boulder.
- Lux, N., and S.J. Henson (2000). "The Impact of Food Safety and Quality Standards in EU Cheese Exports to the United States". Department of Agricultural and Food Economics, The University of Reading.
- Mahé, L.P. (1997) "Environment and quality standards in the WTO: New protectionism in agricultural trade? A European perspective." *European Review of Agricultural Economics* 24, 480-503.
- Marette S., J.C. Bureau and E. Gozlan (2000). "Product Safety Provision and Consumers' Information". *Australian Economic Papers*, 39,4, December, pp 426-441.
- Maskus, K. E., and J.S. Wilson (2000). "Quantifying the Impact of Technical Barriers to Trade: A Review of Past Attempts and the New Policy Context." World Bank Workshop on "Quantifying the Trade Effect of Standards and Technical Barriers: Is it Possible?" April 27.
- Maskus, K.E., and J.S. Wilson and T. Otsuki (2001). "An Empirical Framework for Analyzing Technical Regulations and Trade." In Maskus, K.E. and Wilson, J.S. (Eds.) *Quantifying Trade Effect of Technical Barriers: Can it be done?* University of Michigan Press, Ann Arbor, MI.
- Monteagudo J. and Watanuki M. (2002). Evaluating Agricultural Reform under the FTAA and Mercosur-UE FTA for Latin America. A Quantitative CGE Assessment. Washington D.C.
- Mumford J. (2002), "Quarantine in International Trade", *European Review of Agricultural Economics* 29 (3), pp 329-348, 2002
- OECD (1999a) "*Food safety and quality issues: Trade considerations*", "*Sécurité et qualité des produits alimentaires: considérations pour le commerce international*", Organisation for Economic Co-operation and Development, Paris. Report prepared by JC Bureau, E. Gozlan and S. Marette.
- Orden, D. and D. Roberts, eds. (1997). *Understanding Technical Barriers to Agricultural Trade*, Proceedings of a Conference of the International Agricultural Trade Research Consortium (IATRC), St. Paul, MN, January.
- Otsuki, T., J.S. Wilson and M. Sewadeh (2000). "Saving two in a Billion: A case Study to Quantify the Trade Effect of European Food Safety Standards in African Exports," World Bank, Washington D.C.
- Pineiro M., Blassetti R., Moreno M and Lopez Saubidet R. (2003). The EU Mercosur Interregional Negotiation; Sanitary and Phytosanitary Measures and other Potential Obstacles to Agricultural Trade. In A. Valladao and S. Page eds, *Agriculture and Agrobusiness in the EU Mercosur Negotiations, Negotiating Issues II*. Chaire Mercosur de Sciences Po, Paris.
- Pimentel, D., L. Lach, R. Zuniga, and D. Morrison (2000). "Environmental and Economic Costs Associated with Non-indigenous Species in the United States." College of Agriculture and Life Sciences, Cornell University, Ithaca, NY ([http://www.news.cornell.edu/releases/Jan99/species\\_costs.html](http://www.news.cornell.edu/releases/Jan99/species_costs.html))
- Teixeira E., Cypriano L., Pinto W. (2002). Impacts of AFTA and MERCOEURO on Agrobusiness in Mercosul Countries. 5<sup>th</sup> Annual Economic Conference on Global Economic Analysis, Taipei.
- Thornsbury, S. (1998). "Technical Regulations as Barriers to Agricultural Trade," PhD Dissertation, Virginia Polytechnic Institute.
- UK NAO (2002). The 2001 Outbreak of Foot and Mouth Disease. Report by the Comptroller and Auditor General HC 939. UK National Auditing Office. Session 2001-2002: 21 June 2002
- Wilson C. (1980). The nature of equilibrium with adverse selection. *Bell Journal of Economics*, 5: 75-284.