

Brazil – Measures Affecting Imports of Retreaded Tyres: A Balancing Act

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This version: August 2008

ABSTRACT

This paper provides a legal-economic analysis of the Appellate Body decision in *Brazil – Retreaded Tyres*. We develop a simple economic model that we use to analyze the market structure and environmental externalities that were most relevant to this case. We start by analyzing Brazil's policies in a model in which tyre retreading generates a positive production externality through the delay it provides society before a used tyre becomes a waste product with the potential to harm society through its adverse impact on human health and the environment. We examine the different welfare implications of (i) a production subsidy for retreading of once-used Brazilian tyres, (ii) a tariff on imports of retreaded tyres, and (iii) a ban on imports of retreaded tyres. While a production subsidy is the first-best instrument to address this type of externality, there are reasons to believe that it might be infeasible. The welfare implications of the other measures depend importantly on the magnitude of the positive production externality. From the lens provided by this economic analysis, we draw three primary insights. First, we identify the critical piece of empirical information that the Panel and Appellate Body require to make a rational judgment of the utility of the Brazilian policies contested in the dispute – i.e., the size of the underlying externality associated with retreading. Second, if the justification for the original import ban on retreaded tyres was based on the argument that it was a second-best Brazilian policy designed to combat a large externality, then Brazil's failure to enforce a ban on used-tyre imports has the troubling result of eroding those potential welfare gains through a reduction in equilibrium production (and consumption) of Brazilian retreaded tyres. Third, the Brazilian policy which exempted from the ban retreaded imports from MERCOSUR partners also has the same troubling feature. The second and third points are congruent with the reasons for the Appellate Body's determination that the Brazilian policy did not qualify under the chapeau of Article XX. We examine the WTO jurisprudence of Article XX(b), in order to compare the methodology developed under this jurisprudence to the type of examination of changes to total welfare from implementing one policy relative to a postulated alternative policy that most economists would follow. We find that the WTO jurisprudence in this area is internally incoherent, and also fails to evaluate the types of concerns that an economic welfare analysis would evaluate.

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Bown acknowledges support from the WTO and its hospitality to him as a visiting scholar while a portion of this paper was being written. The authors are grateful for comments received from Joseph Weiler, our discussant, Henrik Horn, Petros Mavroidis, Michele Ruta, Alejandro Jara and other participants at the 2008 American Law Institute conference on WTO Jurisprudence, and from Don Regan. All remaining errors are our own, and any opinions expressed within are our own and should not be attributed to the WTO.

1. Introduction

Free trade and national environmental protection measures are not always consistent. Yet, the parties to the WTO decided, and committed in WTO law, that even where a national environmental protection measure would otherwise violate a free trade rule of the GATT or GATS, the national environmental measure would generally be permitted, subject to certain conditions. It is important to recognize that member states of the WTO were serious *both* about allowing great flexibility for national environmental measures, *and* about establishing some conditions so that this flexibility is neither unlimited nor abused. It is also important to recognize that by establishing the WTO dispute settlement system, member states decided that WTO panels, and the Appellate Body on appeal, would generally decide disputes about the scope of this flexibility.

In the *Brazil—Tyres* case, the Panel and the Appellate Body were called upon to decide the scope of Brazil’s retained flexibility under WTO law to maintain an import ban on certain retreaded tyres. In these decisions, the Panel and Appellate Body explored the scope of their own responsibility to evaluate and weigh several factors in connection with these types of cases under the relevant exceptional provision of GATT: Article XX(b).

Because much of our analysis revolves around the differences among (i) balancing tests, (ii) least trade restrictive alternative tests, and (iii) suitability tests, we provide below brief definitions of these tests in the GATT Article XX “necessity” context. The bare language of Article XX does not point clearly to any one of these tests. Much of this paper’s analysis of WTO jurisprudence, and of an economic approach to Article XX, is concerned with the differences among these tests. While we provide a more specific interpretation of these tests within the context of economic modeling and the dispute later in the paper, here we provide brief definitions:

- Balancing Tests. Balancing tests require a decision-maker to examine and balance multiple factors in making a decision. While balancing tests may be more imprecise and less formal than cost-benefit analysis, they would in this context examine similar factors: (i) regulatory benefits from the national measure, (ii) trade restriction costs resulting from the national measure, (iii) costs of implementing the national measure. Economists would see cost-benefit analysis in this context as an examination of changes to total welfare from implementing one policy relative to a postulated alternative policy. This is a comparative analysis, while cost-benefit analysis or balancing tests may in the legal context sometimes be non-comparative: they may evaluate whether the benefits of the national measure simply exceed the costs.
- Least Trade Restrictive Alternative Reasonably Available Tests (LTRARA). A least trade restrictive alternative test considers, on a comparative basis, whether there exists another measure that would achieve the same regulatory benefits as the existing national measure, while imposing lower trade restriction costs, without excessive costs of implementation. This type of test is sometimes broadened, where the legal problem is not trade restrictiveness, to refer to least treaty inconsistent alternatives reasonably available (LTIARA). The LTRARA and LTIARA tests have been developed in

connection with the interpretation of the word “necessary” in Article XX(b) of GATT.

- Suitability Tests. A suitability test, known in the U.S. constitutional context as a “simple means-ends rationality test,” asks simply whether the national measure seems reasonably designed to achieve the purported legitimate goal. It is the least intrusive of these tests with respect to national autonomy.

In the case at hand, the Appellate Body found that Brazil’s discrimination in the application of its import ban on retreaded tyres, including an exception for MERCOSUR-origin retreads and failure to enforce an import ban on used tyres, met the necessity test included within subparagraph (b) of Article XX, but was arbitrary and unjustifiable within the meaning of the chapeau, or lead-in, of Article XX, and therefore did not qualify for an exception under Article XX. This chapeau-based finding might itself be understood as a strong suitability test, in the context of a finding of discrimination: if a measure contains exceptions or discrimination that cannot be justified by reference to the purpose that formed the basis for provisional justification under one of the paragraphs of Article XX, then it will fail the test of the chapeau.

After briefly exploring the underlying trade data in the relevant tyres markets, we use section 2 to develop an economic model of Brazil’s policy choices with respect to retreaded tyres. We show that an optimal test in this type of case, unconstrained by treaty text, from the standpoint of global welfare maximization, would simply use cost-benefit analysis (what economists would describe as an analysis of changes to total welfare from implementing one policy relative to some different policy) to determine whether the national measure produces net benefits, or net cost-reductions, compared to alternative measures that might be considered (including inaction). Thus, a full cost-benefit analysis in this context would evaluate the following parameters on a global basis, considering the profiles of proposed alternatives:

1. Value of the regulatory goal
2. Contribution of the measure to achieving the regulatory goal
3. Cost of regulatory measure
4. Cost to trading partners via the mechanism of a restriction on trade

This type of comparative cost-benefit analysis¹ would examine whether there is an alternative measure that achieves a higher net benefit, or lower net cost. A least trade restrictive (or least treaty inconsistent) alternative reasonably available test truncates this test by asking only whether there is a measure that is less costly in terms of restriction on trade, at a reasonable cost, that achieves the same regulatory goal to the same extent.

From the lens provided by this economic analysis, we draw three primary insights. First, we identify the critical piece of empirical information that the Panel and Appellate

1 As compared to a cost-benefit analysis of the type that simply examines whether the benefits of a particular measure exceed the costs. Furthermore, as noted above, this type of cost-benefit analysis was not designed with environmental externalities in the exporting state in mind. A full cost-benefit analysis would consider the negative externalities experienced by the exporting state due to retention of goods that result in negative externalities.

Body require to make a rational judgment of the utility of the Brazilian policies contested in the dispute – i.e., the *size* of the underlying externality associated with retreading. Second, if the justification for the original import ban on retreaded tyres was based on the argument that it was a second-best Brazilian policy designed to combat a large externality, then Brazil’s failure to enforce a ban on used-tyre imports has the troubling result of eroding those potential welfare gains through a reduction in equilibrium production (and consumption) of Brazilian retreaded tyres. Third, the Brazilian policy which exempted from the ban retreaded imports from MERCOSUR partners also has the same troubling feature. The second and third points are congruent with the reasons for the Appellate Body’s determination that the Brazilian policy did not qualify under the *chapeau* of Article XX.

In section 3, we focus on the jurisprudence of the necessity test under Article XX as it has developed before and after *Korea—Beef* and *EC—Asbestos*, and in *Brazil-Tyres*, in order to determine how the Appellate Body has interpreted the role of panels and the Appellate Body itself in these cases.

While we show in section 3 that the WTO Appellate Body has spoken of a test that weighs and balances to some degree each of the four factors mentioned above, it has never documented in an opinion its application of this type of test, or insisted that panels actually apply this type of test. Most importantly, in *Brazil—Tyres*, it has shown itself unwilling to evaluate for itself, or to require a panel to evaluate, in any but the most gross categories, any of these four factors. Yet, one might ask, if you consider these factors, but you do not evaluate them, in the sense of assessing their magnitude, and you do not compare them with one another—the costs with the benefits—how do you determine which domestic measures are acceptable and which are not? It seems that the only responsible answer is that without careful evaluation of these factors by the decision-maker, the decision-maker should be very deferential. This is the situation in which the Appellate Body finds itself, but does this degree of deference satisfy its mandate? Or should the Appellate Body require panels to seek greater analytical capacity, perhaps in the form of expert assistance, in order to perform a more extensive analysis of these factors in particular cases?

As to the value of the regulatory goal, human health and safety has not been required to be compromised, but it may be that other values, such as avoidance of fraud, would be, and it may be that in future cases the human health and safety benefit could be so small as to demand compromise. As to the contribution of the measure to the achievement of the regulatory goal, the Appellate Body seems in *Brazil-Tyres* to require only a finding of a theoretical “material” contribution to the achievement of the regulatory goal. The cost of the regulatory measure only arises in the Appellate Body jurisprudence as a threshold matter in relation to *alternative* measures: under *Brazil-Tyres*, where there is an indication that such measures are costly, they are discarded. There is no evaluation of these costs *in relation* to benefits. As to the costs arising from restriction on trade, the Appellate Body requires no evaluation of magnitude or assessment of order of magnitude, but does seem to distinguish between complete restrictions on trade and lesser restrictions on trade.

Yet the Appellate Body has never developed a textual, precedent-based, or welfare-based rationale for its approach to these factors. On the textual side, recall that the only *word* that is being interpreted is the word “necessary.” This word would most naturally suggest that the violation of WTO law is permissible *to the extent that* it is the only way by which the permitted goal can be achieved: it suggests a least treaty-inconsistent alternative test. And

on the precedent side, prior to *Korea—Beef* and *EC—Asbestos*, there was an entrenched understanding that “necessary” meant least treaty-inconsistent alternative reasonably available (“LTIARA”). But the Appellate Body has at least purported to depart substantially from this understanding.

While insights from a global cost-benefit analysis may improve economic efficiency via increased economic welfare, there are important arguments, based on the expertise of WTO tribunals or based more broadly on the difficulty of evaluation, for a retreat from cost-benefit analysis or even from a less precise balancing test (Trachtman, 1998), but again, these arguments have not been judicially articulated.

Furthermore, this case is troubling for the failure of the Panel and the Appellate Body to deal effectively with the problems of defining the measure to be evaluated, defining the chosen level of protection, and evaluating the contribution made by the measure at issue. The failure effectively to address these critical components of the analysis makes the assessment of each of the factors addressed in the Appellate Body’s analysis imprecise and ultimately malleable.

The result of the combination of these problems is an opinion that is so incoherent as to leave states unsure as to what types of measures may withstand scrutiny. Although one may interpret the *Brazil—Tyres* opinion as a reversion to the LTIARA test, the casual and dismissive nature of the Panel’s approach to alternatives, accepted by the Appellate Body, suggests that it is merely a suitability test.

We might understand the panels and the Appellate Body in these types of cases as agents of a collective principal. The collective principal has given these agents general instructions within Article XX, and, in a sense, has authorized these agents, within limits, to determine the scope of retained national flexibility. This authorization, albeit implicit and de facto, arises from the relatively general nature of the language of Article XX (Trachtman, 1999). Given this authorization, we ask in section 2 what would be the best approach to these cases.

That is, if the member states were to decide to amend Article XX of GATT (and Article XIV of GATS), how could they specify the optimal—global welfare maximizing—test that tribunals should apply to determine which national measures are permitted and which national measures are forbidden? Secondly, if the Appellate Body saw itself as charged, implicitly, with devising through its jurisprudence a global welfare maximizing test for these cases, what test would it develop? The latter question is the same as the former, except that the Appellate Body would be constrained by the existing text of Article XX, and so might create an optimal test under textual constraint, whereas the member states are entitled to discard the text and begin again.

2. Economic Analysis

2.1 Background for Modelling Brazil's Policy Choices

In this part, we begin our analysis in section 2.2 by examining the data on trade flows for the goods at issue in the dispute. We then use this information to develop a simple economic model in section 2.3. We use this model to analyze the market structure and

environmental externalities that were most relevant to this case. We start by analyzing Brazil's policies in a model in which tyre retreading generates a positive production externality through the delay it provides society before a used tyre becomes a waste product with the potential to harm society through its adverse impact on human health and the environment.

We use the model in sections 2.3 and 2.4 to examine the welfare-economic impact of Brazil's policies and of two possible alternative policies: (i) a production subsidy on retreads of once-used Brazilian tyres, and (ii) a tariff on imports of retreads. Both of these are capable of achieving Brazil's goal to the same extent as an import ban, but each may raise questions of "reasonable availability" under the necessity test. We do not model the other alternative policies that the Panel and Appellate Body actually considered, because we do not have sufficient information to do so. We also use the model in order to identify the most critical pieces of information required by Panels and the Appellate Body to make economically sound rulings.

After clarifying these aspects of the dispute, we then step back in section 2.5 and consider some additional implications of this case. That is, while one can view the core issues in this dispute as the WTO's ability to restrict the flexibility of a country (Brazil) attempting to encourage pro-environmental policies (tyre retreading), the larger context of this dispute concerns other types of externalities relating to the disposal of tyres more generally and thus the externalities associated with exporting countries.

2.2 The Trade Policy and Data: Understanding Political Economy Motives

Brazil imposed a ban on imports of retreaded tyres in September 2000, a ban that initially applied in a non-discriminatory fashion to Brazilian imports from all foreign sources. Uruguay challenged the legality of the Brazilian import ban under the MERCOSUR agreement and in January 2002 a MERCOSUR ruling found the Brazilian measure to be in violation of MERCOSUR law. Brazil complied with the MERCOSUR ruling by altering the import ban in March 2002 to *exempt* from application of the ban imports of retreaded tyres from MERCOSUR members Uruguay, Paraguay and Argentina and thus applied the ban only to non- members of MERCOSUR.

In November 2003 a tyre retreading manufacturing association in the European Union called BIPAVÉR initiated a complaint under the European Commission's Trade Barriers Regulation and challenged the Brazilian import ban as applied to imports from non-MERCOSUR countries. The complaint led to the EU requesting consultations with Brazil under the DSU in June 2005.

While this dispute is largely about environmental issues, nevertheless, in the next two subsections, we examine trade flow data on retreaded tyres involving Brazil, the EU and other MERCOSUR countries in order to better understand some of the political-economic industry motives for policy decisions associated with various elements of the dispute. We also allow insights from these data to inform our modeling choices in the subsequent section in which we make a set of assumptions regarding Brazilian production and trade in retreaded tyres. We then use the model to provide an economic analysis of changing incentives and economic outcomes deriving from policy decisions and potential compliance with decisions associated with the dispute.

2.2.1 Brazil's imports of retreaded tyres

Figure 1 illustrates the size of Brazil's imports of retreaded tyres over the 1997 to 2006 period, decomposing the source of imports deriving from the EU and MERCOSUR trading partners.² The first noteworthy item is that the value of total Brazilian imports of retreaded tyres, even *before* the import ban went into effect, was quite small, as it peaked at a total of \$20 million in 1998. Prior to the 2000 imposition of the import ban, the major Brazilian source of imports of retreaded tyres was the EU, which contributed in the range of 65%-75% of annual imports of retreaded tyres. Brazilian retreaded imports overall and those deriving from the EU had been in decline prior to the ban, but they did fall dramatically when the Brazilian ban went into effect in 2000.

Figure 2 illustrates the time path of Brazilian imports of retreaded tyres from each individual MERCOSUR trading partner during this same period. From an economic resource perspective, it is somewhat surprising that Uruguay challenged the Brazilian import ban under MERCOSUR law in 2000, as Uruguay's annual exports of retreaded tyres to Brazil had not exceeded \$650,000 in any of the four previous years even without the ban in effect.³ Nevertheless, when Brazil exempted MERCOSUR partners from the ban in 2002, both Uruguay and Paraguay took advantage of the newfound preferential access by immediately increasing exports to the Brazil market. While still not large in absolute terms, Brazilian imports of retreads subsequently rose to more than \$1 million per year from Uruguay and to more than \$500,000 per year from Paraguay.⁴

One potential explanation for the subsequent MERCOSUR export response to the Brazilian preference on retreaded tyres could be a "trade deflection" phenomenon associated with the EU industry adjusting its trade patterns in response to being shut out of the Brazil retreaded import market. That is, with this discriminatory trade policy giving preference to MERCOSUR and banning imports from the EU, economic incentives can arise to make it profitable for the EU to increase retreaded export shipments to other MERCOSUR markets. For example, if the MERCOSUR retreading industry is capacity constrained, imports from the EU could fill domestic consumption needs for retreads that arise when these MERCOSUR countries suddenly ship their retreaded production to the more profitable

2 When we refer to "the EU" in the data section, we define this consistently to be exports from the EU-15 countries. Thus while the size of the EU itself is actually changing during this period, we utilize a consistent definition of the EU as being the EU-15.

3 One logical explanation is that, under the pre-2000 Brazilian market conditions of more liberal trade, Uruguay was simply not the low cost foreign producer of the product. Indeed, evidence on unit values (a proxy for prices) of retreaded tyres taken from 1998 IDB data indicates that Uruguay, Paraguay and Argentina had substantially higher export prices than each individual EU country that registered positive HS 401211 exports to Brazil in 1998.

4 A better measure of the impact would not be the dollar value but a measure of the *volume* of trade, since prices for retreaded tyres also likely increased during this period. Unfortunately data on the volume of trade in these products is not available from the IDB after 2001.

Brazilian market. Nevertheless, figure 3 provides anecdotal evidence that would appear to rule out this explanation, at least with data through 2006. EU exports of retreaded tyres to other MERCOSUR markets have not increased considerably during this period, even after the MERCOSUR exporters received the Brazilian preference.

2.2.2 EU exports of retreaded and new tyres

Figure 1 suggests that, at worst, the Brazilian import ban may have cost the EU retreaded tyre industry \$15 million per year of lost export sales. Why then did the EU pursue this dispute against Brazil at the WTO? Furthermore, as figure 4 indicates, EU retreaded tyre exports to Brazil are small relative to EU *new tyre* exports to Brazil. As we discuss in the economic analysis section below, new tyres are a substitute in consumption for retreaded tyres. Thus the dominant EU new tyre industry and its exporters would be expected to favor any foreign policies which lead to an increase in the price of retreaded tyres while opposing any policies that lead to a reduction in the price of retreads.

Figures 5 and 6 illustrate likely contributing explanations for the EU's political economic decision to pursue the interests of a seemingly small export industry. First, as figure 5 suggests, while the Brazilian market for EU retreaded tyres is relatively small when measured by the absolute value of trade lost to EU exporters, these EU retreaded exporters were fairly reliant on the Brazilian market as a destination for their exports during this period – prior to the import ban in 2000, more than 20% of all extra-EU exports of retreaded tyres were being shipped to Brazil. Nevertheless, as figure 6 indicates, the EU industry has increased its exports substantially during this most recent period as extra-EU market sales nearly doubled between 1997 and 2006 – despite effectively losing a major export market (Brazil) during this time period. Thus, the EU may also be concerned that the Brazil import ban might establish a policy precedent that could be adopted by other countries and slow EU retreaded exports to other markets as well.⁵

2.3 Economic Theory and Analysis of Brazil's Policies

In this section of the paper we develop an economic model to explore some of the potential rationale behind Brazilian policy choices as well as to make potential sense of the Panel and Appellate Body decisions. We begin with the most simple and tractable model possible to shed light on the issues. We then extend the model in various ways to assess additional complications arising in this market.

2.3.1 The basic economic model of the externality

The fundamental externality associated with this dispute involves the *disposal* of used tyres. Regardless of whether the tyre has been used one time only or if it has been used and then re-used (as a retreaded tyre), the external problem not considered by private economic actors in the marketplace is that disposal of an additional tyre creates the opportunity for additional adverse health and environmental consequences for society. Thus consumption of

⁵ And certainly these just focus on the pure economic reasons involving trade values. As we illustrate in the next section, exporting a retreaded tyre may generate positive externalities for the EU given that once the tyre departs its market the EU does not then have to face the (resource or environmental) cost of disposal.

any tyre – new or retreaded – generates what economists refer to as a negative externality. Furthermore, an economic policy designed to target such a negative externality would create incentives to discourage such consumption. While we return to this issue in section 2.5 below, we begin our economic analysis with a slightly different modeling framework which allows us to focus on a sub-segment of the Brazilian tyre market at the fore of this dispute – i.e., the creation of incentives to increase Brazil’s tyre retreading and reduce waste.

Our model begins by considering the fate of a "Brazilian once-used" tyre which we define as a tyre that was *purchased* as a new tyre in Brazil and which was subsequently *used* one-time within Brazil.⁶ We make the simplifying assumption that a once-used tyre in Brazil has potentially one of two fates – it can either be disposed of *immediately* within Brazil, or it can be disposed of *in the future* in Brazil after it has gone through a process of retreading and is consumed one more time. Viewed from this perspective, the production process of a Brazilian firm retreading a Brazilian once-used tyre generates a positive externality. The positive externality is the societal benefit from *delaying* into the future the point at which the existing, once-used Brazilian tyre will require disposal and begin to negatively affect the Brazilian population’s health and environment. We also assume in our baseline model that the externality itself is local (i.e., *not* trans-boundary) so it does not affect non-Brazilians. At the end of the analysis we consider the implications of relaxing this assumption.

Next, in our baseline model we assume that the stock of these "Brazilian once-used" tyres is fixed, which implies that there is no international trade (i.e., no imports or exports) in once-used tyres. We recognize up front that the possibility of trade in "once-used" tyres is a substantive issue in the dispute. Therefore, we relax this assumption of the model as a comparative static exercise in later sections of the paper to ultimately examine the question of how allowing once-used tyres to be traded internationally affects economic incentives and outcomes. But to begin, we assume that there is no trade in such used tyres.

Figure 7 illustrates this model of a positive externality from the production of a retreaded tyre. The implication of our assumptions thus far is that the marginal social cost (MSC) to retreading a Brazilian once-used tyre is less than the marginal private cost (MPC) to the Brazilian firms for retreading the tyre. On the figure, the size of the externality (ϵ) is the vertical distance between MPC and MSC (MPC, ϵ) for any given quantity of tyres produced.

To complete the model, we require two additional pieces of information. First, the Brazilian demand curve for retreaded tyres is given by D. Furthermore, assume that Brazil is a "small" (price-taking) importing country of retreaded tyres. To further focus the analysis, suppose there are two potential foreign source countries from which Brazil may import retreaded tyres – the EU and MERCOSUR (M) – and we assume that the export price of EU retreads is lower than MERCOSUR retreads, so $P_{EU} < P_M$.⁷

6 The original origin the Brazilian once-used tyre – i.e., whether when new it was produced locally or imported – does not matter for this stage of the analysis. We come back to how various policy choices may affect the incentive to trade new tyres below.

7 Again this assumption would seem consistent with the evidence (presented earlier on unit value differences between EU and MERCOSUR source countries) and the political economy behavior and response in the case.

Allowing for the possibility of international trade in *retreaded tyres* within this model perhaps requires additional clarification as to where the externalities exist and where they do not. For example, there is no positive externality to Brazil associated with *importing* a retreaded tyre, as an imported retreaded tyre does not postpone the period of disposal for an existing, once-used Brazilian tyre.⁸

In the following subsections we use this extremely simple framework to analyze a number of different policies and questions related to this dispute. We then perform a number of comparative static exercises in order to examine how changes in assumptions and changes in Brazilian policy matter for informing us as to the key results of interest.

2.3.2 The socially optimal outcome

Before examining any policy questions, it is instructive to use the model first to consider the socially optimal outcome from *Brazil's* perspective – i.e., the combination of equilibrium prices and quantities that lead to the greatest total Brazilian welfare. Total welfare in a model like this consists of the combination of consumer surplus, producer surplus, government revenue or expenditure, and the size of the externality.

A Brazilian social planner would maximize welfare by equating the marginal social benefit to the marginal social cost for the last unit of retreaded tyres produced and consumed. Since by assumption there are no externalities on the demand side of the model, this involves equating marginal private benefit to marginal social cost at the price offered by the lowest cost producer, the EU, at P_{EU} . At this price, domestic output is Q_3 , quantity demanded is Q_7 and imports of $Q_7 - Q_3$ derive from the EU, the low cost foreign supplier.

2.3.3 The market equilibrium with no government policy intervention

Compare the socially optimal outcome to the market equilibrium that would occur in the absence of any government policy intervention. At price P_{EU} , Brazilian consumers demand an equilibrium quantity of Q_7 . However, in the market equilibrium, the domestic industry takes into account only its private costs (MPC) and does not discount them by the externality benefits that their retreading activity provides to society. Thus at a price of P_{EU} , the Brazilian industry is only willing to produce the quantity of Q_1 , which is less than the socially optimal quantity of domestic production given by Q_3 . Note finally that imports from the low cost EU producer are $Q_7 - Q_1$, which are larger than imports would be under the socially optimal outcome.

⁸ On the other hand, we consider below the case where there is a positive externality to the EU associated with *exporting* a retreaded tyre. Furthermore, there would be an externality associated with the *exportation* of Brazilian retreaded tyres, for example, if it were an industry in which Brazil had a comparative advantage. This externality would be different from the one we are considering because it would actually eliminate the need for Brazil to dispose of the once-used tyre forever, since the responsibility of disposal would then fall on actors in the importing country. However, we do not examine the case of Brazil being an exporter of this product as it is not of main concern to the issues in the dispute.

The fundamental inefficiency created by a market-based outcome in the presence of a positive production externality is that producers only consider their private costs and do not factor into their production considerations the external benefits that retreading a tyre has on the rest of Brazilian society. Thus, in a market outcome Brazilian producers end up producing too little (Q_1) output relative to the social optimum (Q_3).⁹

2.3.4 Brazil's first-best policy to confront the externality

Suppose the Brazilian government found itself without political or policy constraints and were free to implement the first-best policy to achieve the socially optimal outcome in the retreaded tyre market. Using the economic concept of the "targeting principle" (Bhagwati and Ramaswami, 1963) it is straightforward to show that Brazilian total welfare is maximized when its government adopts a policy that attacks the market failure at its source. In this case, the first-best policy to address a positive production externality is to implement a production *subsidy* on the retreading of once-used Brazilian tyres that is equal to the size of the externality. A production subsidy of size $\tau(\epsilon) \equiv P_S - P_{EU}$ would thus encourage domestic production to increase to the socially optimal level of Q_3 . This policy thus creates an incentive to retread more of the stock of once-used Brazilian tyres - i.e., additional tyres that would not otherwise have been retreaded in a market-based outcome because prices received by producers were too low as the market was not compensating them for the external societal benefit associated with retreading.

Despite the production subsidy, it is important to note that the equilibrium price facing consumers remains unchanged at a level of P_{EU} . This result is due to the disciplining power of a liberal trade policy of open access to imports from the EU. With free trade, domestic producers do not pass along any price increase to consumers who thus continue to purchase a total quantity of retreads equal to Q_7 . Relative to the outcome of no government intervention, total welfare within Brazil would increase by an amount given by the areas [w,x] on figure 7.¹⁰

Note however one other important implication of the production subsidy. Because of the slight increase in domestic production associated with the optimal policy, when compared to the outcome of no government intervention, imports would fall to the level of $Q_7 - Q_3$. Thus,

9 Brazilian welfare would break down as follows: consumer surplus = [a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t]; producer surplus = [u]; government revenue = [zero], externality = [v]. Combining these elements leads to a Brazilian total surplus = [a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v] under the outcome of a market equilibrium with no government policy intervention.

10 Brazilian welfare would break down as follows: consumer surplus = [a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t]; producer surplus = [f,l,u]; government revenue = - [f,g,l,m,n], externality = [g,m,n,v,w,x]. Combining these elements leads to a Brazilian total surplus = [a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x] under the outcome of a first-best policy. Relative to the market equilibrium with no government policy intervention, the increase in total surplus from implementing the first-best production subsidy would be given by [w,x].

compared to the no government intervention outcome, imports decrease by the amount $Q_3 - Q_1$.

2.3.5 A Brazilian import restriction as a second-best policy

There are a number of reasons to suspect that it might be politically and economically infeasible for Brazil to implement the first-best policy to subsidize retreading of Brazilian once-used tyres. First, a frequent argument in developing countries is that they lack efficient tax *collection* schemes, making it difficult for the government to collect revenue in other Brazilian sectors (without creating other substantial distortions) to pay for a subsidy (equal to area [f,g,l,m,n] on figure 7) to retreaded tyre producers. Second, in this particularly complicated externality example, the positive externality only occurs for a tyre being retreaded that was actually *consumed the first time* in Brazil. In practice, it is likely to be quite difficult (and resource costly) to create a bureaucratic scheme whose sole purpose is to *verify* that the once-used tyre being retreaded (and thus receiving the subsidy) was "Brazilian" and was not consumed the first time in another country and then shipped into Brazil for retreading.¹¹

Recall that the Article XX(b) necessity analysis would call for a search for less trade restrictive alternatives. A domestic subsidy would initially seem to be a less trade restrictive alternative than an import prohibition, but note two concerns.

First, as pointed out in the prior paragraph, the implementation of a subsidy paid upon retreading of a domestic tyre would require either (i) discrimination between domestic used tyres and imported used tyres, potentially violating Article III of GATT, or (ii) a restriction on importation of used tyres, potentially violating Article XI of GATT. In order to determine whether a subsidy program was indeed less trade restrictive, a panel would be required to compare the trade restrictiveness of these different alternatives.

Second, a subsidy program is resource costly, raising the question of whether it is indeed "reasonably available" under WTO Article XX jurisprudence. As the subsidy program is the first best solution, its global costs would be less than any other solution, but the reasonable availability test would ordinarily only consider the costs of implementation, separately from a full cost-benefit analysis. Interestingly, this "reasonably available" criterion seems to be used as a side constraint, rather than to be included in a cost-benefit or welfare analysis. That is, it may be that an alternative is indeed resource-costly, but it may also be that its relative benefits in terms of effectiveness or reduced trade costs outweigh this concern. WTO balancing tests or other tests in this context do not seem to have considered this possibility.

Therefore, because of the resource costs and requirements for either discrimination or import restrictions, in this section we assume that the first best policy option of the

¹¹ As we discuss in more detail below, indeed Brazil was also accused in this dispute of failing to enforce a ban on imports of used tyres. While we show below that the incentive to import used tyres for Brazilian retreading increases under the second-best policies that Brazil ultimately implemented, it is important to note that a similar incentive would also have arisen if Brazil had implemented the first-best production subsidy as well.

production subsidy on retreaded tyres is *not* available to the Brazilian policymaker. We examine the question of whether it is possible that, in general, an alternate policy utilizing an import restriction could make Brazil better off than the outcome of a market equilibrium with no government intervention. In particular, we consider a policy in which the Brazilian government seeks to encourage domestic retreading of once-used Brazilian tyres by imposing an import tariff of size $\tau(\epsilon) \equiv P_S - P_{EU}$. Note that within the context of the events in this case, this policy might most closely represent the Brazilian policy situation vis-à-vis imports of retreaded tyres in the pre-2000 period.¹²

Like the production subsidy of a similar size, an import tariff increases the effective equilibrium price facing domestic Brazilian producers of retreads. This creates an incentive for them to increase production to the socially optimal level of Q_3 . Like the subsidy, this policy thus also encourages firms to retread more of the stock of once-used Brazilian tyres to exploit the presence of the positive externality.

However, the primary difference between the production subsidy and the import tariff is the latter's adverse impact on Brazilian consumers. An import tariff also *increases* the equilibrium price of retreaded tyres in the eyes of Brazilian consumers to P_S . This increase in price causes consumers to decrease total retreaded consumption to Q_5 and decrease imports to the level of $Q_5 - Q_3$. Thus the level of lost imports associated with the policy (relative to the no government intervention outcome) is $\{(Q_7 - Q_5) - (Q_3 - Q_1)\}$. In comparison, note that while the first-best production subsidy policy had no impact on domestic consumer prices or consumption of retreaded tyres, it also led to a reduction in the equilibrium import volume, though by a smaller amount ($Q_3 - Q_1$). Thus compared to the optimal policy, this import tariff decreases import volumes by an *additional* amount equal to $(Q_7 - Q_5)$.

Relative to the outcome of no government intervention, the import tariff causes total welfare within Brazil to change by an amount given by the areas $[w,x] - [k,s,t]$ on figure 7.¹³ While the import tariff does create an incentive to increase domestic production and takes advantage of the externality (increasing welfare by the areas $[w,x]$), the inefficient nature of this second-best policy imposes other costs on the economy (decreasing welfare by the areas $[k,s,t]$). The cost is the decreased *consumption* of retreaded tyres to inefficiently low levels – what economists that study second-best policies have termed a "by-product distortion." This adverse effect on Brazilian consumers might also be understood to make this alternative fail to meet the "reasonably available" criterion, although it is important to point out that it is

12 According to data from the IDB, Brazil implemented a 19% *ad valorem* MFN tariff on HS 401211 during the pre-2000 period. Note that we do not claim that the 19% *ad valorem* tariff is a good proxy for the size of the retreading externality. While an important question for appropriate design of policy, we have no scientifically-based knowledge of the size of the actual externality at issue in the dispute.

13 Brazilian welfare would break down as follows: consumer surplus = $[a,b,c,d,e]$; producer surplus = $[f,l,u]$; government revenue = $[h,i,j,o,p,q,r]$, externality = $[g,m,n,v,w,x]$. Combining these elements leads to a Brazilian total surplus = $[a,b,c,d,e,f,g,h,i,j,l,m,n,o,p,q,r,u,v,w,x]$ under the outcome of a second-best import tariff policy. Relative to the market equilibrium with no government policy intervention, the increase in total surplus from implementing the second-best import tariff would be given by $[w,x] - [k,s,t]$.

better for consumers than Brazil's actual policy of an import ban. Virtually any policy will have some costs, and someone would be required to bear these costs. This problem shows the problem with considering "reasonable availability" out of the context of a full welfare analysis.

Nevertheless, if $[w,x] > [k,s,t]$ this particular import restriction policy would make Brazilian economic welfare higher than under the market-based outcome of no government policy intervention. Thus a second-best policy can be welfare-improving from Brazil's perspective when the externality gains are large and the by-product (consumption) distortion losses associated with the import tariff are small.

2.3.6 Brazil's actual policies: *potentially* second-best?

The *Brazil—Tyres* dispute does not address a Brazilian MFN import tariff on retreaded tyres similar to that analyzed in the last section, but instead it addresses policies associated with a ban on imports of retreads implemented in 2000, as well as Brazilian permission for imports of retreads sourced from MERCOSUR partners and imports of used tyres (to be retread within Brazil). How far from a second-best policy described in the last section were Brazil's actual policies at issue in the dispute? In the following subsections we use our existing model and economic structure to assess the implication of the trade policies that Brazil did implement.

2.3.6.1 Brazil's 2000 import ban

Suppose we begin the analysis now from the standpoint of the second-best policy of the import tariff described in the last section, which is arguably closest to the pre-2000 trade policy that Brazil imposed on imports of retreaded tyres. How does the fact that Brazil changed its import restriction in 2000 to an import ban instead of a potential *second-best* import tariff affect the economic analysis?

Changing the trade policy from a second-best tariff to an import ban has a number of repercussions on economic incentives and outcomes in the Brazilian market. Consider again figure 7, and begin from the tariff (of size $\tau(\epsilon)$) in which the Brazilian equilibrium price was P_S . First, the import ban creates a scarcity of retreaded tyres in Brazil that causes the market-clearing price to increase from P_S to P_B . The price increase affects both domestic producers and consumers: while domestic production increases from Q_3 to Q_4 , consumption falls from Q_5 to Q_4 , and the resulting volume of imports, of course, is zero. Finally, with zero imports, tariff revenue that the government collects also falls to zero.

Compared to the outcome under the second-best policy of an MFN import tariff, an import ban causes Brazil's economic welfare to fall. While the ban does increase domestic production and thus societal wellbeing on one side of the market via gains to producer surplus and the externality benefit associated with retreading, these welfare gains are swamped by the enormous losses experienced by other Brazilians in this market: i.e., the *reduction* in consumer well-being, government revenue, and economic efficiency associated with the entry of inefficient domestic tyre retread firms into the market. Compared to the

second-best policy outcome of an MFN import tariff, Brazil's economic welfare under the import ban falls by an area equal to $\{[d,e] + [i,j,q,r] + [p]\}$ on figure 7.¹⁴

Thus, by the same criterion by which we questioned the “reasonable availability” of a tariff, we might even more strongly question the reasonable availability of the import ban. Of course, since the import ban was Brazil’s actual measure, this evaluation would only take place within the context of a balancing test that evaluated and compared each alternative. Finally, an import ban is definitely more trade restrictive than an MFN import tariff on the one hand, or the first best policy of a subsidy, on the other hand.

2.3.6.2 What if the externality is very large?

Given the overwhelmingly negative welfare consequences of the import ban identified in the last section, how do we make sense of Brazil *voluntarily* changing its policy from a pre-2000 MFN import tariff policy to the import ban in 2000?

One possibility to consider is that the size of the externality in this particular tyre retreading example is actually quite large. Thus far, our model in figure 7 describes the retreading externality as relatively small, and with a small externality, we have shown that Brazil can only *reduce* its own economic welfare when it replaces a small (second-best) MFN import tariff with a prohibitive import ban.

Consider figure 8, however, in which we replace the small externality (MSC of figure 7) with a larger externality represented by MSC^1 . In this representation, the externality is so large that the intersection of MSC^1 with P_{EU} – i.e., the point determining the socially optimal level of domestic production in the presence of the externality – occurs at Q^*_3 , which is at or above the autarky level of domestic production Q_4 . If we now return to the insights generated in section 3.3, appropriate design of a second-best import tariff policy to confront the externality would thus be for Brazil to impose a tariff that is so large that its effect on imports is prohibitive. But as is clear, a prohibitive import tariff has the same economic effect as an import ban. Thus if the externality is so large so as to make the autarky level of domestic production a reasonable approximation for the socially optimal level of domestic production in the presence of the externality, the import ban may not necessarily be a welfare-reducing policy when compared to the second-best import tariff.¹⁵

14 The area $[d,e]$ represents an additional consumption distortion associated with the higher consumer prices under the import ban, the area $[i,j,q,r]$ represents a new revenue distortion created when the policy is implemented as a quantitative restriction that foregoes tariff revenue, while the area $[p]$ represents the efficiency loss associated with entry of inefficient Brazilian tyre retread firms into the market.

15 Of course this reasoning and analysis would indicate that the pre-2000 Brazil MFN import tariff of 19% was itself not a second-best policy as it was "too small" to target such a large externality. Such reasoning would be more credible if it were accompanied by a justification for what information (on the size of the externality) that Brazilian policymakers received that led them to change to the more restrictive policy in 2000.

Nevertheless, the main revelation of this analysis is identification of the *information* needed to make a rational judgment of the utility of the Brazilian import ban. For a Panel, the Appellate Body or any other analyst to rationally decide whether Brazil's import ban on retreaded tyres was warranted – i.e., whether it can effectively lead to the same outcome as a second-best policy that increases Brazilian production of retreaded tyres to the socially optimal level – one piece of required information is the *size* of the underlying externality associated with retreading.

2.3.6.3 What if Brazil allows imports of *used* tyres for domestic retreading?

Next suppose we examine another important question raised in the dispute: that of the impact of Brazil's de facto policy permitting imports of *used* tyres. Used tyres are a key input to the retreading process. Thus far, our analysis has assumed that the stock of once-used tyres in Brazil was fixed and that imports of used tyres were prohibited. In this section we relax that assumption.

How does allowing imports of used tyres affect the market for retreading “once-used Brazilian tyres?” First note that, because of our earlier assumptions, such information does not enter the supply side of our model directly, as we have assumed the retreading production process in this model is for “once-used Brazilian tyres” only. Thus, allowing imports of used tyres would enter the model on the demand side. More concretely, suppose that importation of used tyres creates a *new good* within Brazil – i.e., a retread from a “once-used foreign tyre.” This new good is a substitute consumption good for retreads of “once-used Brazilian tyres” – in reality they may be differentiated in name only.

However, it is important to clarify that, according to the logic of our model, *neither* the production nor the consumption of this new good is associated with any local Brazilian externalities.¹⁶ It generates no direct externality itself because production of a retread from a “once-used foreign tyre” does not directly affect the point in time in which a tyre in the stock of “once-used Brazilian tyres” becomes waste. Nevertheless, while neither the production nor the consumption of this new good generates any direct externalities to Brazil itself, through its impact as a substitute in consumption, we show how it can affect the size of the *equilibrium* externality in the retreads of “once-used Brazilian tyre” market we have been discussing thus far.

Figure 9 illustrates the impact of the arrival of this new good into the Brazilian market. Here we again assume that the externality for retreading the once-used Brazilian tyres is large, as this allows us to begin the analysis from an equilibrium under an import ban policy that is sensible. The initial equilibrium price is thus P_B and equilibrium quantity is Q_4 .

16 While clearly the reduction in stock of “once-used foreign tyres” would generate a positive foreign externality (through the reduced need to dispose of foreign tyres) because we have assumed these externalities are local, this is of no benefit to Brazil and therefore is not a component of its objective function. In the last section we consider extending the model to an assumption that these externalities are trans-boundary in nature.

Note again for reference that the socially optimal level of domestic production occurs at Q^*_3 .¹⁷

The arrival of the new substitute good in consumption causes the demand curve for a retread of a "once-used Brazilian tyre" to shift to the left from D to D_1 . This causes the equilibrium market price (P_B) and domestic production of retreaded tyres (Q_4) to fall. This is problematic from the perspective of Brazilian economic well-being, as the equilibrium quantity now moves *further away* from the socially optimal level of domestic production given by Q^*_3 . A reduction in retreading activity therefore *reduces* the size of the *equilibrium* positive production externality experienced by Brazil.

Thus, if the justification for the original import ban on retreaded tyres was based on the argument that it was a second-best policy designed to combat a large production externality associated with retreads, then failing to enforce a ban on *used*-tyre imports has the troubling result of eroding those potential welfare gains through a reduction in equilibrium production (and consumption) of once-used Brazilian retreads.¹⁸ The fundamental insight is that allowing imports of used tyres weakens the incentive to retread "once-used Brazilian tyres," which then reduces the size of the *equilibrium* externality associated with retreading once-used Brazilian tyres.

This point became critical to the outcome of this case, as Brazil's measure was found not to qualify for an exception under Article XX(b) because of its failure to meet the requirements of the chapeau of Article XX, in part due to the de facto exception for used tyre imports. It might be said that the chapeau tests the integrity, or good faith, of the policy basis for the exception, by finding arbitrary or unreasonable measures that block one type of trade while diluting the policy impact by allowing another.

2.3.6.4 What if Brazil exempts MERCOSUR partners from the 2000 import ban?

A final important issue in the dispute involves a decision that Brazil made in 2002 to exempt MERCOSUR exporters from application of the 2000 import ban on retreads. How does this exemption from the import ban affect the economic analysis?

¹⁷ Again, even though because of the import ban the EU product is not present in the Brazilian market, its existence defines the socially optimal level of domestic production, given by the intersection of MSC^1 with the potential export price of the low cost foreign producer, P_{EU} .

¹⁸ Note that this outcome is quite different from the outcome that would have occurred had the policy on retreaded tyres not been an import ban but instead a more liberal import policy (e.g., MFN import tariff) that allowed a positive level of retreaded imports in equilibrium. In such a situation, because Brazil is a small importer of retreaded tyres and unable to affect world prices, a decrease in demand would have no effect on the price within Brazil. While the decrease in demand would lead to a decrease in imports, because domestic prices are unchanged, the domestic level of production (and resulting externality resulting from that production) would be unchanged.

We examine this possibility in figure 10, in which we again assume that the positive production externality is large, in order to help justify the existence of Brazil's 2000 import ban as a second-best policy. We therefore begin our analysis under this import ban equilibrium (autarky equilibrium price and quantity are P_B and Q_4), and examine the impact of allowing for the import ban exemption. Recall from our original discussion of the model that we assume $P_M > P_{EU}$, i.e., that MERCOSUR suppliers were not the low cost foreign source of retreaded tyres, an assumption justified by a comparison of data on unit values for respective exporters of retreaded tyres in the Brazilian market in 1998.

A Brazilian change in import policy to exempt MERCOSUR partners from the ban on retreaded tyres would lead to a fall in the Brazilian price of retreaded tyres from P_B to P_M in figure 10. Under an equilibrium price of P_M , equilibrium domestic consumption is Q_6 , and imports from MERCOSUR partners are $Q_6 - Q_2$. With the decline in the equilibrium price, domestic production in Brazil falls from Q_4 to Q_2 . This also reduces the size of the *equilibrium* production externality that Brazil experiences. Particularly problematic, however, is that the qualitative effect of the exemption is identical to what we observed in the last section regarding the allowance of imports of used tyres as an input. That is, from the perspective of economic well-being, this is a concern because the equilibrium quantity now moves *further away* from the socially optimal level of domestic production given by Q^*_3 .

Thus if the justification for the original import ban on retreaded tyres was based on the argument that it was a second-best policy designed to combat a large production externality associated with retreads, then allowing an exemption for retreaded imports from MERCOSUR partners also has the troubling result of eroding those potential welfare gains through a reduction in equilibrium production (and consumption) of retreads made from once-used Brazilian tyres.

A second order welfare concern from Brazil's perspective is the source of the retread imports. In addition to the reduction in welfare associated with a decrease in domestic production in the presence of the positive externality, Brazil suffers a secondary welfare loss because it allows imports from the less efficient MERCOSUR industry while continuing the ban on the more efficient EU industry. Put differently, Brazil could replicate the local production effect of the MERCOSUR exemption by changing the policy to source imports from the EU instead, and at the same time improve its overall well-being by changing the source of its imports to the low-cost foreign producer and collecting tariff revenue on those imports.¹⁹

Finally, although it was not an argument considered in the dispute, there could be some logic to this MERCOSUR exemption if the externality is not locally confined to one country but is still *geographically* confined to the South American region. For example, this could occur if the exemption serves to also stimulate retreading of "once-used MERCOSUR tyres" and this has externality benefits for Brazilian health and environment because of

19 Brazil could do this by simply imposing an MFN tariff of a size equal to $P_M - P_{EU}$. This policy would have the same welfare effect as the MERCOSUR exemption (equilibrium price is P_M , equilibrium production is Q_2 , equilibrium consumption is Q_6), but now Brazil would collect tariff revenue of size $(P_M - P_{EU}) \times (Q_6 - Q_2)$, which is larger than the tariff revenue it collected from the exempt imports from MERCOSUR, so Brazilian welfare is strictly higher.

geographical proximity – i.e., external benefits that it would not experience for the retreading of "once-used EU tyres" which require disposal an entire hemisphere away.

2.4. International Externality Implications of Brazilian Policies – the Terms of Trade

The analysis presented in the last section is a necessary starting point for a number of reasons. First, it provides a potential environmental externality-based explanation for the import ban policy that Brazil chose to implement in 2000. Furthermore, it provides a rigorous framework that we can then use to assess potential "counterfactuals" that the Panel and Appellate Body may consider as they evaluate arguments made in the dispute.

Nevertheless, our analysis of the model thus far is incomplete because we have not yet examined the potential *international externality* implications of the Brazilian policies and these are the implications of most concern to WTO law. Note here that when we refer to "externality" we are no longer referring to the environmental externality associated with retreaded tyres – we are now focusing on the trade-related costs or benefits that Brazilian policies "inadvertently" impose on foreigners. While the international externality could manifest itself through an impact on pollution, the most direct impact will be on more economic measures (welfare to foreign consumers and producers) that are directly affected by changes to the volume of international trade.

This section of the paper proceeds in three steps. First, we clarify how to modify the assumptions of the basic model developed in the last section in order to examine the issue of international externalities. Second, we then use this extended model to examine whether it is likely that the *purpose* of the contested Brazilian policy – the import ban on retreads – was motivated by a Brazilian *international cost-shifting* motive. Third, we turn to the most important question from the perspective of WTO law – i.e., identifying the size of any negative externality that Brazil's policies impose on international parties, and how the size of this externality changes depending on the "counterfactual" policy that is under consideration. This international negative externality, at least to the extent that it is transmitted by trade restriction, is highly relevant to the GATT Article XX(b) analysis.

2.4.1 Modifying the model to allow for international externalities

First note that in our existing, simple benchmark model, the international externality impact of the Brazilian policies is *defined* to be zero by the assumption that Brazil is a "small" importing country in the market for retreads. Thus we must first relax this assumption so that Brazil is allowed to be "large," so that the impact of its policy choices not only affects economic activity within Brazil, but also economic activity in international markets.

Here we make almost all of the same assumptions as we did in section 2.3.1. The only differences are that we now assume that Brazil is "large," and to simplify we no longer include a reference to MERCOSUR in the analysis. Figure 11 then presents a graphical representation of the "international market" for retreaded tyres for trade between Brazil and the EU, the low cost foreign producer. Here we represent Brazil's import demand curve as MD and the EU's export supply curve as XS. Under a policy of free trade, Brazil's import demand is given by MB_{FT} , and the equilibrium free trade price would be P_{EU}^1 . The impact of an import tariff on retreads from the EU of size τ would be to shift in the Brazilian import demand curve to MB_{τ} . Because of the large country assumption, the import tariff causes the

price received by EU producers of retreaded tyres to fall to P_{EU}^1 , whereas the price paid by Brazilian consumers increases to $P_S (= P_{EU}^1 + \tau)$.

Finally, a Brazilian policy of an import ban on retreads from the EU would imply no Brazilian import demand curve on figure 11 by definition. However, while it is not part of the figure here because of our focus on the two country model, a significant reduction in import demand for EU's retreaded exports would be expected to lead to a decrease in the equilibrium EU export price for retreads sold in other markets.

2.4.2 Were Brazil's policies imposed for cost-shifting reasons?

The economics literature on trade agreements (e.g., Bagwell and Staiger, 2002a) argues that one fundamental role of the WTO is to prevent governments from manipulating their trade policies in order to "shift" (or defray) the economic costs of pursuing a particular policy goal onto foreigners. For example, one fundamental result that comes out of this literature is that, without a trade agreement like the WTO, large importing countries have an incentive to use policy to restrict imports to inefficiently low levels in order to manipulate their terms of trade. Because the importing country has monopsony power as a "large purchaser" in international markets, when it restricts its own demand for imports (e.g., via an import tariff) this drives down the price that foreign exporters receive for their product. Thus an optimal tariff can actually improve the importing country's economic welfare (a potential policy goal), but is a "beggar-thy-neighbor" policy in that this only occurs via imposing costs onto trading partners whose welfare thus necessarily falls.

Is this cost-shifting motive – i.e., a desire by Brazil to defray the cost of increasing its own domestic economic welfare in the retreaded tyre market by passing along some of the cost to foreign exporters – at the heart of the Brazilian import ban policy? Figure 12 illustrates that such a motivation for this policy seems highly unlikely, given that Brazil imposed its controversial trade restriction as an import ban. An import ban does not allow Brazil to increase its welfare through collection of a tariff.

Start again from the pre-2000 Brazilian policy of an MFN import tariff. In figure 11, this indicates that we start from a policy in which the price paid by Brazil's consumers is P_S , the export price received by EU producers is P_{EU}^1 and the tariff is of size τ . Suppose Brazil changes this policy to an import ban. The result is all of the same welfare implications that we identified in section 3.6 – with one exception. Because Brazil is now a "large" country – the portion of the welfare loss associated with foregone government revenue (from transforming the policy from a tariff to a ban) *increases* by an area equal to the rectangle [y]. Thus if we adjust the model to assume that Brazil is a large country, the change in policy to an import ban is even more costly from Brazil's perspective than before.

The fundamental intuition behind "cost-shifting" as a welfare-improving motive is that this generally occurs only when the country imposes the policy as a *tariff* and is able to collect revenue. With a quantitative restriction such as an import ban, Brazil no longer collects tariff revenue from the EU. Thus it is unlikely that the motive behind the trade policy change in this instance was for Brazil to generate additional welfare gains for itself where the cost of those gains would be passed along to foreigners.

2.4.3 What is the size of the externalities Brazil's policies impose on others?

While defraying the cost of the Brazilian policy via a terms-of-trade cost being imposed on foreigners may not have been the intention of the Brazilian import ban, did it nevertheless impose negative externalities? If so, what type of externality is Brazil imposing on the EU when it imposes a ban on EU retreads?

This question is important to the extent that the availability of an exception under Article XX(b) of GATT depends on the extent of the losses imposed on foreign parties due to trade restriction. Although WTO jurisprudence has not so far attempted to estimate the magnitude of the effects of trade restriction for these purposes, a reference to a “least trade restrictive alternative” would seem to suggest that the best approach would be to do so.

Intuitively, the externality cost to the EU retread industry in this instance is measured by their lost exports to the Brazilian market. The complication to the analysis is deciding on the appropriate *counterfactual* – i.e., the EU losses in comparison to what benchmark?

2.4.3.1 Counterfactual I: the second-best policy of an import tariff

Suppose we assume that if Brazil had not imposed the import ban in 2000, it would have implemented the second-best policy of an import tariff described in section 2.3.5. In that equilibrium, imports were equal to $Q_5 - Q_3$, and in our large country model case the price received by EU exporters would have been at the level P_{EU}^I . Thus, in comparison to the counterfactual of the second-best Brazilian policy, the externality cost to the EU as measured by the value of lost trade is $P_{EU}^I \times (Q_5 - Q_3)$.

We have argued that the Brazil trade policy on retreaded tyres prior to the import ban in 2000 when it imposed a 19% *ad valorem* MFN import tariff is a reasonable proxy for this outcome. Assuming that demand and supply in Brazil are also relatively stable during this time period (so fluctuations are driven by policy changes and not market conditions changing for other non-trade policy related reasons), drawing inference from the trade data from figure 1 suggests that the value of $P_{EU}^I \times (Q_5 - Q_3)$ is in the range of \$10 million per year (the three year average value of EU exports to Brazil in 1997-1999).

2.4.3.2 Counterfactual II: the first-best policy of a production subsidy

Suppose we assume that if Brazil had not imposed the import ban in 2000, it would have implemented the first-best policy described in section 2.3.4 of (i) a zero import tariff and (ii) a production subsidy in order to encourage the retreading of once-used Brazilian tyres. In that equilibrium, imports were equal to $Q_7 - Q_3$, and in our large country model case the price received by EU exporters would have been at the level P_{EU}^{FT} .²⁰ Thus, in comparison

20 Here we assume that, even though Brazil is a large country, its optimal subsidy policy would have been set as if it were a small country, so it would implement the policy described in section 3.4. For a discussion of large countries attempting to shift some of the costs of the subsidy onto trading partners, see Bagwell and Staiger (2002b).

to the counterfactual of the first-best Brazilian policy, the externality cost to the EU as measured by the value of lost trade is $P_{EU}^{FT} \times (Q_7 - Q_3)$.

The complication, of course, is that Brazil's pre-2000 import policy was not one of free trade, but was a 19% *ad valorem* MFN import tariff. Thus, we would need to discount appropriately the value of lost trade under a free trade policy {i.e., $P_{EU}^{FT} \times (Q_7 - Q_3)$ } to reflect the fact that Brazil would have demanded a market access concession of its own from the EU in order to reduce its tariff from 19% to 0%. From the EU exporter's perspective, the value of the tariff reduction from τ to zero is equal to a gain in the value of exports given by $\{(P_{EU}^{FT} - P_{EU}^1) \times (Q_7 - Q_3) + P_{EU}^1 \times (Q_7 - Q_5)\}$ on figure 12. Thus if we discount the externality cost found above $\{P_{EU}^{FT} \times (Q_7 - Q_3)\}$ by the amount $\{(P_{EU}^{FT} - P_{EU}^1) \times (Q_7 - Q_3) + P_{EU}^1 \times (Q_7 - Q_5)\}$, we are again left with $P_{EU}^1 \times (Q_5 - Q_3)$, i.e., the size of the externality in the import tariff counterfactual.

2.5 Considerations of Other Environmental Externalities

Thus far, our analysis has focused on two types of externalities of relevance to this case. First, in section 2.3, we explored the case of a positive externality to Brazil associated with tyre retreading and the implications for its own policy choices and WTO rules and rulings which may constrain its own free choice in this area. Then in section 2.4, we expanded the externality analysis to examine the case in which Brazil is a large country in the "terms-of-trade" sense – i.e., that a change to its trade policy has the ability to affect economic welfare in other countries. Nevertheless, even this extension of the model only impacted foreign country welfare through economic "fundamentals" – i.e., a reduction in EU export prices leading to income distribution effects within the EU (losses to producers of retreads, gains to EU consumers) and lower EU economic welfare overall.

An additionally important element that our analysis has ignored thus far is the potential impact of Brazilian policy on the size of *environmental* externalities within other WTO Members such as the EU. While we will not formally introduce these issues into an economic model here, in the next section we describe how they could be introduced into the model and the likely implications of doing so for WTO law. Then in the following section we examine relevant law from jurisdictions such as the US and EU, seeming to take account of this type of externality, before in the last section returning to a brief discussion of the core externality at issue in this market.

2.5.1 Extending the model to examine EU environmental externalities

Suppose next we extend our basic model of section 2.4 to also allow for a large positive externality to the EU simply associated with the exportation of retreaded tyres – i.e., the fact that the EU does not need to dispose of the tyres itself, avoiding the potential adverse health and environmental consequences.

First, it should be pointed out that the presence of such a positive externality does create an incentive for EU policymakers to design policies to encourage the exportation of such products. Again using the targeting principle, the most efficient EU policy to encourage the exportation of retreaded tyres would be a retreaded tyre export subsidy of a size equivalent to the positive externality. Indeed, in the present case, Brazil argued that the EU

had determined not to allow waste tyres to be transferred from wealthy EU member states to poor EU member states, and that in order to solve the EU's growing disposal problem the EU turned to exports.²¹ While there may not be any evidence in the case that the EU was imposing such a policy directly, there are also, of course, indirect ways to replicate the economic incentives of such a policy through alternatives. For example, suppose the EU imposed a substantial sales tax on every retreaded tyre sold *within* the EU market under the guise that it would be used to pay for the environmental effects of disposal, but this tax would not be applied for every retreaded tyre that was exported.

On the other hand, even in the absence of any export-encouraging policies implemented by the EU, there may be more fundamental economic conditions that might result in the EU exporting retreaded tyres to Brazil, even when considering retreaded tyres as a relatively "wasteful" product.²² For example, as transport costs decrease and the disparity between the opportunity costs of urban land in developed economies and rural land in developing economies increases, economic incentives would suggest that waste would be traded with more frequency for comparative advantage reasons.²³ The implication is that determination of whether such trade is economically grounded would require more information on evidence of WTO-inconsistent export subsidies and/or determinants of comparative advantage in retreaded tyres or other waste products.

Nevertheless, what are the EU environmental effects of the Brazilian import ban on EU exports of retreaded tyres? Clearly, a Brazilian import ban which reduces EU exports of retreaded tyres will also reduce the equilibrium size of this positive externality enjoyed by the EU. Thus the welfare loss to the EU would be even larger than that identified by our analysis of sections 2.4.3.1 and 2.4.3.2, which did not consider the presence of the EU positive environmental externality associated with exporting. But the interesting question, explored below, is whether WTO law is intended or able to take this positive environmental externality into consideration.

2.5.2 Restrictions on Cross-Border Movement of Waste

In connection with hazardous waste, Levinson (1999, p. 666) argues that "hazardous waste disposal, by imposing large costs and few benefits on local jurisdictions, would be expected to result in . . . a race to the top in environmental stringency." This would at least be true as to imported waste. However, a race to the top is not necessarily efficient, even as to imported waste. If there are economies of scale in connection with hazardous waste disposal, decentralization resulting from barriers to trade may be inefficient. Levinson (1999, p. 667) argues that "if states are permitted to erect tariff barriers to hazardous waste imports,

21 First Written Submission of Brazil, Brazil—Measures Affecting Imports of Retreaded Tyres, WT/DS322, 8 June 2006.

22 Waste, of course, is generally moved to designated places for disposal: it is always "traded" in this sense (even if within the borders of a single state), and the real question is the geographic scope of the trade. There is no a priori economic reason why all waste should be disposed within the borders of a particular country.

23 This economic logic, of course, is reminiscent of the point made by the infamous Lawrence Summers World Bank memo in the early 1990s.

the result could be a general decentralization of hazardous waste disposal and a decline in economic efficiency and environmental safety.”

Rather, under circumstances of externalities, economies of scale, and other departures from perfect competition, it cannot be said with confidence that either a free market in waste or prohibition of imports is globally efficient. Rather, it may be that the best solution to the decision as to what level of import restrictions would be appropriate would arise from a cost-benefit analysis that examined global costs and benefits of free trade and of environmental protection. However, there are substantial theoretical and practical problems with cost-benefit analysis, as discussed above.

Interestingly, within the U.S. federal system, interstate restrictions on importation of waste from other states, and price discrimination between imported and locally produced waste, are generally found to be prohibited by the Commerce Clause (Article 1, section 8) of the Constitution.²⁴ In the 1992 Walloon Waste case,²⁵ the European Court of Justice determined that the principle of local disposal of waste—preventive action at the source—had priority over trade liberalization requirements. Soon after that decision, the European Union passed legislation to require prior informed consent for trans-boundary movement of waste. In 1996, the ECJ found that restrictions on exportation of waste, designed to finance the establishment of local disposal facilities, violated the free trade requirements of the Treaty of Rome.²⁶ Restrictions on the ability of states to discriminate between local and imported waste, or to bar imported waste, reduce the likelihood that states will become self-sufficient in waste disposal.

In the United States, waste has tended to flow from urban to rural states, and from states with greater incomes to states with lesser incomes. We have observed a “race to the top” in which states have sought to deflect waste, and the negative externalities associated with waste, to other states, through the use of import barriers.²⁷

The one thing that is clear is that the WTO treaty was not designed to deal directly with problems of cross-border flows of waste. And yet, disputes regarding measures like Brazil’s restriction on imports of retreaded tyres may increasingly be brought to the WTO for resolution.

2.5.3 The Core Externality – Consumption of Tyres

To conclude this section, we re-introduce a discussion of the fundamental, underlying externality problem associated with this case and argue that a more holistic approach to addressing this environmental problem is needed. In recognition that governments have an incentive to impose policies that shift the cost of environmental clean-up onto a trading partner, it is useful to re-examine the source of the core problem - the negative externality

²⁴ City of Philadelphia v. New Jersey, 437 U.S. 617, (1978) and Fort Gratiot Sanitary Landfill, Inc. v. Michigan Department of Natural Resources, 504 U.S. 353, (1992).

²⁵ Case C-2/90, Commission v. Belgium (Walloon Waste) ECR I-4431(1992).

²⁶ Case C-203/96, Chemische afvalstoffen Dusseldorp BV et al. v. Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, ECR I-4075 (1998).

²⁷ See Fort Gratiot Sanitary Landfill, Inc. v. Michigan Dep't of Natural Res., 504 U.S. 353 (1992) (waste import restrictions are a *per se* violation of the Commerce Clause).

associated with the disposal of all tyres. Even if tyres are retreaded, all tyres do ultimately become waste in a form that can lead to adverse health and environmental outcomes for society.

To the extent that consumption of any tyre generates this negative externality, reliance on the "targeting principle" described earlier suggests that the optimal policy would involve confronting the externality at its source. Thus targeting a negative consumption externality with a first best policy would imply a *consumption tax* that would cause consumers to internalize the adverse societal implications of their need to consume tyres.

What are the implications of this insight for our earlier analysis? While we have identified a potentially useful *partial* policy response to deal with the positive externalities associated with the process of tyre retreading (either through an optimal retreading production subsidy or an appropriately designed second-best import restriction), this analysis suggests that such a policy should be *complemented* with a domestic consumption tax on all tyres.

3 WTO Jurisprudence of Article XX(b)

The discussion in section 2 has been intended to develop a welfare-economics-based approach to restrictions such as Brazil's ban on imports of retreaded tyres. While that discussion adverted to various aspects of WTO law, a full discussion of the state of the jurisprudence would have made it impossible to provide a clear exposition of the welfare economics involved in this type of case. Now, having provided that exposition, it is possible for us to set forth an analysis of the WTO jurisprudence that is informed by the welfare economics framework outlined in section 2.

Since its inception in 1947, GATT recognized that certain government policies may justify measures that would otherwise violate basic GATT market access rules. A national measure that is proposed to be justified under Article XX(b) of GATT, relating to the protection of human, animal, or plant life or health, must pass two principal tests. First, it must fit within the language of paragraph (b) of Article XX, including the requirement that the national measure be "necessary" to protect human, animal, or plant life or health. Second, it must meet the requirements of the chapeau of Article XX, including the requirement that discrimination engendered by the measure not be arbitrary or unjustifiable. Each national measure that would otherwise violate another provision of GATT must pass both these tests.

Table 1 summarizes the factors addressed under the necessity test as the jurisprudence has developed up to and including the *Brazil—Tyres* decision. It does so by comparing each stage in the development to a full examination of changes to total welfare from implementing one policy relative to a postulated alternative policy, or global cost-benefit analysis. It should be highlighted, however, that the type of balancing test that the Appellate Body has called for, is not the same as cost-benefit analysis. But it does refer to most of the factors that would be relevant in cost-benefit analysis.

However, it must also be highlighted, in light of our discussion at the end of section 2, that neither the Appellate Body's balancing test, nor the cost-benefit analysis that we describe here, includes consideration of environmental externalities in the exporting state relating to

trade. That is, it does not include consideration of the environmental, as opposed to trade, benefits to the EU from exporting retreaded tyres.

While a full cost-benefit analysis would be optimal if it entailed no other costs, there may be important reasons why it would be appropriate to use a truncated or proxy method of analysis. These reasons include the problem that judges are unable to assess directly the value to others of a certain regulatory outcome, and that it may be very difficult to develop the relevant information.²⁸ In the penultimate section of this part, we emphasize the problems of defining the measure at issue, of defining the respondent state's chosen level of protection, and of evaluating the contribution of the respondent state's measure to achievement of the relevant goal, and explain how these problems may skew the cost-benefit or trade restrictiveness analysis of reasonably available alternatives under the necessity test.

To some extent, the 2001 *EC—Asbestos* and *Korea—Beef* cases at least purported to introduce a form of balancing test or proportionality test into Article XX of GATT.²⁹ To many commentators, the idea of balancing tests in contexts where domestic regulation is subject to international scrutiny has been anathema to judicial restraint and national sovereignty. There are two likely reasons.

First, balancing tests seem to some to accord too much power to courts. However, it is not unusual for courts to be assigned the task of balancing, explicitly or implicitly, under specified circumstances. This is common in a number of domestic contexts. Furthermore, under the Appellate Body's opinion in *EC—Asbestos*, even the determination of violation of national treatment obligations under Article III may be understood as requiring a type of balancing, to determine whether imports are subject to "less favourable treatment".

Second, balancing tests seem to some to intervene too greatly in national regulatory autonomy.³⁰ This intervention is not only considered excessive because it might strike down domestic regulation, but perhaps even more importantly because it might involve an *international* tribunal in too extensive an inquiry into the costs and benefits of domestic regulation. And yet, as noted at the beginning of this paper, it is not illogical that member states of the WTO would have made this assignment to the WTO's judicial bodies. And it seems true that cost-benefit analysis, putting aside its theoretical and practical problems for a moment, presents the optimal solution to the question of how best to manage environmental externalities arising from trade in waste.

The necessity test under Article XX(b) and XX(d) of GATT,³¹ until the 2001 *EC—Asbestos* and *Korea—Beef* decisions of the Appellate Body, was generally interpreted as requiring the domestic regulation to be the least GATT-inconsistent method reasonably available to achieve the desired goal (LTIARA). The classic statement of this test was articulated in the GATT panel report in *U.S.—Section 337*:

28 See Trachtman, *supra* note 3.

29 See Neumann and Turk (2003).

30 For a more extensive analysis of the objections to balancing tests, see Trachtman (1998).

31 The TBT and SPS Agreements have made "necessity" a "positive requirement" on all relevant regulations while the GATT keeps it, under Article XX, as a "justification" for restrictions found to violate other provisions, including basic market access rights.

It was clear to the Panel that a contracting party cannot justify a measure inconsistent with another GATT provision as ‘necessary’ in terms of Article XX(d) if an alternative measure which it could reasonably be expected to employ and which is not inconsistent with other GATT provisions is available to it. By the same token, in cases where a measure consistent with other GATT provisions is not reasonably available, a contracting party is bound to use, among the measures reasonably available to it, that which entails the least degree of inconsistency with other GATT provisions.³²

The inclusion of reasonable availability as a criterion adds a second factor to an analysis that would otherwise be unidimensional, in that it would otherwise focus only on the degree of departure from GATT, while maintaining a requirement for equivalent achievement of the regulatory goal. We will see below that the Panel and Appellate Body in *Brazil—Tyres* failed to clarify the regulatory goal. They also declined to assess the extent to which Brazil’s import ban achieved the goal, other than to accept a theoretical contribution to achievement as “material,” and to deem this measure of achievement of the goal sufficient to complete the “weighing and balancing” analysis. They thus failed to articulate or apply a coherent standard for evaluation of alternatives.

In the 2005 *U.S.—Gambling* case, the Appellate Body confirmed that a dynamic, or comparative, analysis of potential alternatives is appropriate:

A comparison between the challenged measure and possible alternatives should then be undertaken, and the results of such comparison should be considered in the light of the importance of the interests at issue. It is on the basis of this "weighing and balancing" and comparison of measures, taking into account the interests or values at stake, that a panel determines whether a measure is "necessary" or, alternatively, whether another, WTO-consistent measure is "reasonably available".³³

Interestingly, in WTO jurisprudence under Article XX, the types of alternatives that are considered have not generally included, as alternatives to import bans, such measures as tariffs, subsidies, or taxes, as considered in section 2.

In *Brazil—Tyres*, the Panel and the Appellate Body properly included in the “reasonable availability” assessment the question of adverse effects associated with alternative measures, in addition to the monetary costs of these measures, although as discussed below, they failed to assess these adverse effects in a satisfactory manner. If we compare the least treaty-inconsistent alternative reasonably available (LTIARA) formulation with full cost-benefit analysis, the factor missing in LTIARA analysis is the value of achievement of the regulatory goal.³⁴ This factor is included in the Appellate Body’s

32 See GATT Panel Report, United States—Section 337 of the Tariff Act of 1930 (“US—Section 337”), adopted 7 November 1989, BISD 36S/345, at para. 5.26; GATT Panel Report, United States—Measures Affecting Alcoholic and Malt Beverages (US—Malt Beverages), adopted 19 June 1992, BISD 39S/206, at para. 5.52; and GATT Panel Report, Thailand—Restrictions on Importation of and Internal Taxes on Cigarettes (“Thailand—Cigarettes”), adopted 7 November 1990, BISD 37S/200, at para. 223.

33 Appellate Body Report, U.S.—Gambling, para. 306.

34 We continue to exclude also any consideration of exporting state environmental externalities.

statement of *Korea—Beef* balancing, as discussed below. However, as further discussed below, the method of integrating these factors is also different under full cost-benefit analysis.

3.1 *Korea—Beef* Balancing

The Article XX necessity test was addressed in 2001 in *Korea—Beef*, where Korea attempted to justify its dual retail system for beef by arguing that this system was required in order to ensure compliance with a domestic regulation against fraud. The Appellate Body interpreted the necessity test of Article XX(d) to imply a requirement for balancing among at least three variables:

In sum, determination of whether a measure, which is not ‘indispensable’, may nevertheless be ‘necessary’ within the contemplation of Article XX(d), involves in every case a process of weighing and balancing a series of factors which prominently include the contribution made by the compliance measure to the enforcement of the law or regulation at issue, the importance of the common interests or values protected by that law or regulation, and the accompanying impact of the law or regulation on imports or exports.³⁵

After reiterating that WTO Members have the right to determine for themselves the level of enforcement of their domestic laws,³⁶ the Appellate Body called for an authentic balancing and weighing of (at least) these variables:

- “The more vital or important those common interests or values are, the easier it would be to accept as ‘necessary’ a measure designed as an enforcement instrument”;³⁷
- “The greater the contribution [to the realization of the end pursued], the more easily a measure might be considered to be ‘necessary’”;³⁸
- “A measure with a relatively slight impact upon imported products might more easily be considered as ‘necessary’ than a measure with intense or broader restrictive effects”.³⁹

Once “reasonable availability” is included, at least in connection with the assessment of alternative measures, it would be difficult to describe this language as anything but the announcement of a balancing test.⁴⁰

But the Appellate Body did not announce a fully articulated balancing test, and as stated above, not all balancing tests entail explicit cost-benefit analysis.⁴¹ Balancing tests may be far less precise, and proceed by a kind of gestalt, rather than aggregating the value of

35 Appellate Body Report, *Korea—Various Measures on Beef*, WT/DS161/AB/R and WT/DS169/AB/R, at para. 164.

36 *Id.*, at para. 177.

37 *Id.*, at para. 162.

38 *Id.*, at para. 163.

39 *Id.*

40 *But see*, Regan (2007)

41 *But see, id.* (suggesting that balancing tests and cost-benefit analysis are equivalent).

costs and benefits in mathematical form. It was not clear in *Korea—Beef* how these variables would affect each other, nor was it clear how their balancing would affect the final determination that a measure qualifies under Article XX and how this new test would relate to the traditional LTIARA test described above.

Yet in *Korea—Beef* and in *EC—Asbestos*, the Appellate Body tried to reconcile its new balancing test with the traditional least trade restrictive alternative reasonably available test. In fact, in *Korea—Beef*, the Appellate Body stated both that its balancing test was part of the basic “necessity” analysis, as shown in the quote above, and that it was part of the “reasonable availability” analysis.⁴² In *EC—Asbestos*, the Appellate Body found that in light of France’s chosen level of protection, and noting that the protection of human life is vital and important to the highest degree,⁴³ “the remaining question, then, is whether there is an alternative measure that would achieve the same end and that is less restrictive of trade than a prohibition.”⁴⁴

Interestingly, in its decision regarding *EC—Asbestos*, the Appellate Body referred to its decision in *Korea—Beef* to the effect that in determining whether another alternative method is reasonably available, it is appropriate to consider the extent to which the alternative measure “contributes to the realization of the end pursued”.⁴⁵ This language suggests that there may be some case in which it would be appropriate to restrict the degree to which a state may expect to achieve its appropriate level of protection. This is a significant departure from the conventional understanding of “reasonably available,” which would consider the costs of the alternative regulation but not the degree of its contribution to the end. In fact, the degree of contribution to the end seemed before to be inviolable. Furthermore, the Appellate Body in *Asbestos* referred to *Korea—Beef* for the proposition that the more important the common interests or values pursued, the easier it would be to accept the national measure as necessary.⁴⁶

However, in *U.S.—Gambling*, the Appellate Body confirmed that a “‘reasonably available’ alternative measure must be a measure that would preserve for the responding Member its right to achieve its desired level of protection with respect to the objective pursued”⁴⁷ It is not clear how the Appellate Body will reconcile the right to the member state’s chosen level of protection with the prescription to evaluate the importance of the value protected.⁴⁸ But it seems that panels are expected to assess the reasonableness and

42 Para. 166.

43 Appellate Body Report, *EC—Asbestos*, WT/DS135/AB/R.

44 *Id.*

45 *Id.*, at para. 172 (citing its report in *Korea—Various Measures on Beef*, WT/DS161/AB/R and WT/DS169/AB/R, at paras. 161–164).

46 *Id.*, at para. 172.

47 Appellate Body Report, *U.S.—Gambling*, para. 308

48 See Marceau and Trachtman (2002). Regan (2007) highlights this problem. He argues that despite the Appellate Body’s statements to the contrary, the Appellate Body has not engaged in a balancing test. Regan appears to conflate balancing—in which no commensuration is needed, and a kind of gestalt decision-making might be acceptable—with a more formal and demanding cost-benefit analysis. However, he is correct that the evidence of actual balancing is at least not compelling, and that at least under cost-benefit analysis, it seems impossible to engage in a full cost-benefit analysis and preserve the respondent state’s chosen level of protection unimpaired. However, it seems possible that a kind of truncated

importance of the values at the basis of the challenged measure. “The more vital or important those common interests or values are, the easier it would be to accept as ‘necessary’.”⁴⁹

In *Korea—Beef*, the possibility of an unreasonable or inauthentic policy goal was raised:

The application of such [less restrictive] measures for the control of the same illegal behaviour for like, or at least similar, products raises doubts with respect to the *objective necessity* of a different, much stricter, and WTO-inconsistent enforcement measure.⁵⁰

*We think it unlikely that Korea intended to establish a level of protection that totally eliminates fraud with respect to the origin of beef (domestic or foreign) sold by retailers. The total elimination of fraud would probably require a total ban of imports. Consequently, we assume that in effect Korea intended to reduce considerably the number of cases of fraud occurring with respect to the origin of beef sold by retailers.*⁵¹ (emphasis added)

How does this argument fit into a LTIARA test, or into a balancing test? There are two ways that it could be understood. First, it could be understood from an evidentiary standpoint, by which the Appellate Body is declining to accept at face value the chosen level of protection expressed by Korea, but is substituting a “real” chosen level of protection. Second, it could be understood as an instance in which the Appellate Body has found the national chosen level of protection to be unreasonable, and has judicially “reduced” it for purposes of further analysis. This second understanding would be consistent with a balancing test in which the chosen level of protection is not sacrosanct, but can be subjected to compromise.

Note that a similar analysis could have been, but was not, applied in *Brazil—Tyres*. In *Brazil—Tyres*, it seems equally—indeed patently—unlikely that Brazil intended to establish a level of protection that totally eliminates waste tyres derived from retreads, or even one that does so “to the maximum extent possible.” However, the Panel and the Appellate Body seem to have accepted that this was Brazil’s goal.

In *Brazil—Tyres*, the Panel⁵² and the Appellate Body⁵³ both refer to *Korea—Beef*, *EC—Asbestos*, *U.S.—Gambling*, and *Dominican Republic—Cigarettes*, and to the references in those cases to “weighing and balancing.”

balancing, holding constant or sacrosanct the chosen level of protection, could be termed a type of “balancing test,” even though it is not cost-benefit analysis.

49 Appellate Body Report, *Korea—Various Measures on Beef*, WT/DS161/AB/R and WT/DS169/AB/R, at para. 162.

50 *Id.*, at para. 172.

51 *Id.*, at para. 178.

52 Paras. 7.104-7.105.

53 Paras. 141-145.

3.2 *Appropriate Level of Protection*

The Appellate Body recites that the Panel had found that “the objective of the Import Ban is the reduction of the ‘exposure to the risks to human, animal or plant life or health arising from the accumulation of waste tyres.’”⁵⁴ This is an appropriate objective within Article XX(b) of GATT. “The Panel also observed that ‘Brazil’s chosen level of protection is the reduction of the risks of waste tyre accumulation to the maximum extent possible.’”⁵⁵ What is the difference between an “objective” and a “chosen level of protection?” It appears that the objective is the basic value referenced in the relevant subsection of Article XX, while the “chosen level of protection” is the degree to which that basic value is fulfilled.⁵⁶

In analyzing whether the Brazilian import ban contributed to the realization of the policy of “reduction of the risks of waste tyre accumulation to the maximum extent possible,” the Panel examined (i) whether the import ban contributed to the reduction in the number of waste tyres generated in Brazil, and (ii) whether a reduction in waste tyres could reduce risk to health.⁵⁷ However, a “reduced number of waste tyres” is not a degree to which *health* is fulfilled. This is very important in connection with the determination of reasonably available alternatives. While a reduced number of waste tyres may indeed reduce the adverse health effects of waste tyres, there may be other, less trade restrictive, ways to achieve the same health effects without reducing the number of waste tyres.⁵⁸

Rather, it would be more accurate to understand as the “chosen level of protection” the degree of exposure to disease from waste tyres existing in Brazil under the import ban on rereads as it is. This is what Brazil actually “chose.” Here, the Panel made a further error,⁵⁹ by attempting to separate a formally distinct “measure” from its exceptions, including the MERCOSUR exception and the exceptions that Brazil made for imports of used tyres. If these were understood as part of the level of protection against health risks from used tyres that Brazil actually chose, a wider array of alternative measures might have been found to be reasonably available to achieve Brazil’s actual chosen level of protection. It is hard to imagine a substantive reason to assume that Brazil chose a *higher* level of protection than the actual one that it implemented, *including* the effects of the MERCOSUR exception.

In the context of Article XX(b), reducing the number of waste tyres cannot be understood as a level of protection, but only as a *means* of protection. A *means* of protection is an alternative to be evaluated in determining the least trade restrictive alternative under a traditional necessity test, and is not itself a standard to which all other means can be held. If it were the latter, it would be circular, and no test at all.

54 Appellate Body Report, para. 144, quoting Panel Report, para. 7.102.

55 Appellate Body Report, para. 144, quoting Panel Report, para. 7.108.

56 Appellate Body Report, para. 140.

57 Appellate Body Report, para. 134.

58 Furthermore, as we showed in section 2, there may be other alternative ways to reduce the number of waste tyres.

59 Which the Appellate Body criticized, but did not reverse because the EC had formulated its claims this way. Appellate Body Report, para. 26.

In the *EC—Asbestos* case, a somewhat similar dichotomy arose. That is, in that case, France wanted to eliminate all exposure to asbestos, while Canada argued that a focus on health risks would allow for the substitution of management of asbestos. However, in the *EC—Asbestos* context, these are different: even well-managed asbestos presents greater risks than a rule of zero-exposure.

3.3 Evaluation of Contribution

In *Tyres*, both the Panel and the Appellate Body affirmed that, consistent with prior jurisprudence, the analysis does not require quantification of risk or of contribution of the measure or of alternative measures to the achievement of the objective.⁶⁰ As noted above, there might be circumstances in public policy decision-making, and especially where a cost-benefit analysis may be desirable, where quantification would also be desirable. All other things being equal, the more precision, the better. But precision is costly, and may be unavailable at any cost. And yet, the simple dichotomy between quantitative and qualitative evaluation fails to recognize that there is something in between: a non-quantitative assessment of magnitude. It is impossible to determine whether an alternative measure could contribute as much as the existing measure without some assessment of magnitude, and so it is incumbent on a panel applying a balancing test or a LTIARA test to make an assessment of magnitude.

Instead, the Panel elaborated the following syllogism:

- The import ban encourages domestic retreads of domestic used tyres.
- At least some domestic used tyres are being retreaded in Brazil.
- Brazil has the production capacity necessary to retread domestic used tyres.
- Brazil's ban on imports of used tyres results in domestic retreads of domestic used tyres.
- Therefore, the import ban contributes to an overall reduction in waste tyres in Brazil.

This syllogism is notable for a number of features. The result of reduction in waste tyres is purely theoretical, and has no empirical backing. While it may be reasonable to assume on the basis of theory that some results will ensue—we show this in Part I—there can be no way to know the magnitude of the effect without some empirical work.

Therefore, all that the Panel, and the Appellate Body, knew was that in theory the suppression of imports of retreads under these circumstances causes an increase in domestic retreads and a decrease in waste. The European Communities strenuously objected, arguing that the Panel should have determined the *actual* contribution of the import ban to health, rather than a theoretical contribution, and arguing further that it is impossible to balance without determining the extent to which the import ban contributes to achievement of the stated objective.

But here, the Appellate Body made a major departure from the balancing test articulated in *Korea—Beef* and in *EC—Asbestos*. The Appellate Body found that a

⁶⁰ Appellate Body Report, para. 146.

contribution exists when there is a genuine means-ends relationship between the measure and the objective.⁶¹ This is a “suitability test.”⁶²

Note how this theoretical contribution, based on a means-ends syllogism, feeds into the test. We have a value of the highest order: health. We have an unknown but presumed positive and “material” contribution to health. This seems to contradict the statement by the Appellate Body in *Korea—Beef* that a “necessary” measure is “located significantly closer to the pole of ‘indispensable’ than to the opposite pole of simply ‘making a contribution to.’”⁶³ In fact, here, “simply making a [material] contribution to” the goal was enough.

And we have the greatest possible restriction of trade and violation of GATT. Given the possibly minimal contribution, we must assume in future that any measure that contributes to health, no matter how minimally, will satisfy the necessity test under Article XX(b). Thus, at least where health is the objective, this is no balancing test. Recall that *Korea—Beef* put the balancing, however, in two places: (i) in the initial determination of whether the national measure at issue satisfies the requisite relationship between objective, contribution, and trade barrier, and (ii) in the comparison of the national measure at issue to potential alternatives.⁶⁴ So, it is still possible that there would be a balancing test in connection with the comparison of alternatives.

3.4 Evaluation of Alternatives

But it is in connection with the examination of alternatives that the Panel provided the most questionable reasoning, which reasoning was accepted by the Appellate Body. The Appellate Body explained that it is necessary to examine alternatives, “which may be less trade restrictive while providing an equivalent contribution to the achievement of the objective pursued.”⁶⁵ What can possibly be meant by an “equivalent contribution” when no assessment of the magnitude of the Brazilian measure’s contribution has been made? Perhaps once it was determined that a merely theoretical contribution was made by the Brazilian measure, this equivalence test might only ask that a merely theoretical contribution be made by the alternative measure. This absurdity points out the deficiency of the Panel’s and Appellate Body’s position. Indeed, the Appellate Body referred to its decision in *U.S.—Gambling*, holding that “an alternative is not reasonably available where it is merely theoretical in nature, for instance, where the responding Member is not capable of taking it, or where the measure imposes an undue burden on that Member, such as prohibitive costs or substantial technical difficulties.”⁶⁶ Here, the contribution of the actual Brazilian measure was merely theoretical in nature. It would be strange to impose a stricter standard on the alternative measures.

61 Appellate Body Report, para. 210.

62 In the same paragraph, the Appellate Body stated that the Panel enjoys latitude in designing an appropriate methodology, noting that the appropriate methodology will depend on the type of evidence that is available. However, the Appellate Body warned, this latitude is not boundless. Appellate Body Report, para. 145.

63 Appellate Body Report, *Korea—Beef*, para. 161.

64 Appellate Body Report, *Korea—Beef*, para. 164.

65 Appellate Body Report, para. 156.

66 *Id.*

Having failed to assess the degree of contribution of Brazil's import ban to the chosen level of protection, the Panel could not criticize any theoretically plausible alternative in terms of contribution to health. But, strangely, it rejected alternatives that might contribute to health without reducing the number of waste tyres.

As noted above, the Appellate Body quoted its decision in *U.S.—Gambling* to the effect that it is necessary to “preserve for the responding Member its right to achieve its desired level of protection with respect to the objective pursued.”⁶⁷ Thus, an alternative must satisfy three criteria: (i) it must achieve the chosen level of protection, (ii) it must be less trade restrictive, and (iii) it must be reasonably available.

Some of the measures offered by the European Communities as possible alternatives to reduce the accumulation of waste tyres were found by the Panel to have already been implemented or to be in the process of being implemented. The Panel held, and the Appellate Body accepted, that under these circumstances the proposed alternatives could be “cumulative rather than substitutable.” Of course, this argument could be made in many circumstances, and neither the Panel nor the Appellate Body offered a means to distinguish, from an evidentiary standpoint, between cumulative and substitutable alternative measures. The correct distinction must be simply between what is already being done, and what has not been done yet. That is, an alternative measure, in relation to the measure being evaluated, must be a measure that has not yet been implemented.

One such alternative measure was to enforce without exception Brazil's import ban on used tyres. This legislative ban had been negated in some circumstances by injunctions from Brazil's courts. Here, the Panel and the Appellate Body fell into the trap of respecting separation of powers within a divided government. The correct way to address national measures at international law in this type of context is to take the aggregate measure that arises from the internal domestic processes as the national measure, rather than to try to separate the acts of different internal actors. For purposes of international legal responsibility, the state is a solid billiard ball: whatever measure emanates from it is subject to evaluation for compliance. Using this approach, it would be clear that Brazil had not completely banned imports of used tyres, and that the completion of its ban on used tyres could indeed be a less trade restrictive alternative means of achieving the same level of reduction of the health risks from waste tyres, compared to the ban on importation of retreads.⁶⁸ No evaluation was made of this possibility in evaluating the necessity of Brazil's import ban on retreads.⁶⁹

Another such alternative, as discussed in section 2, was to encourage domestic retreading, for example through a subsidy. In fact, encouraging domestic retreading is likely to be the most economically attractive alternative, and, while it would reduce imports to some extent, it would not be nearly as restrictive as a ban. Here, the panel determined that Brazil was already utilizing this type of measure. However, there was no evaluation of whether additional incentives beyond those implemented or planned would have constituted a less restrictive alternative in relation to the import ban.

67 Appellate Body Report, para. 156, quoting *Gambling*, para. 308.

68 This argument depends on a position that a ban on imports of used tyres is somehow less trade restrictive than a ban on imports of retreads.

69 Appellate Body Report, para. 159.

Even more strangely, in the case of alternatives such as landfilling, which might have reduced the number of waste tyres, but with side effects that might have diminished health, the Panel came up empty-handed because it provided no analysis of the relative magnitude of each risk. Here we see that it is impossible to weigh and balance, or even to evaluate alternatives, in this context, without some type of information regarding magnitude. Brazil's ban was *theorized* to contribute to health by reducing the number of waste tyres, while other alternatives might also reduce the number of waste tyres or otherwise reduce the adverse effects of waste tyres, at some cost in terms of other dimensions of health. Without knowing the magnitude of each effect, it is impossible to know whether Brazil's import ban, or the alternative, protects health better. And yet, the Panel rejected alternatives on the ground that they were likely to have some collateral deleterious effect on health, without assessing the magnitude of this effect.

To put a fine point on it, assume that the contribution to health of Brazil's import ban, by virtue of a reduction of waste tyres, equals 1. Assume that a recycling program would contribute to health by virtue of a reduction of waste tyres, with a magnitude of contribution equal to 10. Now assume that there is a collateral adverse health effect associated with recycling equal to -1. Can it be correct to say that the recycling program is not reasonably available due to adverse health effects?

Similarly, with respect to the proposed alternatives of stockpiling and incineration, the Panel failed to evaluate the risk, and so could not provide any judgment as to whether these types of measures could achieve Brazil's chosen level of health protection. Furthermore, in connection with all of these alternatives, the Panel used as Brazil's chosen level of protection the "reduction of the risks associated with waste tyre accumulation to the maximum extent possible." By defining the level of protection too narrowly—in terms of number of tyres instead of health—the Panel artificially foreclosed some alternatives. Concurring, the Appellate Body put it as follows:

According to the Panel, "insofar as the level of protection pursued by Brazil involves the 'non-generation' of waste tyres in the first place", collection and disposal schemes, such as that adopted by CONAMA Resolution 258/1999 or the Paraná Rodando Limpo programme, "would not seem able to achieve the same level of protection as the import ban". (citations omitted)

Both the Panel and the Appellate Body failed to recognize that non-generation of waste tyres alone is an impermissible level of protection under Article XX. They therefore erroneously discounted alternative means of protecting health.

The European Communities also proposed alternatives that focused on management, rather than reduction, of waste. Yet, as noted above, the Panel and the Appellate Body also understood Brazil's chosen level of protection as the reduction of risks associated with tyre accumulation "to the maximum extent possible" when evaluating alternative measures.⁷⁰ This was also error: the correct reference is the reduction of the risks precisely as much as

70 Appellate Body Report, para. 170.

the existing measure did so.⁷¹ The search for a less restrictive alternative is not a search for a *more* effective alternative than the one actually implemented by the respondent state.

In another error, the Appellate Body focused on reduction of waste tyres as Brazil's policy objective, and agreed with the Panel to the effect that non-generation measures are more apt to achieve Brazil's objective of reducing exposure due to accumulation.⁷² However, there was no evidence to support this policy prejudice.

Furthermore, the Appellate Body made the following statement as to management measures: "Because these practices carry their own risks, and these risks do not arise from non-generation measures such as the Import Ban, we believe, like the Panel, that these practices are not reasonably available alternatives."⁷³ Without some evaluation of the magnitude of the different risks, the Appellate Body has no grounds for this statement. The numerical example used above to show the problem with similar logic in connection with recycling, applies also as to management measures.

3.5 Brazil—Tyres Balancing?

In conclusion, while the Panel and the Appellate Body recited the "weighing and balancing" formulation from *Korea—Beef, Asbestos, Gambling, and Cigarettes*, it seems impossible to weigh and balance without assessing magnitudes. Indeed, a "qualitative" assessment in this type of analysis must also assess magnitudes. This does not require quantification, but it requires judgment based on facts and inevitably requires estimation of magnitudes. How else can it seriously be determined whether an alternative measure makes an "equivalent contribution," the standard set by the Appellate Body?⁷⁴ Can equivalence in this context be concerned with anything besides magnitudes? Yet the Appellate Body is satisfied with the establishment of a means-ends relationship. Not only did the Panel fail to evaluate the contribution of Brazil's import ban to protecting health, it also failed to provide usable assessments of any of the alternatives proposed.

The Appellate Body's opinion here belies its language elsewhere in the opinion: "The weighing and balancing is a holistic operation that involves putting all the variables of the equation together and evaluating them in relation to each other after having examined them individually, in order to reach an overall judgement."⁷⁵ "[T]he contribution of the measure has to be weighed against its trade restrictiveness" It defies understanding how this weighing could be done, and how the Appellate Body could agree with the Panel that "the contribution of the Import Ban to the achievement of its objective outweighs its trade restrictiveness,"⁷⁶ without an assessment of the magnitude of the contribution of the import ban. How could one value possibly be said to outweigh the other when it has not been measured? So, this is no balancing test.

71 See Appellate Body Report, *Korea—Beef*, paras. 177-179 (Korea cannot assert a chosen level of protection greater than that which its measure actually achieves).

72 Appellate Body Report, para. 174.

73 *Id.*

74 Appellate Body Report, para. 156, 178.

75 Appellate Body Report, para. 182.

76 Appellate Body Report, para. 179.

But even more surprisingly, the Appellate Body's approach also makes impossible the use of a LTIARA test, for such a test must determine equivalence of contribution, and equivalence of contribution requires assessment of magnitudes. So, in effect, the Appellate Body has now implicitly backed away not only from balancing, but also from the traditional LTIARA test.

While the full weighing and balancing under Article XX necessity announced in *Korea—Beef* was not expected by the diplomats who negotiated the WTO, or their governments, the LTIARA test was clearly intended. After all, in addition to the fact that the LTIARA test is the natural meaning of the word “necessary,” this test had been enunciated in the GATT jurisprudence under Article XX, and was explicitly adopted (as a least trade restrictive alternative test) in a similar context in the TBT Agreement and in the SPS Agreement. Furthermore, it has been explicitly adopted by the Appellate Body. Therefore, it seems reasonable to say that the Appellate Body has backed away from its mandate.

States determined, in the Uruguay Round, that one of the functions of dispute settlement would be to identify in these contexts the existence of less treaty inconsistent or trade restrictive alternatives that would contribute equivalently to the achievement of the relevant goal. They implicitly assigned the panels and the Appellate Body to serve as their agents to perform this function. The Appellate Body has refused this mandate.

It appears that the Panel, and the Appellate Body, sought to be deferential to Brazil's regulatory autonomy, especially in the environmental context. It is easy to see why this is an attractive course. But in order to rationalize deference, the decisions have done much violence to text, to precedent, and to legal logic. Furthermore, this approach cannot be explained by judicial modesty in the face of difficult public policy questions. Indeed, a balancing or LTIARA examination in this case posed daunting problems of judicial determination of public policy parameters. But the Panel and the Appellate Body did not avoid this type of determination: they *made it*, using vague and unsatisfactorily conclusory statements, rather than seeking the best data available.⁷⁷ The Appellate Body notes, wistfully, that certain “estimates would have been very useful and, undoubtedly, would have strengthened the foundation of the Panel's findings.”⁷⁸

If the Appellate Body follows this approach in the future, the necessity test will be an easy hurdle for states to surpass, and states will have greater incentives to engage in regulatory protectionism. But recall that Brazil lost this case on the basis of its failure to satisfy the requirements of the chapeau of Article XX.

3.6 The Chapeau Line of Equilibrium and Arbitrary or Unjustifiable Measures

The main concern of this article is the necessity test under Article XX(b). However, the chapeau of Article XX is also relevant to a full evaluation of the WTO jurisprudence of Article XX(b). Moreover, it was under the chapeau that the Appellate Body found Brazil's

77 For a similar criticism in another context of panel and Appellate Body analysis, see Sapir and Trachtman (2008).

78 Appellate Body Report, para. 153.

measure illegal. Therefore, we briefly describe the Appellate Body’s analysis under the chapeau.

The chapeau of Article XX establishes three standards regarding the application of measures for which justification under Article XX may be sought: first, there must be no “arbitrary” discrimination between countries where the same conditions prevail; second, there must be no “unjustifiable” discrimination between countries where the same conditions prevail; and, third, there must be no “disguised restriction on international trade”.⁷⁹

In *Brazil—Tyres*, the Appellate Body found that in order to avoid being considered arbitrary or unjustifiable discrimination, the rationale for discrimination must bear a “rational connection to the objective falling within the purview of a paragraph of Article XX”⁸⁰ Where the rationale—compliance with MERCOSUR rules—was extraneous to Article XX(b), it could not satisfy this requirement. The Appellate Body stated that “there is arbitrary or unjustifiable discrimination when a measure provisionally justified under a paragraph of Article XX is applied in a discriminatory manner . . . and when the reasons given for this discrimination bear no rational connection to the objective falling within the purview of a paragraph of Article XX. . . .”⁸¹ The Appellate Body similarly found that Brazilian court injunctions ordering that imports of used tyres resulted in Brazil’s import ban on retreads being applied in a manner that constitutes arbitrary or unjustifiable discrimination.⁸²

When the analysis of the chapeau of Article XX took place in the context of the invocation of sub-paragraph (g) thereof in the *U.S.—Gasoline* case, the Appellate Body (faced with a measure benefiting from a provisional justification under Article XX(g)) examined, under the chapeau of Article XX, whether less trade restrictive alternatives were reasonably available to the United States and whether the restrictiveness of the measure was somehow disproportionate since similar costs were not at all imposed on domestic producers. In other words, even after Article XX(g) itself is satisfied, some form of a necessity test (least trade restrictive alternative analysis) seems to be performed under the chapeau of Article XX.

In *US—Shrimp*, the Appellate Body stated that the chapeau of Article XX, “embodies the recognition of the . . . need to maintain a balance of rights and obligations” between the right of a Member to invoke the exceptions of Article XX on the one hand and the rights of the other Members under the GATT 1994, on the other hand. This interpretation and application of Article XX requires “locating and marking out a line of equilibrium between the right of a Member to invoke an exception under Article XX and the rights of the other Members under varying substantive provisions”.⁸³ “The location of the line of equilibrium is not fixed and unchanging; the line moves as the kind and the shape of the measures at stake

79 See the Appellate Body Report, *US—Gasoline*, WT/DS2/AB/R, at pp. 21–22; Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products—Recourse to Article 21.5 of the DSU by Malaysia (“US—Shrimp (Article 21.5—Malaysia)”)*, WT/DS58/AB/RW, at para. 118; and Appellate Body Report, *US—Shrimp*, WT/DS58/AB/R, at para. 150.

80 Appellate Body Report, *Brazil—Tyres*, para. 227.

81 *Id.*

82 *Id.*, para. 246.

83 Appellate Body Report, *US—Shrimp*, WT/DS58/AB/R, at paras 156–160.

vary and as the facts making up specific cases differ.”⁸⁴ A search for a line of equilibrium sounds suspiciously like a balancing test.

Thus, while in *Brazil—Tyres*, the determination under the chapeau of Article XX involved no balancing, in other contexts, a panel may be required to engage in a type of balancing test in order to determine whether the requirements of the chapeau are met. Again, balancing may entail complex factual determinations and social policy prioritization that may be difficult for judicial bodies.

4 Conclusion

It is certainly true that in complex public policy settings, it would be very difficult for a tribunal to prepare a full public policy analysis, comparing alternative measures in satisfactory detail and with enough information to allow intelligent choice. This difficulty is well-understood, and is experienced by all sorts of tribunals. And yet, where tribunals are given a mandate to make these types of decisions, there is no alternative but to seek the appropriate information. The use of experts may be required to assemble even a minimally reliable analysis in a case like *Brazil—Tyres*. A LTIARA analysis is difficult because it requires assessment of trade impacts or of other treaty violation impacts, and the potency and availability of alternative measures. A balancing test, as articulated in the Appellate Body’s recent cases, adds the difficult parameter of determining the importance of the objective.

Furthermore, while it would take experts to prepare the information in a case such as this, matters such as the importance of the objective are essentially matters of preferences, and cannot readily be determined by experts for others.

So it is not difficult to see why the Appellate Body has backed away from precision in these matters, and by doing so has had to choose deference to the respondent state. Yet, there is no legal authorization in the WTO treaty for deference in these matters to the respondent: a rule of *in dubio mitius* would be an inappropriate slanting of the playing field in favor of respondents, denying complainants the benefit of their bargain.

The Appellate Body must provide a level playing field, in order to perform its function of “providing security and predictability to the multilateral trading system.” Furthermore, it must articulate a clear textual rationale for its approach. It does not serve to provide security and predictability to apply the test declared with disregard for the facts needed in order to do so properly, or to declare one type of test, and apply another.

As if these problems were not weighty enough, there is an even more difficult problem lurking behind *Brazil—Tyres*. This is the problem of fragmentation. *Brazil—Tyres* makes clear that WTO law alone is insufficient to take into account the full scope of the problem of waste disposal: in these types of cases, WTO law lacks a basis for considering the environmental concerns of the *exporting* state. WTO law does not provide for a global welfare analysis. So, it is clear that the WTO legal system as it stands will not be sufficient to respond to the growing need to establish a global system of environmentally sound and efficient waste disposal.

84 See Appellate Body Report, US—Shrimp, WT/DS58/AB/R, at para. 158.

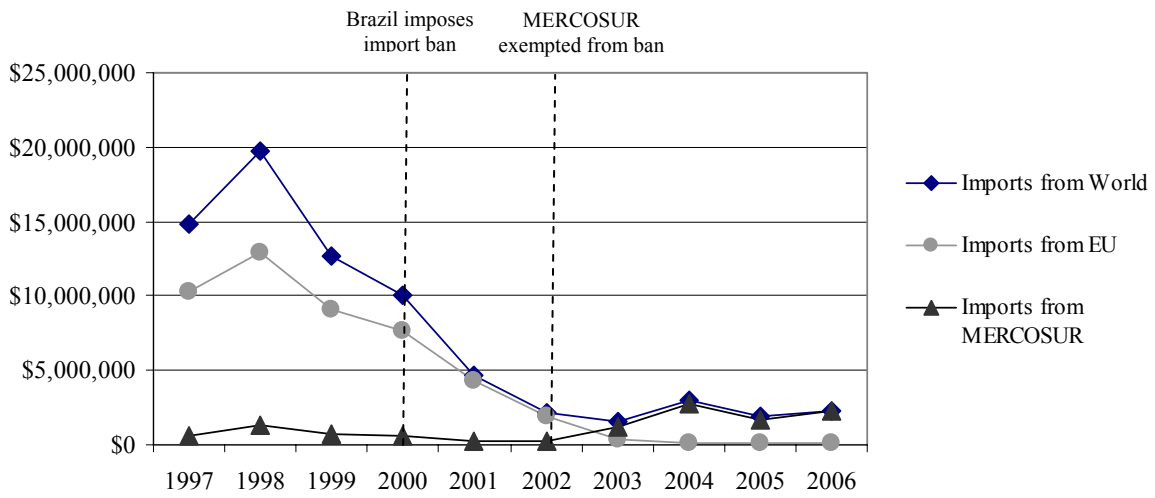
We present a welfare economics-based analysis of the rationale for an import ban such as that imposed by Brazil in this case. From this particular welfare-economic analysis we identify at least three fundamental insights. First, the Panel and Appellate Body require empirical information on the *size* of the underlying externality associated with retreading tyres if they are to make a rational judgment of the utility of the Brazilian policies contested in the dispute. Second, if the justification for the original import ban on retreaded tyres was based on the argument that it was a second-best Brazilian policy designed to combat a large externality, then Brazil's failure to enforce a ban on used-tyre imports weakens the effectiveness of the ban by eroding potential welfare gains through a reduction in equilibrium production (and consumption) of Brazilian retreaded tyres. Third, the Brazilian policy which exempted from the ban retreaded imports from MERCOSUR partners also has the same feature of weakening the possible environmental externality benefit of the import ban.

More generally, how can a welfare economics analysis inform the jurisprudence in this field? First, this analysis shows the very limited conditions under which an importing state may actually improve its welfare through an import ban. Of course, one response to this analysis is that states are motivated by political welfare, rather than just economic welfare. So we would still expect to see states imposing similar import bans to protect certain industries, and WTO law would still have a role to play in restraining such measures. But since the Article XX test asks what regulatory benefit is achieved by the importing state, the welfare economics analysis is critical. The welfare economics analysis shows with mathematical precision the relationship between the environmental externality Brazil is seeking to address, and its import ban. Furthermore, the welfare economics analysis contextualizes the evaluation of the relevant factors under the necessity test: it shows why these factors matter, and how they relate to one another. This is true even if we decide that quantification is out of the reach of WTO judicial bodies. Our welfare economics model also shows the gaps in the WTO balancing test compared to a full examination of the costs and benefits of a particular measure. Finally, it shows some important logical gaps in the WTO treaty and in its jurisprudence, paving the way for law reform in this area.

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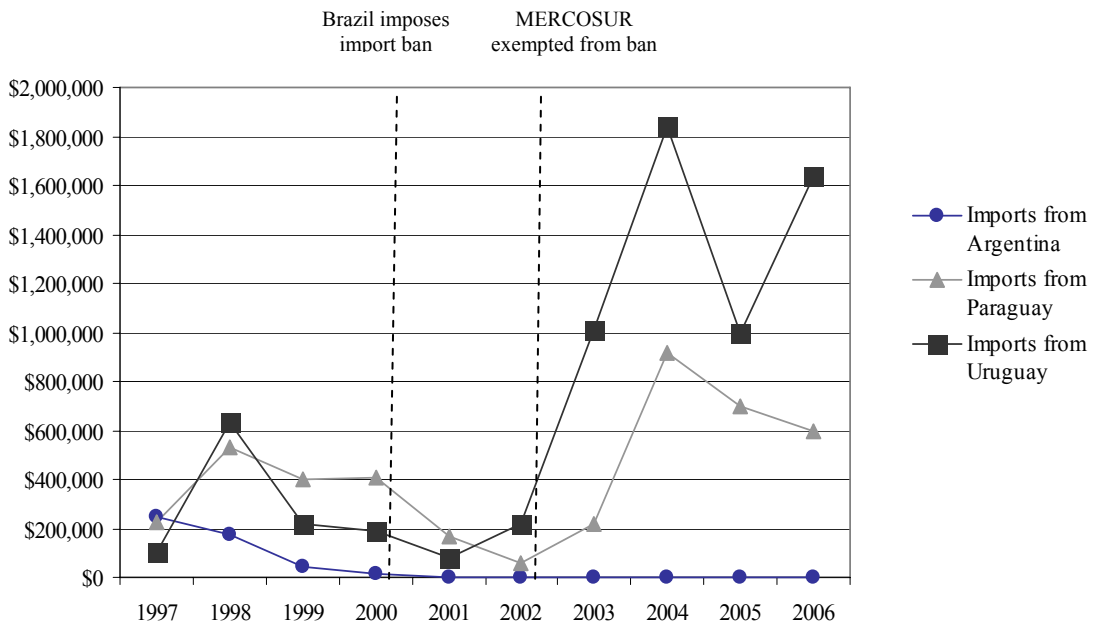
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Figure 1. Brazil's Imports of Retreaded Tyres, 1997-2006



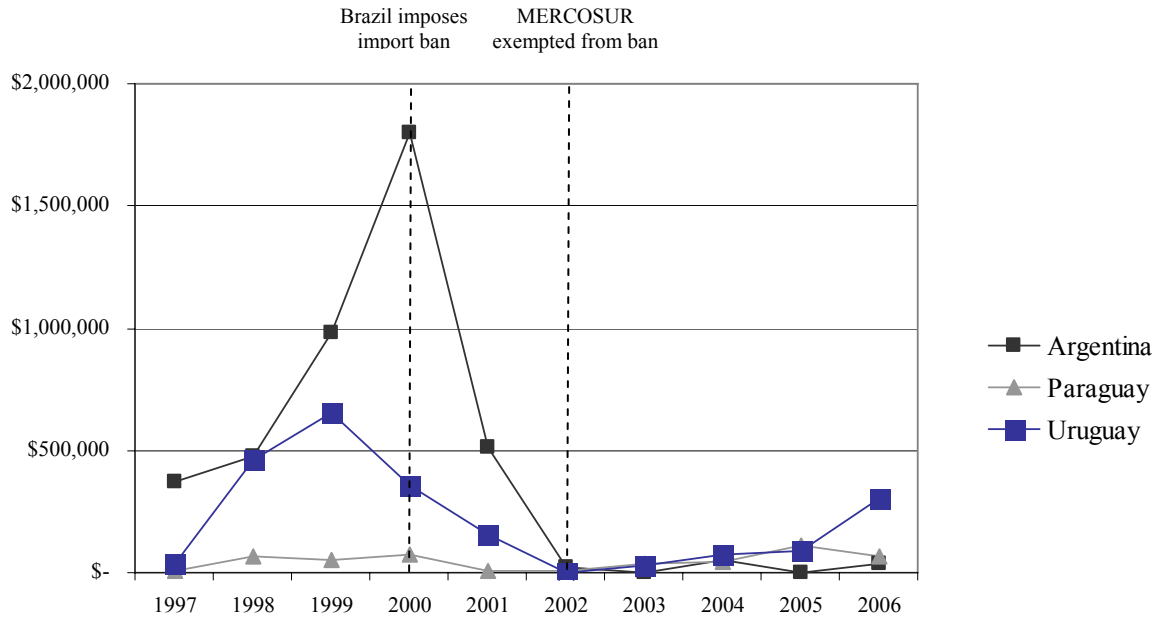
Source: Data collected by authors. Brazil imports under HS (1996) category 401210, data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 2. Brazil's Imports of Retreaded Tyres under MERCOSUR, 1997-2006



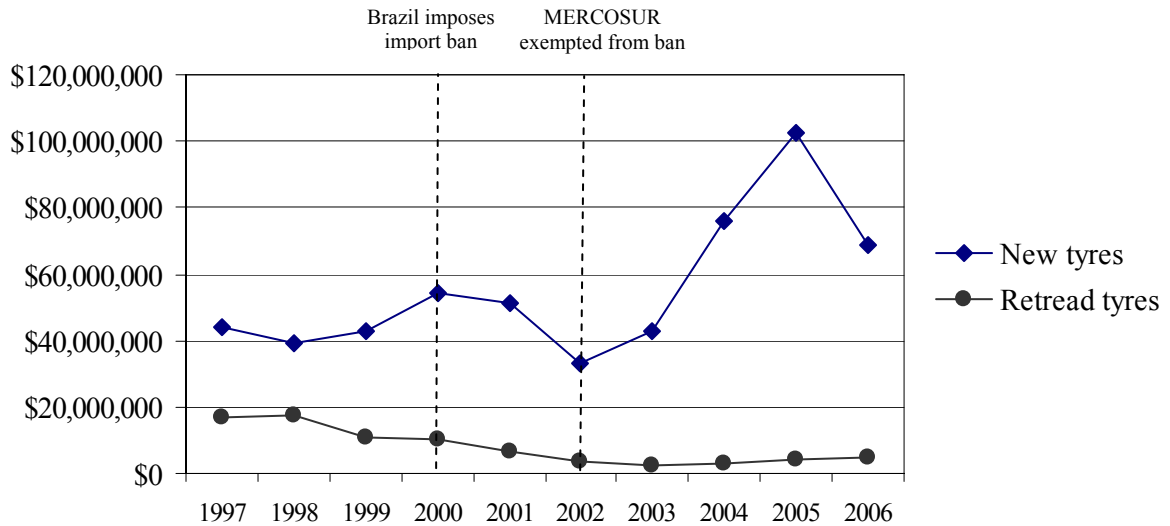
Source: Data collected by authors. Brazil imports under HS (1996) category 401210, data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 3. EU Exports of Retreaded Tyres to Other MERCOSUR Countries, 1997-2006



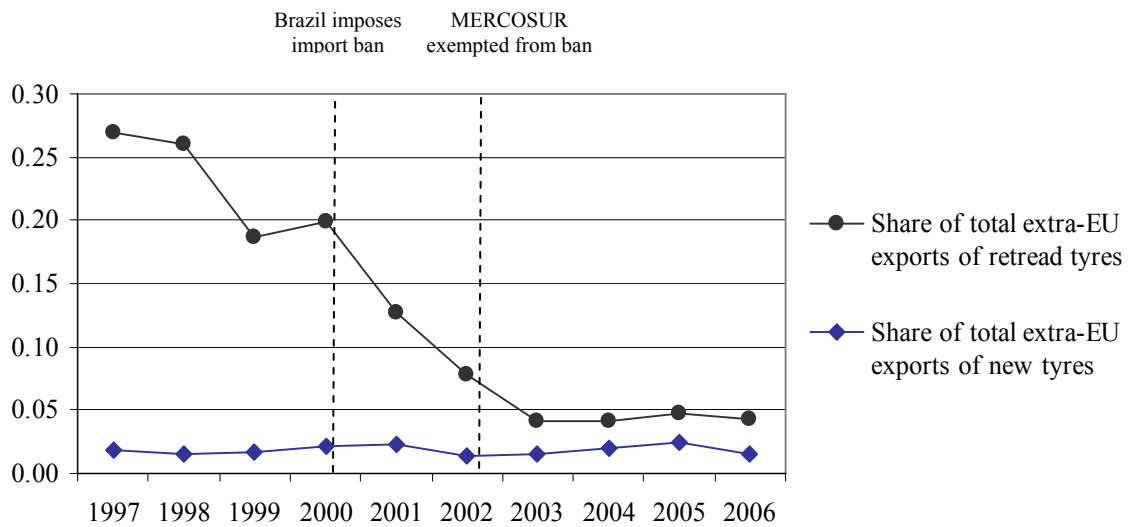
Source: Data collected by authors. EU exports under HS (1996) category 401210 (retreaded tyres), data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 4. EU Exports of Tyres to Brazil, 1997-2006



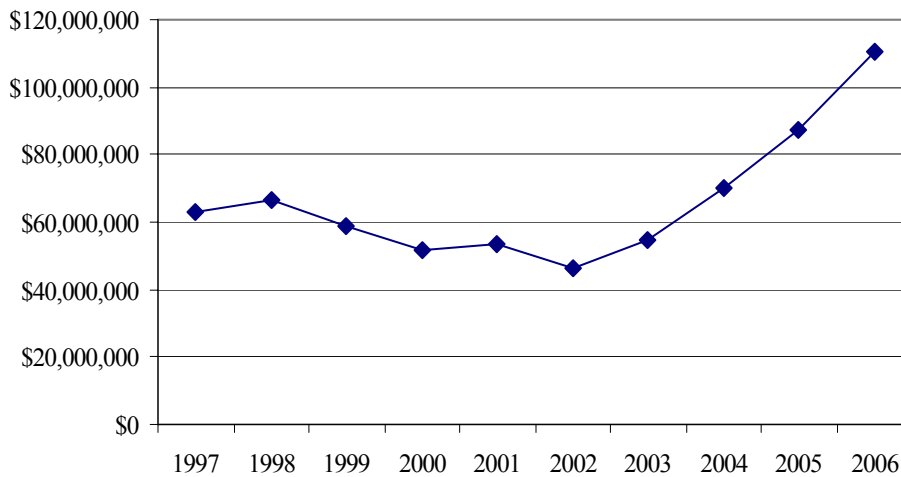
Source: Data collected by authors. EU exports under HS (1996) categories 4011 (new tyres) 401210 (retreaded tyres), data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 5. EU Reliance on the Brazilian Market for Retreaded and New Tyre Exports, 1997-2006



Source: Data collected by authors. EU exports under HS (1996) categories 4011 (new tyres) 401210 (retreaded tyres), data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 6. Total Extra-EU Retreaded Tyre Exports, 1997-2006



Source: Data collected by authors. EU exports under HS (1996) category 401210 (retreaded tyres), data taken from the WTO's Integrated Database (IDB) via WITS.

Figure 7. Positive Production Externality Associated with Retreading a Once-used Brazilian Tyre

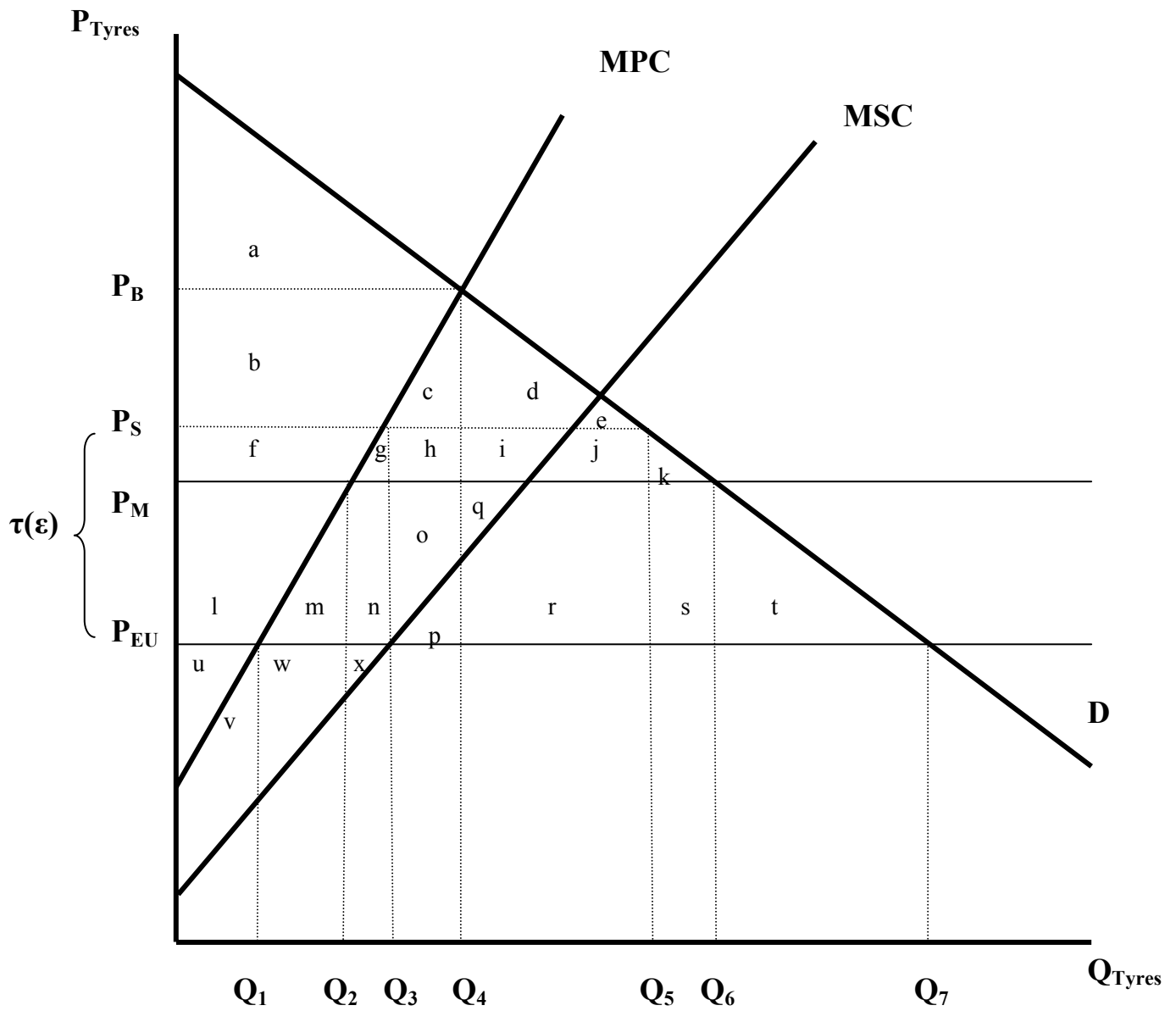


Figure 8. Increasing the Size of the Externality

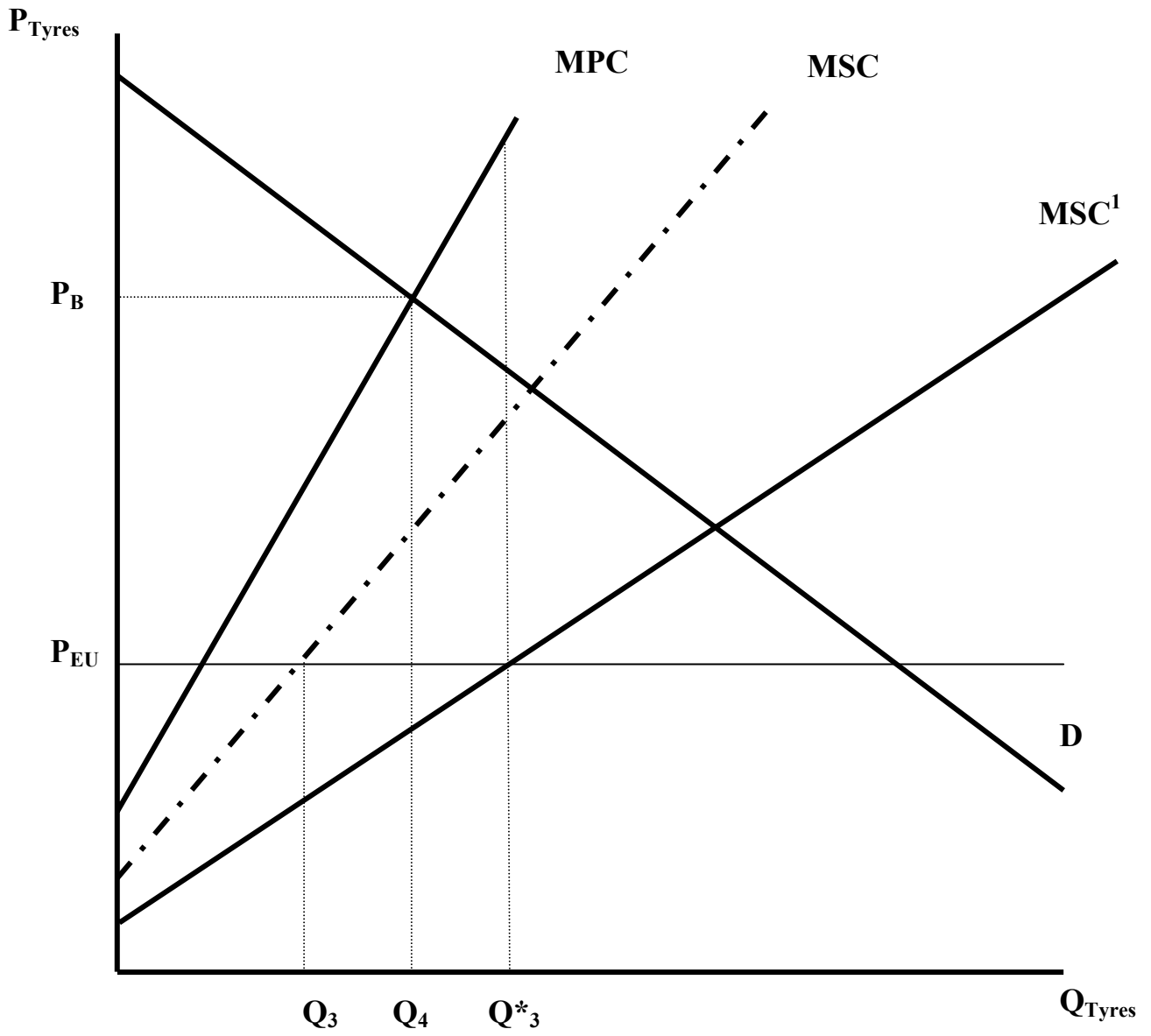


Figure 9. Imports of Used Tyres and Impact on Retreads of Once-used Brazilian Tyres

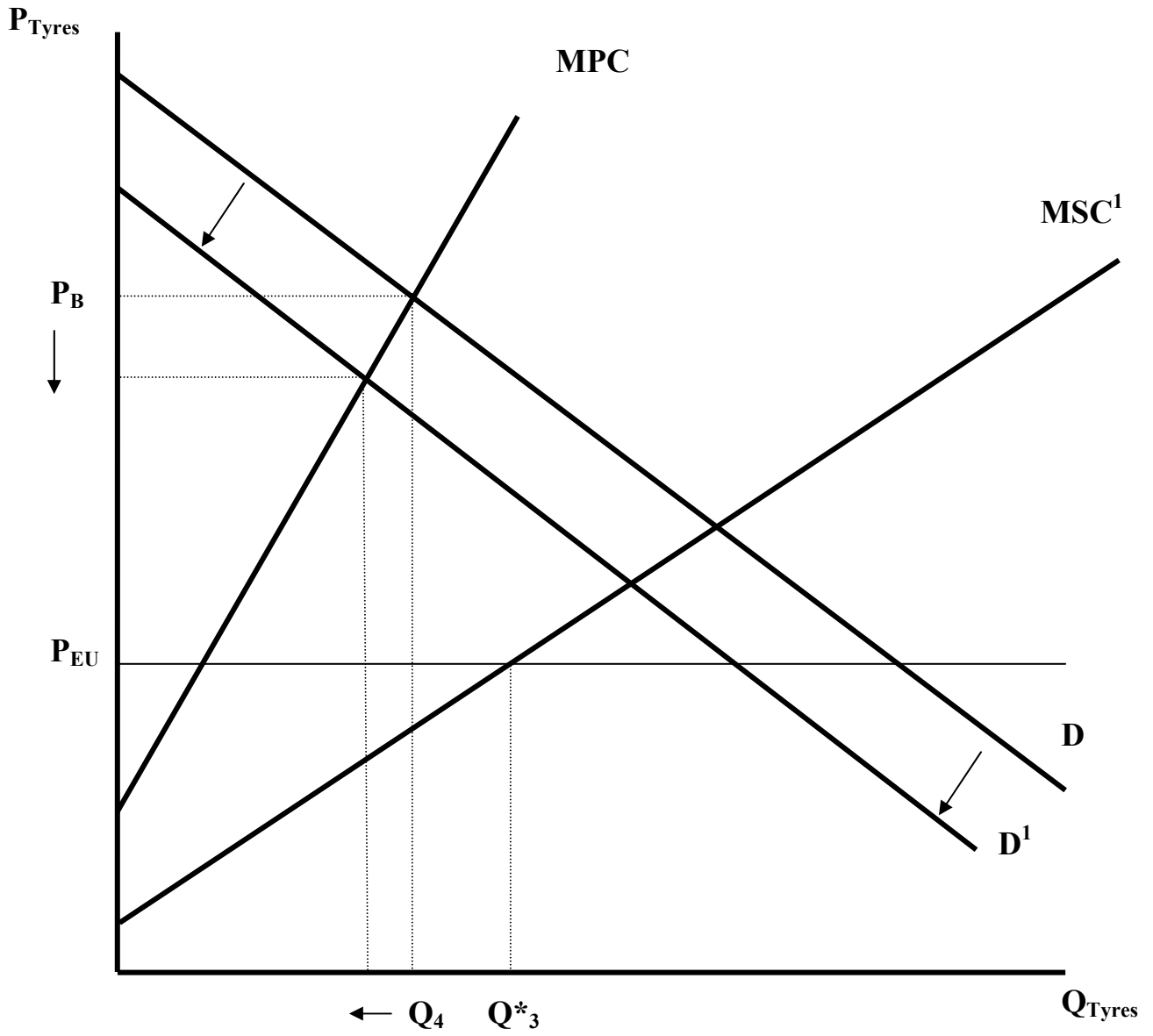


Figure 10. Import Ban Exemption for MERCOSUR Partners and Impact on Retreads of Once-used Brazilian Tyres

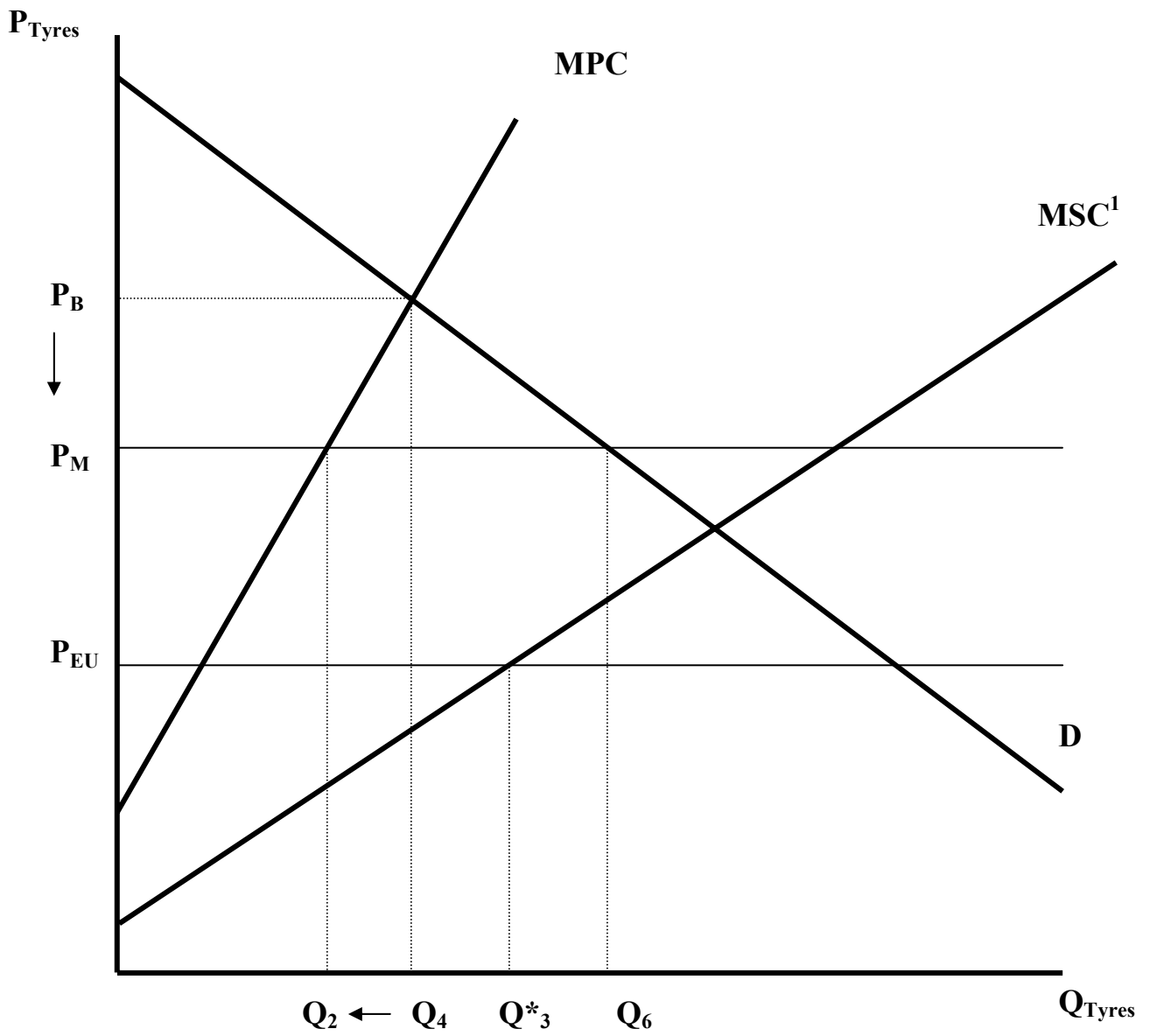


Figure 11. Brazil's Import Demand and EU Export Supply, Large Countries

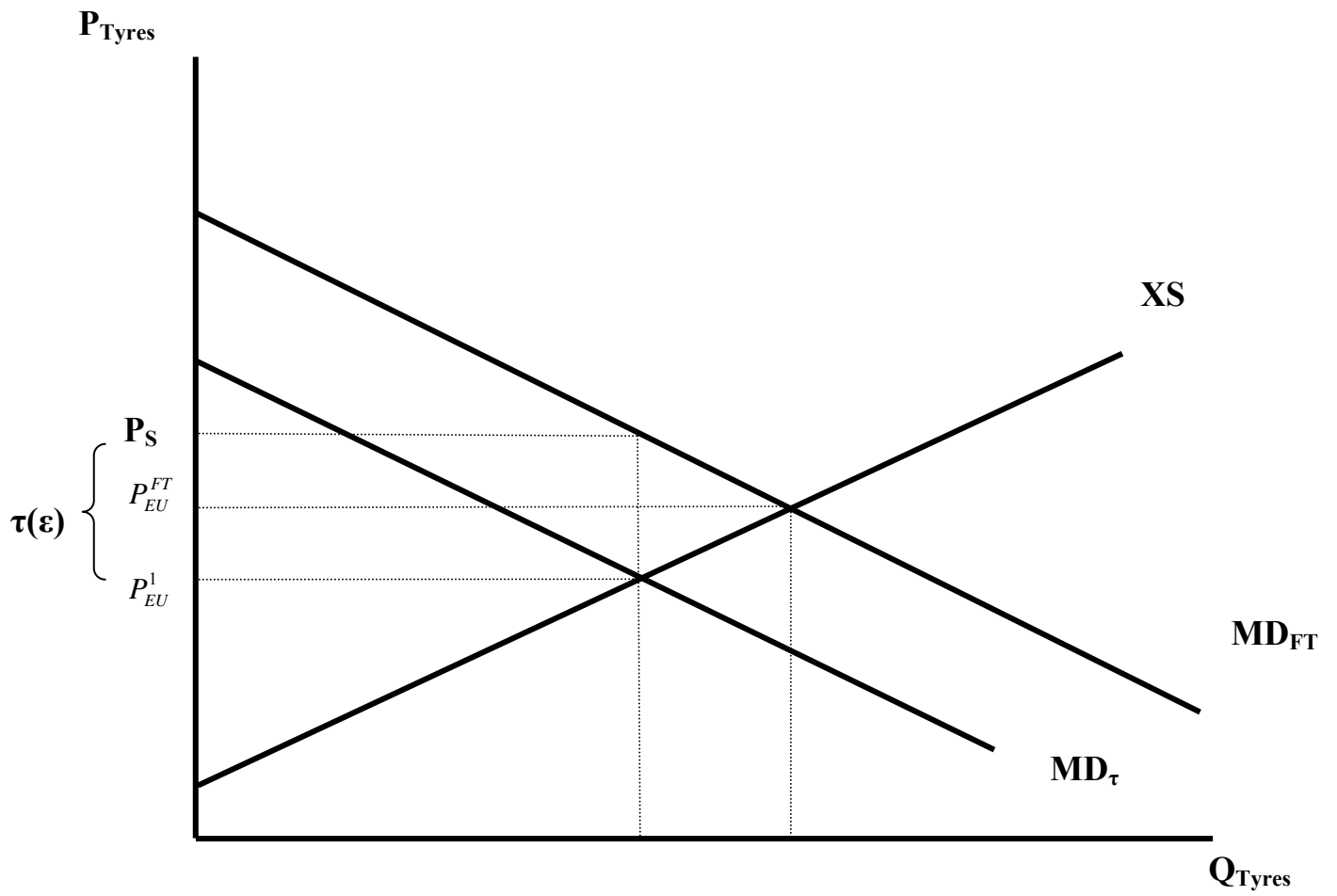


Figure 12. Brazil as a Large Importing Country from the EU

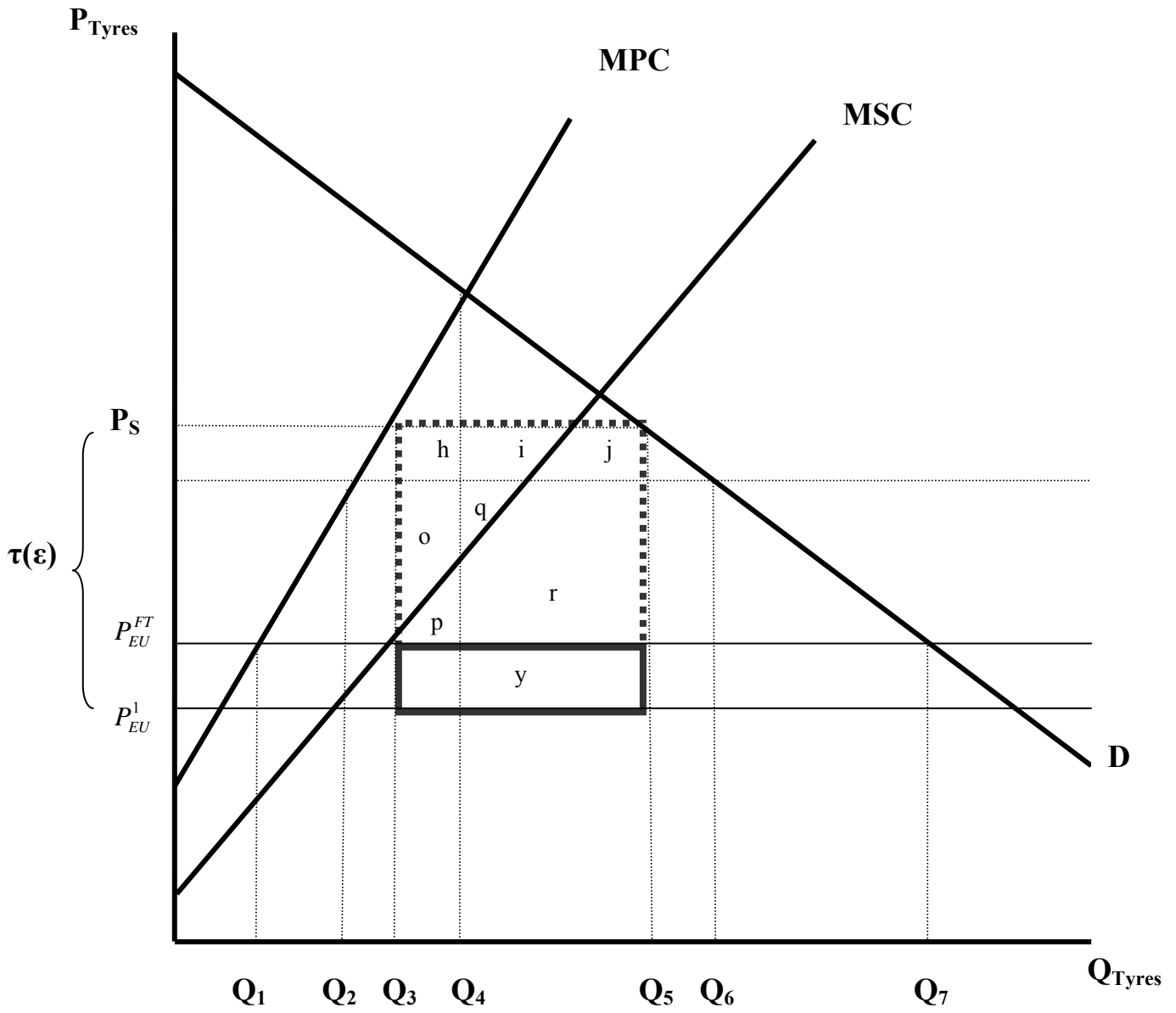


Table 1. Pre-Korea Beef: Necessity as a Least Treaty-Inconsistent Alternative Reasonably Available (LTIARA) Test

	Regulatory Goal	Contribution to Meeting Regulatory Goal	Trade Restrictiveness (Treaty Inconsistency)	Cost of Regulation (Reasonable Availability)	Method of Aggregation of Factors
Full Cost-Benefit Analysis	Evaluate value of goal	Discount value of regulatory goal by degree of achievement	Assess lost welfare	Assess cost	Evaluate and sum for each proposed alternative measure—choose best
Least WTO Inconsistent Alternative Reasonably Available	No evaluation of regulatory goal	Match or exceed national measure at issue	Compare alternatives in terms of trade restrictiveness	Assess reasonable availability	Choose alternative that is least trade restrictive, provided reasonably available
Korea-Beef Balancing (as articulated)	Evaluate value	Discount value of regulatory goal by degree of achievement	Assess trade restrictiveness	Assess reasonable availability	Weighing and balancing (not further specified)
Brazil-Tyres “Balancing” (as practiced)	Assess categorically—health is greater (but, as in Gambling, recognize national entitlement to choose level of protection)	Threshold requirement of material contribution, established theoretically	Assess categorically—quota of zero is most trade restrictive	Assess in vague terms: flaws undermine reasonable availability	Labelled “weighing and balancing”, but no articulation of how factors relate to one another