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# GATT and the economics of food safety

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**Food safety is of increasing importance in higher-income countries where consumers demand higher quality and safer food. They will do so through the market when information makes it possible. They will demand better assurances of safety through government regulations where externalities and health risks prevail. The microeconomics of this demand for increased food safety is discussed in terms of how it can lead to non-tariff barriers to trade that might ultimately be regulated by the GATT. The public goods nature of food safety is explored along a continuum of food quality characteristics for the purpose of identifying when government regulations are needed.**

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Concern about the quality and safety of the food we eat these days is widespread and growing. It is being driven by increased affluence, by new scientific discoveries, by more sophisticated measurement, by new information about linkages between diet and health, by new food technology and by mass communications. Consumers around the world, especially in high-income countries, are demanding food that does more than provide physical energy and nutritional balance. They demand foods that improve physical fitness and longevity, that are fresh, good tasting and convenient, and above all do not contribute to acute, chronic or degenerative diseases. These new demands are part of an irreversible structural change in all affluent countries; they will eventually become increasingly important in developing countries as well.

Growing demand for higher-quality and safer food leads, also, to a higher demand for effective government regulation of food quality and safety. As local and national governments respond with new food safety regulations, they may be, wittingly or not, establishing new non-tariff trade barriers (NTBs) that can impede international trade in food products.

Simultaneously, niche markets for 'super-safe' foods such as salmonella-free chicken, cholesterol-free eggs, uncontaminated raw oysters or organic produce are increasing. These markets are generally well-defined, local markets that are difficult for importers to enter because the markets tend to be small and foods sold in them have rather strict standards of identity and safety designed to accommodate specific consumer demand and supplier technology. Niche markets are technically not barriers to trade but may be perceived as such since traditional sellers of generic commodities cannot sell in them.

As international trading partners struggle to harmonize standards across international borders in order to promote freer trade, the quest for food safety often pulls in another direction. It could ultimately reinforce the trend towards bilateral trade agreements or trading blocs where agreements about food standards can be worked out more easily.

This article briefly discusses the importance of food safety issues and the implications of non-tariff trade measures for trade negotiations. The microeconomic effect of the demand for food safety on the demand for domestic and international government regulations is presented with a

discussion of how this affects international trade negotiations especially in the current round of the General Agreement on Tariffs and Trade (GATT).<sup>1</sup> Finally the public sector economics of the food safety issues is presented as a basis for considering when regulations are appropriate and when domestic regulations might lead to trade barriers.

## Food safety measures and trade

With increased economic integration of world economies, including expanding trade in value-added foodstuffs, the importance of sanitary and phytosanitary standards has been elevated and redefined to include the health of consumers and the environment. This goes way beyond a concern for pest- or disease-infected imports to concerns about how consumption pollutes the environment, health risk management, the use of food additives and the level of tolerances for contaminants in foods, beverages and feedstuffs.<sup>2</sup>

Food safety issues have become an important part of the GATT negotiations for several reasons. First, international agencies concerned with human health and consumers' rights have developed a network to exchange information about potential health hazards. Their political clout reinforces the reality of the need to protect consumers' health and rights regardless of their country's wealth and negotiating power. The Food and Agricultural Organization (FAO) of the United Nations and the International Organization of Consumer Unions (IOCU) are examples of institutions that focus on both economic and ethical issues concerning trade in food and agricultural products in developing countries.

Second, as Waldorf suggested almost 30 years ago,<sup>3</sup> the demand for value-added services in the food sector shifts out as the value of household time increases relative to the price of these services and the demand for 'insured quality' increases. Insured quality is another service that busy consumers are willing to pay for. This translates into a demand for government regulations to ensure food safety which opens the door for even more non-tariff barriers. Just a few examples over the past few years are the European Communities' ban on beef and pork treated with growth hormones, the USA's rejection of Australian beef contaminated with pesticide residues and the USA's and Canada's recent disputes over 'equivalent' meat inspection.

Third, agreement in the Uruguay round of the GATT negotiations has come to hinge in large part on a multilateral agreement over how to harmonize a variety of national food safety regulations. Harmonization means the 'use of international standards, guidelines or recommendations by all the contracting parties . . . to increase coordination and integration between international and national systems and approaches for approving the use of food additives or for establishing tolerances for contaminants in foods, beverages and feedstuffs'.<sup>4</sup> It does not mean that all foods have exactly the same identity or recipe in all trading countries. It does mean that all traders agree to follow some minimum international guideline for food safety such as that set out by the UN's Codex Alimentarius Commission.

A framework for making decisions about the defensibility of alleged NTBs and identifying credible arbitrators of future disputes will be essential to a successful closure to the current round of negotiations. The GATT has been very successful over the past 20 years in decreasing

<sup>1</sup>The present Uruguay Round was launched in 1986 and was scheduled for conclusion in December 1990. However, at the time of writing a final agreement is still proving elusive.

<sup>2</sup>Multilateral Trade Negotiations, *The Uruguay Round Agreement – Text on Agriculture, Part C: Decisions By Contracting Parties on the Application of Sanitary and Phytosanitary Measures*, MTN.TNC/W/FA, 21 December 1991, p 40.

<sup>3</sup>William H. Waldorf, *Demand for Manufactured Foods, Manufacturers' Services and Farm Products in Food Manufacturing: A Statistical Analysis*, Technical Bulletin No 1317, US Department of Agriculture, Economic Research Service, Washington, DC, 1964.

<sup>4</sup>Multilateral Trade Negotiations, *op cit*, Ref 2, p 1.42.

tariffs from an average of 40% to 8% through a series of multilateral trade agreements.<sup>5</sup> But the importance of this function has diminished as more and more countries enter into bilateral trade agreements and as tariffs have been replaced by technical trade barriers of various types. According to the GATT rules agreed upon under the Tokyo Round Agreement, the GATT must be notified of new technical barriers. Between 1980 and 1990, 168 such notifications were made that concerned public health and safety. Half of those notifications involved food safety issues associated with fertilizers and pesticides, heavy metals and other chemicals.<sup>6</sup> In addition technical trade barriers are becoming more discriminatory and less transparent in usage and economic effects. An inability to quantify and therefore compare the value of NTBs has made them a major challenge to the entire GATT system.<sup>7</sup>

Several solutions to the dilemma of the GATT's continued viability have been proposed. One is to find a way to convert NTBs to a tariff equivalent, referred to as tariffication. This is part of a larger scheme to 'reinstrumentalize' (quantify) national trade policies along some common 'aggregate measure of support'. With a common and comparable denominator for NTBs the GATT could continue to function in a relatively objective manner as it has in monitoring tariffs. The EC and the USA both support this idea, but for different reasons. The EC sees it as a way to continue many of its old practices under the Common Agricultural Policy while the USA sees it as an easier way to monitor NTBs and other trade policies in the future.<sup>8</sup>

Attempts to quantify the economic value of NTBs have been made by Laird and Yeats,<sup>9</sup> but they point out the heavy reliance on uneven data and questionable assumptions about demand and supply elasticities. Nevertheless they show that in 1973 the average nominal tariff<sup>10</sup> of NTBs on 14 food types was 6% for the USA, 5% for Sweden, 22% for Japan and 16% for France. It is often not possible to isolate the tariff value of a particular non-tariff barrier since many products are subject to several NTBs simultaneously. The aggregate equivalent tariff value of NTBs is expected to be higher now since NTBs have been growing.

Short of tariffication, there is a great need for an international regime – a decision-making framework – which will lay out the basic ground rules for defining NTBs and provide for an impartial international court or arbitration panel to which aggrieved exporters can appeal. This international regime would play the role of the state at the national level or a hegemonic nation on the international scene. It would 'modify the matrix of pay-offs to single actors in ways that make the choice of cooperation convenient and that will deter free-riding behavior'.<sup>11</sup>

Independent international courts or arbitration panels have been established to hear disputes between individual countries. A new panel, formed to oversee US-Canadian trade under the 1988 Free Trade Agreement, has already arbitrated some disputes. The GATT's Standards Code, aimed at harmonizing international standards, has worked fairly well in the industrial sector, but has not provided guidance for agricultural product standards. It has never been accepted for such guidance by trading countries. It is hard to imagine that individual countries would surrender sovereignty over their own health and safety standards to an international court like the Multilateral Trading Organization (MTO) being proposed in a restructured GATT.<sup>12</sup> However, as experience with the European Court shows, the economic interests of countries are often well served by such court decisions. In fact it has

<sup>5</sup>Julis J. Nogues, Andrzej Olechowski and I. Alan Winters, 'The extent of nontariff barriers to industrial countries' imports', *World Bank Review*, Vol 1, No 1, September 1986, pp 181-199; Sam Laird and Alexander Yeats, 'Trends in nontariff barriers of developed countries, 1966-1986', *Weltwirtschaftliches Archiv*, 1990, pp 299-324; Sam Laird and Alexander Yeats, *Quantitative Methods for Trade-Barrier Analysis*, Macmillan, London, 1990; Robert E. Litan and Peter O. Suchman, 'US trade policy at a crossroad', *Science*, Vol 247, No 4938, 5 January 1990, pp 33-38.

<sup>6</sup>GATT: *International Trade 90-91*, Vol I, Part III: *Trade and Environment*, Geneva, 1992, p 23.

<sup>7</sup>Laird and Yeats, *Quantitative Methods for Trade-Barrier Analysis*, *op cit*, Ref 5.

<sup>8</sup>Michele De Benedictis, Fabrizio De Filippis and Lucas Salvatici, *Between Scylla and Charibdis: Agricultural Economists' Navigation Around Protectionism and Free Trade*, Università Degli Studi de Roma 'La Sapienza', Dipartimento di Economia Pubblica, Rome, 1990.

<sup>9</sup>Laird and Yeats, *Quantitative Methods for Trade-Barrier Analysis*, *op cit*, Ref 5, p 31.

<sup>10</sup>The nominal tariff rate is calculated as the relative price of a specific good adjusted for the exchange rate, i.e. the Nominal Protection Coefficient is the domestic price ( $P_d$ ) divided by the world price ( $P_w$ ) times the exchange rate ( $Ex$ ) between the exporting and importing country. All is multiplied by 100 to get a percentage number.  $NPC = (P_d/P_w * Ex) * 100$  (*ibid*).

<sup>11</sup>Benedictis, Fillipis and Salvatici, *op cit*, Ref 8.

<sup>12</sup>J.H. Jackson, *Restructuring the GATT System*, Royal Institute of International Affairs and the Council on Foreign Relations, New York, 1990.

Table 1. Classification scheme for different forms of non-tariff trade measures on imports.

Type I measures (trade-distorting intent for imports)	Type II measures (secondary trade-restrictive intent)
A. Quantitatively operating	A Quantitatively operating
1 Global import quotas	1 <i>Communications media restrictions</i>
2 Bilateral import quotas	2 <i>Quantitative advertising restrictions</i>
3 Restrictive licensing	
4 Liberal licensing	
5 Voluntary export restraints	B. Operating on prices/costs
6 Embargoes	1 <i>Packaging and labelling regulations</i>
7 Government procurement	2 <i>Health and sanitary regulations</i>
8 State trading practices	3 <i>Safety and industrial standards</i>
9 Domestic-content regulations	4 <i>Border tax adjustments</i>
	5 <i>User taxes and excises</i>
B. Operating on prices/costs	6 <i>Customs clearance procedures</i>
1 Variable import levies	7 <i>Customs classification procedures</i>
2 Advance deposit requirements	8 <i>Customs valuation procedures</i>
3 Anti-dumping duties	9 <i>Exchange restrictions</i>
4 Countervailing charges	10 <i>Disclosure regulations</i>
5 Subsidies to import competitors	11 <i>Government-provided entrepreneurship R&amp;D financing and related aids for import-competing industries</i>
6 Credit restrictions on importers	
7 Tax benefits for import competitors	
8 Discriminatory internal freight costs	
9 International commodity agreements	
10 Orderly marketing arrangements	

Sources: Sam Laird and Alexander Yeats, 'Trends in nontariff barriers of developed countries, 1966-1986', *Weltwirtschaftliches Archiv*, 1990, p 303; Ingo Walter, 'Nontariff protection among industrial countries: some preliminary evidence', *Economica Internazionale*, Vol 25, 1972, pp 335-354.

been argued that the European Court, in upholding Article 30 of the EEC Treaty,<sup>13</sup> has made decisions that conform to economic efficiency. Access to markets has been preserved by mandating or allowing product information that facilitates consumer choice and allows imports from member countries.<sup>14</sup>

'A committee on Sanitary and Phytosanitary Measures shall be established to provide a regular forum for consultations.'<sup>15</sup> This committee, stipulated under the latest GATT negotiations, would monitor international harmonization and the use of international standards, guidelines and recommendations. It has yet to become functional, but it is very much a part of the current plans for the GATT. It would serve as an arbiter of international trade disputes as well as a coordinator of scientific information about food safety and health risks.

## Non-tariff barriers to trade

<sup>13</sup>Article 30 of the EEC Treaty states that 'quantitative restrictions on imports and all measures having equivalent effect shall, without prejudice to the following provisions, be prohibited between Member States'. It has been used to prohibit information requirements or 'recipe standards' that hinder trade among member states and are not 'necessary for the defence of the consumer or for the fairness of commercial transactions': Wouter Wils and Geert Wils, 'Free movement of goods and quality regulation of foodstuffs', *European Food Law Review*, No 1, November 1990, p 102. For food products, the EC 1992 harmonization plan rests heavily on this article and mutual recognition.

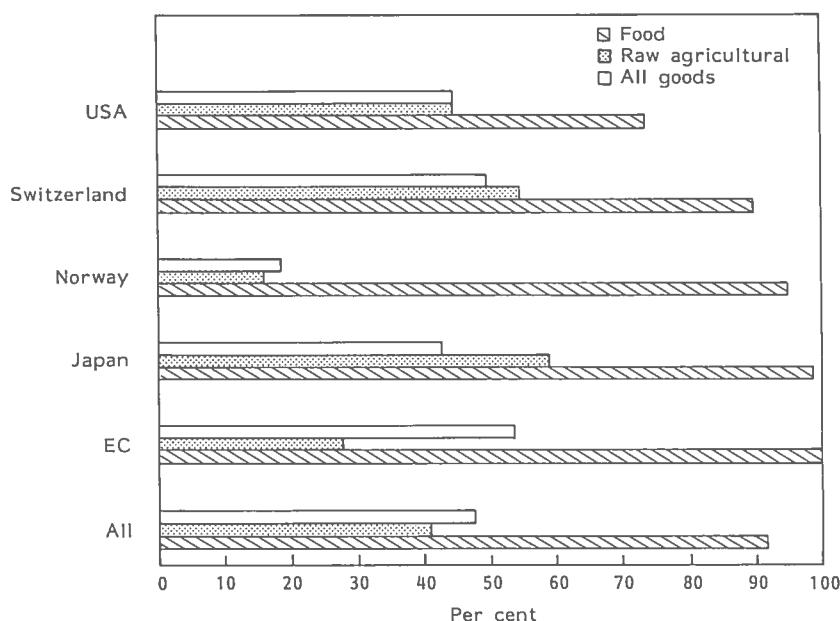
<sup>14</sup>*Ibid.*

<sup>15</sup>Multilateral Trade Negotiations, The Uruguay Round, 'Draft text of sanitary and phytosanitary measures', MTN.GNG/NG5/WGSP/7, 20 November 1990, p 10.

<sup>16</sup>James P. Houck, *Elements of Agricultural Trade Policies*, Macmillan, New York, 1986, Ch 8.

Non-tariff trade barriers include a variety of measures designed to protect domestic industries. In doing so, they distort trade. They are often administered and applied from deep within national bureaucracies, escaping widespread notice and transparency.<sup>16</sup> Non-tariff trade barriers include voluntary export restraints, embargoes, anti-dumping duties, import quotas, variable levies, countervailing duties and a host of other measures. These 'Type I' measures deliberately restrict the quantity or alter price/cost relationships of traded goods. They are listed in Table 1.

'Type II' non-tariff trade measures restrict trade inadvertently or incidentally to their primary purpose. Those most likely to be associated with food are italicized in Table 1. 'Type II' regulations differentially restrict trade only when the standards in the importing country are stricter than those of the exporter, making the imported products unacceptable to local consumers and regulatory agencies. In practice 'Type II' regulations can often be designed intentionally to discourage imports of products that compete with local producers. Although it is this case that violates the spirit and the rules of the GATT (Article XX(b)), both intentional and inadvertent 'Type II' non-tariff barriers



**Figure 1.** Proportions of trade value affected by non-tariff barriers, 1986.

Source: Sam Laird and Alexander Yeats, 'Trends in nontariff barriers of developed countries, 1966-1986', *Weltwirtschaftliches Archiv*, 1990, pp 299-324.

will probably increase as nations' food quality standards ratchet upwards.

Using data from a variety of sources, Laird and Yeats traced the percentage of transactions (frequency) and the percentage of import values (coverage) that were subject to NTBs between 1966 and 1986 in 18 OECD countries.<sup>17</sup> Over all developed countries the frequency increased from 17% to 54% of all transactions being affected, with food products recording the highest increases - from 36% to 89%. After food, raw agricultural products experienced some of the largest increases, especially in textile fibres and crude animal and vegetable materials.

In value terms, NTBs affected 56% of food imports in 1966 and 92% in 1986. Non-tariff trade barriers affected 25% of the value of all imports in 1966, doubling to 48% 20 years later. In raw agricultural products, NTBs grew from affecting 4% of the value to 41%.<sup>18</sup> Clearly NTBs are very prominent in the international food trade. Figure 1 shows the percentages of the import value of food, raw agricultural products and total goods that were affected by NTBs in 1986. As high as these figures may look, they undercount total NTBs. Non-tariff barriers which actually prohibited trade from occurring were not counted since, clearly, no transactions could have been made.

About 30% of the import trade measures in the USA in 1986 were 'Type II' NTBs. Of the products covered by 'Type II' NTBs, food accounted for 34.5% of the transactions in the USA compared to about 25% in Japan.<sup>19</sup> In both countries about 16% of all transactions subject to 'Type II' NTBs can be attributed to raw agricultural products (see Figure 2).

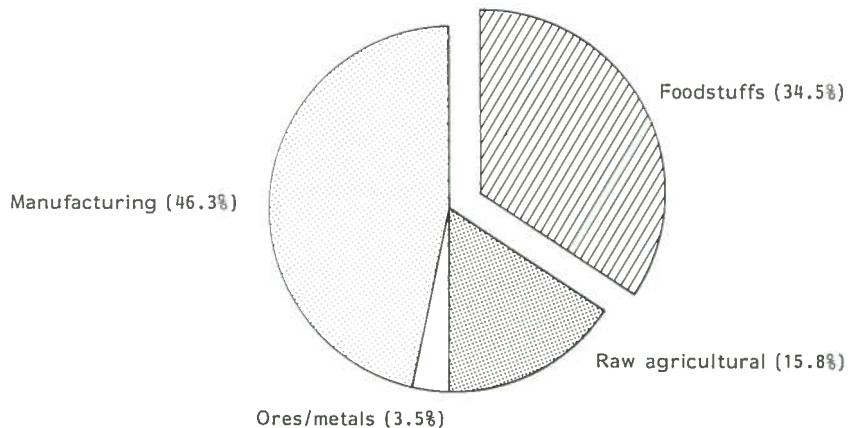
It is not possible to tell what portion of the 'Type II' NTBs are attributable to health and safety standards directly, but packaging, labelling, advertising and disclosure regulations are often closely related to health and safety concerns. It is fair to say that many of the NTBs that apply to food and agricultural products are 'Type II' in nature. Figure 3 shows that 60% of NTBs on food and 95% of those on raw agricultural products were of 'Type II' in the USA in 1986.<sup>20</sup> That is, they could be

<sup>17</sup>Laird and Yeats, 'Trends in nontariff barriers . . .', *op cit*, Ref 5.

<sup>18</sup>Many of the NTBs on raw agricultural products include routine inspections and the issuance of phytosanitary certificates. These are internationally accepted and not necessarily barriers to trade but measures to ensure widely accepted standards are enforced.

<sup>19</sup>Laird and Yeats, 'Trends in nontariff barriers . . .', *op cit*, Ref 5, pp 318-320.

<sup>20</sup>*Ibid.*



**Figure 2.** Percentages of US Type II NTBs applied to various products, 1986.

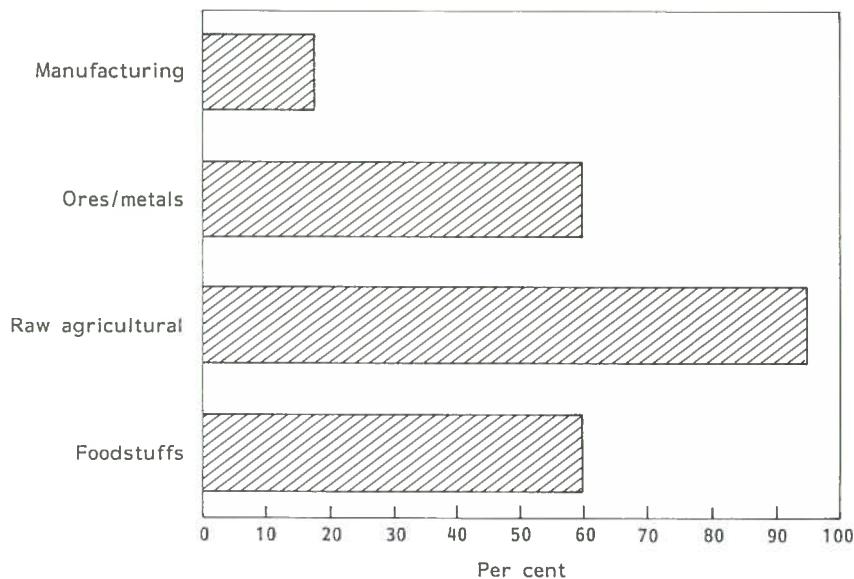
Source: As Figure 1.

interpreted as secondary barriers – measures whose primary purpose is not to protect domestic industries from foreign competition but to protect domestic consumers generally and/or provide them with truth in labelling, advertising or packaging.

A big problem in trade negotiations is to determine when 'Type II' NTBs are intentional and when they are secondary. Article XX(b) of the GATT includes a longstanding agreement that sanitary and phytosanitary measures (SPMs) imposed by a given country to protect the health and safety of its domestic consumers are acceptable and are not to be considered official trade barriers.<sup>21</sup> Proposed additions to Article XX(b) as of November 1990 include a second layer of criteria which stipulates that SPMs must be 'based on scientific principles and are not maintained against available scientific evidence'. In addition, SPMs must not 'arbitrarily or unjustifiably discriminate between contracting parties where identical or similar conditions prevail'. Sanitary and phytosanitary measures shall not 'be applied in a manner which would constitute a disguised restriction on international trade'.<sup>22</sup> A dilemma occurs when it is not possible to tell if such a regulation genuinely protects the health and safety of consumers or if it masquerades as such in order to protect the economic interests of domestic producers. If a country's health and safety standard is in excess of an international

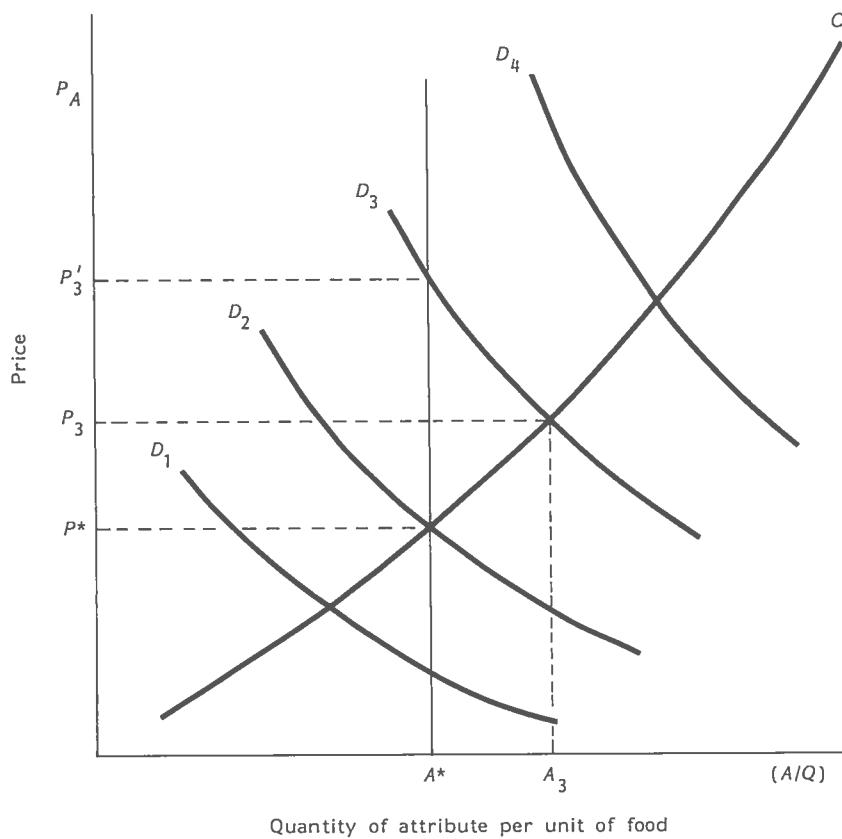
<sup>21</sup>Maury E. Bredahl and Kenneth W. Forsey, Jr, *Harmonizing Phytosanitary and Sanitary Regulations Through GATT Negotiations*, Staff Paper AER 1988-11, Department of Agricultural Economics, University of Missouri-Columbia, 1988.

<sup>22</sup>Multilateral Trade Negotiations, *op cit*, Ref 15, p 3.



**Figure 3.** Percentages of products' NTBs that are Type II, USA, 1986.

Source: As Figure 1.



**Figure 4.** Demand for quality attributes per unit of food and quality regulation.

standard, where one exists, it would need to be justified on scientific grounds under the new GATT agreements. More stringent SPMs on imports than those applied to domestic suppliers, that are not justifiable on scientific grounds, are clearly intended to restrict trade. If so, they are 'unfair' and a potential exporter should be able to appeal their use to a mutually agreed upon arbitrator. However, an arbitrator can function only if there is an internationally accepted code of trade and an enforcement mechanism.

Although determining the intent of a non-tariff trade barrier would be the main function of an international court such as the proposed Committee on Sanitary and Phytosanitary Measures in the GATT, one might ask how much the intent really matters. A health and safety standard demanded by domestic consumers, in line with their demand for high-quality food, which inadvertently bans or limits imports of lower-quality products can serve as a *de facto* barrier to trade. The standard demanded by consumers will be part of the market signal to trading partners. They must either provide that quality standard at a competitive price or relinquish that market.

### Microeconomics of food quality and safety

A relatively simple way to view the effects of changing consumer demand for safe and healthful food is found in Figure 4. Simple domestic demand and supply schedules are presented for a given set of health and safety attributes. As in the familiar Lancaster model of consumer demand, quality attributes are the arguments in the utility

function; they are treated as normal goods with downward-sloping demand curves. Once the price and quantity of a set of quality attributes are determined per unit of the basic commodity, further economic analysis can proceed.

Consider Figure 4 where  $C$  is a single marginal cost curve for the supply of attribute  $A$  per unit of a basic food product,  $Q$ . In this instance  $A$  could be increasing levels of safety such as a gradual reduction in chemical residues in a food product, or it might be the number of safety inspections conducted per unit of output as a food was processed. The price is the price (cost) per unit of the quality or safety attribute ( $A$ ) per unit of food.

The various demand functions,  $D$ , represent consumers' private willingness to pay for various amounts of  $A$  at differing incomes. If improved quality and safety are superior products with respect to income change, the demand for them will shift out as people and nations become more affluent.<sup>23</sup> The downward slope of the demand curve signifies that for any given level of income the lower the price of the attribute per unit of good, the more consumers are willing to purchase. This model does not assume endogenous prices where higher prices signal higher quality and therefore greater demand at higher prices given the income level.

If market information about quality attributes of products is evenly distributed between buyers and sellers, and if these quality attributes are not collective or public goods (ie non-rival or non-exclusive),<sup>24</sup> then the intersections of the various demand curves and cost (supply) function will signal efficient market equilibria for  $A$  per unit of  $Q$ . The market price will transmit all necessary information; externalities will not exist and government regulation is not required. However, if information about quality attributes is asymmetrically distributed with consumers having less, on balance, than producers, or the quality attribute is a collective good, then a modified view of this market process is appropriate.

First, assume that as the demand curves for increasing amounts of quality and safety (per unit of product) shift out, they will become less elastic. This follows from the microeconomics of time allocation and household technology where rising wage rates increase the proportion of the full cost of commodities that is attributed to the opportunity cost of time relative to the price of purchased goods and services. As this happens, individuals in households substitute capital for labour in household technology and substitute time in the paid labour force for household time which tends to further increase their income. Both of these substitution effects act to decrease the price elasticity of the purchased commodities. Considering food safety as a commodity that can be produced at home by individuals or purchased in the market ready to use, the demand for it will become less elastic as wages and incomes rise and the purchase price becomes a smaller portion of the full cost. People will be willing to pay others to assure the safety of their food rather than produce it themselves using time-intensive household technology.

Second, in addition to the impact of consumption and production substitutions in the household as wages increase, consumers have higher opportunity costs of time. This means that the costs of illness and death are greater and the productivity losses to society are higher for those with higher wages. More affluent individuals and societies will demand a

<sup>23</sup>Cesar Falconi and Terry Roe, 'A model of the demand and supply of the health effects of food substances', in Julie Caswell, ed, *Economics of Food Safety*, Department of Resource Economics, University of Massachusetts, 1991.

<sup>24</sup>Alan Randall, 'The problem of market failure', *Natural Resources Journal*, Vol 23, 1983, pp 131-148.

higher level of food safety and will be willing to pay for a reduction in health risks.

Third, the demand for minimum quality standards and regulations will increase as income rises since suppliers have an incentive to cheat on quality standards when market information is asymmetric.<sup>25</sup> The higher, less elastic demand curves increase the incentives for sellers in affluent markets to charge buyers for higher quality attributes than are actually presented. Suppose we are considering the situation reflected by  $D_2$  in Figure 4. A minimum quality standard of, say,  $A^*$  might be sensible. This would prevent sellers from selling quality below that called for by the open market price of  $P^*$ .

If the quality attribute being demanded is perfectly transparent to consumers (information is symmetric), there would be no need for the minimum standard to change as rising incomes push demand outwards to  $D_3$  or  $D_4$ . If, however, the quality attribute being supplied is not transparent to consumers, or it is accompanied by externalities not captured in the price, they might reasonably insist on an increase in the quality standard set by their regulators, and  $A^*$  would drift to the right, say to  $A_3$ . In the absence of a minimum quality standard at  $A_3$ , with demand  $D_3$  sellers could charge up to  $P_3'$  for  $A^*$  and capture  $(P_3' - P^*)$  in excess profit. Alternatively, sellers could charge prices in between  $P_3'$  and  $P_3$ , deliver quality somewhat higher than at  $A^*$ , and still capture excess profits. This would lead to both higher prices and higher quality in the products, but less quality would occur with full symmetry of information. If  $D_3$  was even less elastic (steeper) than shown here, the incentives for sellers to cheat by charging higher prices to higher-income consumers would only increase.

In the context of international trade, foreign suppliers who meet standard  $A_3$  at a price less than or equal to  $P_3$  will be able to compete in this market. Those who cannot will need to seek outlets with less stringent quality standards or a higher willingness to pay for quality  $A_3$  such as might be evidenced by some consumers with income along  $D_4$ . Hence the ratcheting up of demand for high-quality and safe foods will tend to segment international markets further. Those who produce for high-quality markets could be at a competitive disadvantage in selling to developing countries unless they can produce a variety of qualities simultaneously or successfully price discriminate. For example, in Figure 4 suppliers who produced quality standard  $A_3$  at a cost of  $P_3$  could not profitably sell it in a market where demand was represented by  $D_1$ . Markets will become more segregated and both low and high demand for the attribute  $A$  will be *de facto* barriers to trade. They might be considered discriminatory NTBs even when it is the nature of the consumer demand that determines the level of acceptable quality and safety.

The recent GATT negotiations stipulated that an importing country shall accept the SPMs of the exporting country as 'equivalent' if the exporting country objectively demonstrates to the importing country that its measures achieve the equivalent level of SPM protection.<sup>26</sup> This requires reasonable access for inspectors from the importing country. Methods for establishing equivalency have been contentious for a long time. In the USA most safety standards are based on inspection and certification of production or processing methods. This is seen as a more efficient method of ensuring quality products that either the generally European and Japanese method of inspecting final product characteris-

<sup>25</sup>Harald von Witzke and Ian Sheldon, 'The growing demand for food quality: implications for agricultural trade and policy', in Paul Gallagher, ed, *A Review of Perspectives and Policies on Food Security*, Staff Paper 239, Department of Economics, Ames, IA, January 1992, pp 69-80.

<sup>26</sup>Multilateral Trade Negotiations, *op cit*, Ref 15, p 5.

tics. However, countries waffle on their methodology. For example the USA has proposed that trading partners agree to honour each others' standards as 'equivalent' based on the inspection and certification of meat and poultry processing plants or methods in the USA. Yet they also argue that in spite of using hormones in the production of meat, meat of equivalent quality to that demanded in Europe is produced since hormones cannot be detected in the final product. The EC has argued that the final product equivalence is not good enough in this case and bans US meat based on production technology. Neither seems willing to resort to scientific grounds and an opinion by a third party to settle this difference.<sup>27</sup> The GATT Standards Code requires that subsidies and regulations be specified in terms of the performance of the end product rather than in terms of production and processing methods. Allowing the equivalence to be established on the basis of the attributes of the final product requires more expensive inspection but encourages innovation which is more beneficial to long-term trade.<sup>28</sup>

The approach taken by various nations to setting minimum quality standards and enforcing them can become a contentious matter in trade negotiations. The way governments intervene to correct apparent market failures caused by the public goods nature of food quality and safety (and information about them) depends upon the relative weights given to government costs, consumers' health and producers' income in a society's overall welfare function.<sup>29</sup>

### Food quality attributes as public and private goods

In recent papers by this author a continuum of food quality attributes was presented.<sup>30</sup> Some of these attributes are positive and negative externalities which define them as collective or public goods. The idea behind this continuum is the same as that proposed by Hahnel and Albert, who argue that externalities are pervasive, not exceptional, and that they are fairly normally distributed across market goods and services such that there are very few pure private or pure public goods.<sup>31</sup> To draw the analogy more clearly, one can think of the traditional public goods four-block diagram where the non-rival, non-exclusive public goods are in the upper left-hand corner and the rival, exclusive private goods are in the lower right-hand corner; semi-private/public goods are in the opposite corners. The continuum of food characteristics/externalities cuts diagonally across this set of blocks from the upper left-hand corner of pure public goods to the lower right-hand corner of pure private goods (Figure 5).

If one folds the set of blocks in half along this diagonal and imagines the diagonal as the base of the distribution of externalities, one can see that the triangle fits under the distribution and reinforces the suggestion that externalities are pervasive with a great mixture of positive and negative ones in the middle indicating that most foods will be semi-public/private goods.<sup>32</sup> The base of this distribution in Figure 6 can also overlay the original continuum of food characteristics as shown in Figure 7 since it is perfectly reasonable to assume that most of the foods will fall into the centre of the continuum with a mixture of positive and negative externalities.

The major difference between the former presentation (Figure 7) of the continuum of food characteristics/externalities and the presentation made in Hahnel and Albert is that they argue it is not the characteristics

<sup>27</sup>Carol Kramer, 'Implications of the hormone controversy for international food safety standards', *Resources*, No 105, Resources for the Future, Washington, DC, Fall 1991.

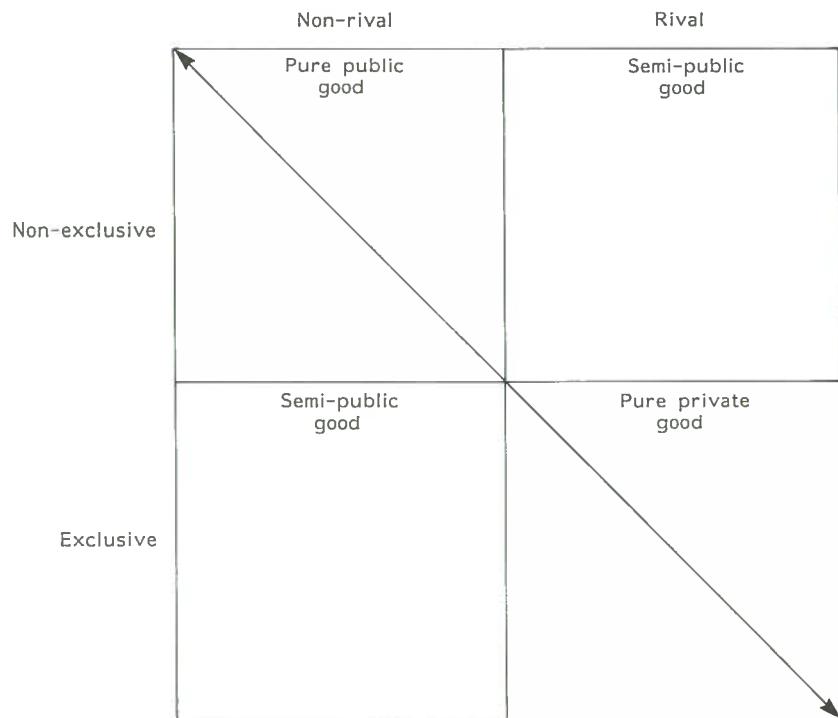
<sup>28</sup>Wils and Wils, *op cit*, Ref 13.

<sup>29</sup>Terry L. Roe and Theodore Graham-Tomasi, 'Competition among rent seeking groups in general equilibrium', Bulletin No 90-2, Economic Development Center, Department of Economics and Department of Agricultural and Applied Economics, University of Minnesota, St Paul, MN, September 1990.

<sup>30</sup>Jean Kinsey, 'Food quality and prices', in B. Spitze, ed, *Agricultural and Food Policy Issue Alternatives for the 1990s*, Department of Agricultural Economics, University of Illinois, 1990, pp 143-165; Jean D. Kinsey and James P. Houck, 'The growing demand for food quality: implications for international trade', in M. Shane and H. von Witzke, eds, *Public Goods in International Trade, Food Quality and Environment Regulation*, United States Department of Agriculture, Economic Research Service, Washington, DC, 1993.

<sup>31</sup>Robin Hahnel and Michael Albert, *Quiet Revolution in Welfare Economics*, Princeton University Press, Princeton, NJ, 1990.

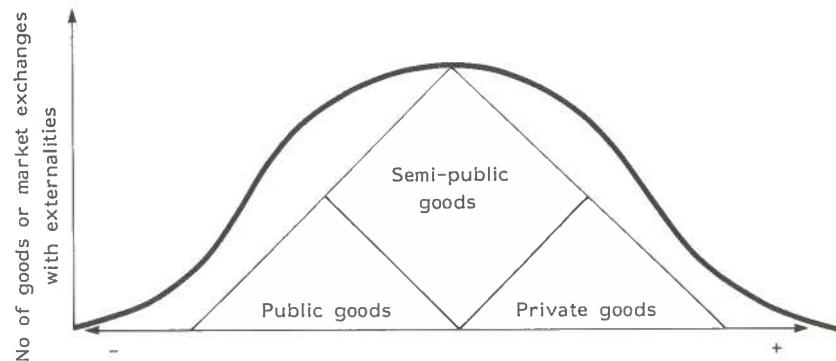
<sup>32</sup>*Ibid.*



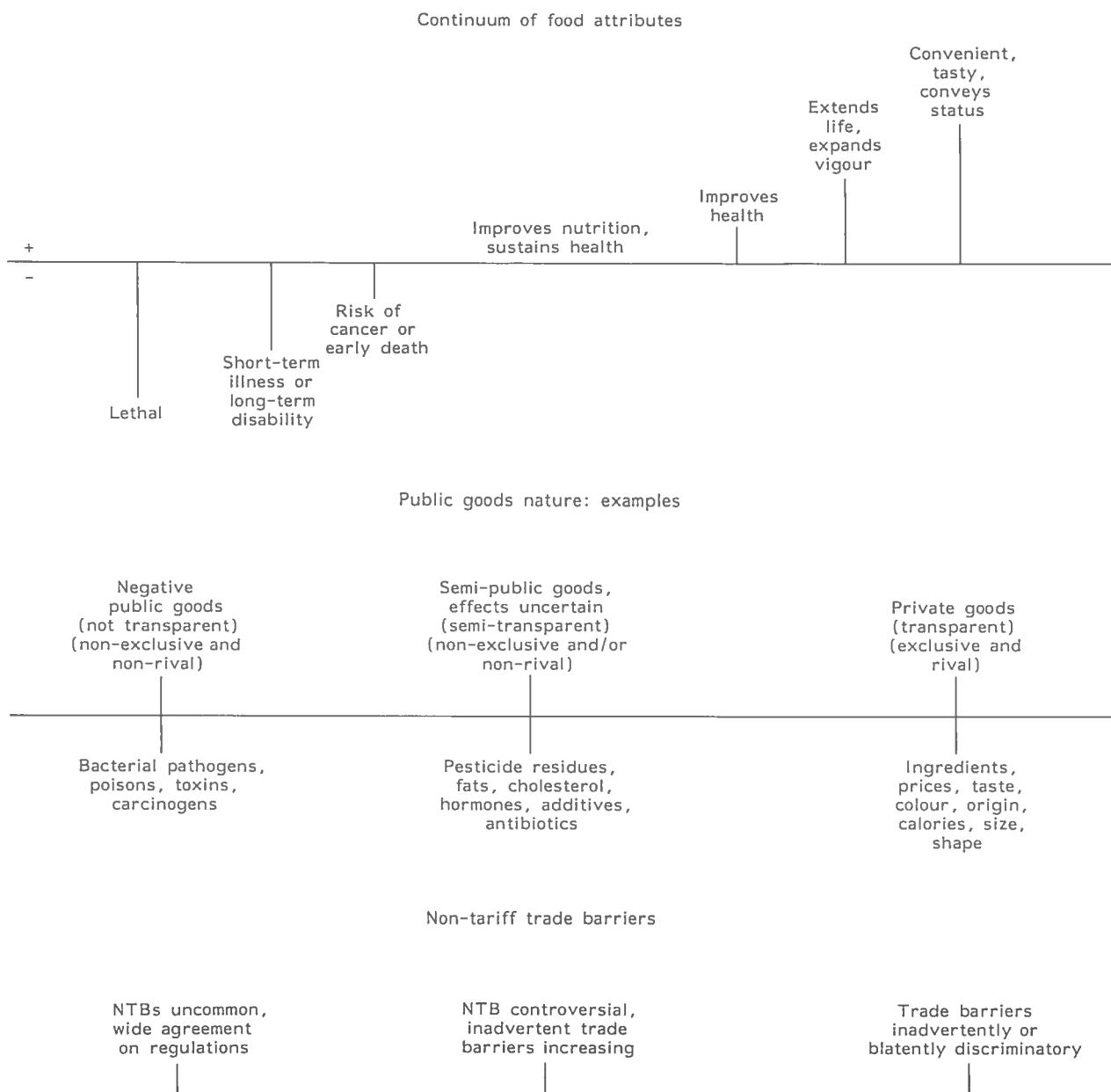
**Figure 5.** Classic public/private goods diagram.

of the goods that is relevant but the nature of the market itself. The market and its endemic set of property rights determines who gets to make what decisions, and in turn determines the extent to which the choices and actions on the part of individual buyers and sellers affect the well-being of others. If preferences are endogenous (as Hahn and Albert argue they are), then preferences will be altered by the extent to which a consumer's well-being is affected by the actions of others. For example, if the actions of sellers directly diminish the utility of consumers because negative externalities prevail or economic fraud exploits, these consumers will develop a preference for institutions or regulations that will decrease their exposure to those negative externalities and give them more say in how other agents (sellers) may behave. (That is, they will demand that  $A^*$  move out to  $A_3$  in Figure 4.) They will expect to benefit from the attenuation of the 'public bad' associated with the sale of foods that impede their health and longevity. This would be true for individuals or for trading partners.

This brings us back to the question of NTBs. The extent to which the actions or choices of buyers and sellers in country  $X$  affect the utility of



**Figure 6.** Distribution of externalities in market transactions.



**Figure 7.** Combined continuum of food attributes and public/private goods.

persons in country  $Y$  will determine the extent to which people in country  $Y$  demand to increase or restrict imports from country  $X$ . The more closely their preferences are alike with regard to the externalities along the continuum the more efficiently trade can take place between their countries. They will demand similar regulations and market behaviour will be more easily harmonized.

Non-tariff measures at the left end of the continuum will probably not be seen as discriminatory. These are obviously 'public bads'. Few countries will object to regulations that reduce the risks of death and long-term illness. These regulations enhance well-being and productivity, and are Pareto efficient.<sup>33</sup> They secure individual expectations about the protection of a person from physical attack, invasion and

<sup>33</sup>*Ibid.*

nuisance. Also, secure property rights provide a sound basis for conflict-resolving trade.<sup>34</sup>

The far right side of Figures 6 and 7 represents attributes that are close to being pure private goods. They have few externalities and those that do exist will not persist.<sup>35</sup> This is because the characteristics of the goods at this end of the continuum are typically 'transparent' to consumers; information is relatively symmetric. Food attributes here can be readily identified through sensory perception, conventional wisdom or voluntary or mandatory labelling. The costs of making these new attributes exclusive are relatively low. Private markets will readily determine the efficient level of quality and safety.

Although private goods require little government regulation in the form of inspection, some agency must still be accountable for the truth of the information on the labels and in the advertising. Labelling regulations will need to be negotiated as much as the safety standards themselves. Informational attributes need not become trade barriers except in the case where consumers in country Y have no demand for the quality of imported goods being offered or if importers misrepresent the quality through false labelling.

Any country restricting imports on the basis of these positive and transparent attributes could quite easily be seen as invoking a deliberate NTB. Some examples from the EC can be mentioned. In 1976 Germany tried to ban the import of Cassis de Dijon from France because it had less than the minimum amount of alcohol (25%) for fruit liquors sold in Germany.<sup>36</sup> In 1980 the Dutch tried to ban French *brioche* for not having the right shape, and, therefore, being likely to mislead consumers. Similarly Belgium tried to ban the import of margarine not displaying a cubic shape. All these cases were heard and settled in the European Court. Wils and Wils argue that this international court sets rules such that 'the borderline between measures that are in conformity with or contrary to European law is exactly the same as the borderline between economically desirable and undesirable measures'.<sup>37</sup>

The quality and safety attributes in the middle of the continuum are less transparent and the pervasive externalities are more likely to persist since they cannot be made transparent at reasonable costs with current technology. Likewise, preferences for quality attributes and the expected outcome from their consumption are likely to be more diverse in this intermediate range of semi-public/private goods. Products and markets with these attributes will cause the most controversy in trade negotiations, especially negotiations about acceptable levels of risk and how to regulate those risks. Debates about zero tolerances versus *de minimis* standards versus cost/benefit analysis are underway in the USA and will be magnified at the international level. Imprecision in scientific measurement and uncertainty about the outcome of exposure to newly discovered risks complicates these debates and decisions further. The outcome of exposure to allegedly hazardous substances is different in various climates and depends on the rest of the diet as well. For example, since in France sulphur dioxide is used to preserve wines, and since French people drink a lot of wine, it seems reasonable to restrict the use of sulphur dioxide in other foods as cumulative effects could be harmful. In countries where little wine is consumed, this may not be important.<sup>38</sup>

Food safety attributes in the centre of the continuum include nutritional characteristics such as saturated fat, cholesterol, carotene and

<sup>34</sup>Randall, *op cit*, Ref 24.

<sup>35</sup>*Ibid.*

<sup>36</sup>Tony Venables, 'Consumer protection and protectionism', in *International Trade and the Consumer*, OECD, Paris, 1986, pp 191–206; S.J. Fallows, *Towards 1992: Completing the EEC Internal Market for Food*, Horton, Bradford, UK, 1988.

<sup>37</sup>Wils and Wils, *op cit*, Ref 13, p 107.

<sup>38</sup>Fallows, *op cit*, Ref 36.

other nutrients claimed to have especially helpful or harmful effects on health. The extent to which changes in people's consumption of food attributes are public or private goods depends heavily on the amount of information available, on the cost of exclusion and on consumers' and governments' preferences for long-run risk aversion.

The most appropriate government regulations for these particular attributes depend on how much the social benefits of restrictions exceed the private benefits of freer and wider choice. We know from public goods theory that those goods (attributes) that carry large negative benefits (externalities) will be over-provided unless taxed or restricted in some way. It is likely that, with the wide range of opinions about the seriousness of the negative externalities in the middle of the continuum, agreement about regulations of these attributes will not be widespread. Rather, a more segregated market, similar to the one depicted in Figure 4, will probably result. The segmentation will be exacerbated by varying willingness to pay for public regulation. From public goods theory we also know that once  $A^*$  is set, all consumers must consume at least that amount of  $A/Q$ , if they consume  $A$  at all. The price paid for  $A^*$  will be some mix of the private production costs and the implicit willingness to pay for public regulation. In the extreme, if  $Q$  is publicly provided, such as in the case of drinking water, the total price would be divided among consumers according to their demand for it.

## Conclusion

Increasing incomes in developed countries will continue to expand the market demand for high-quality, safe foods. This phenomenon alone will tend to segment world trade and create inadvertent trade barriers. It will be accompanied by some increases in restrictive regulations demanded by money-rich, time-poor consumers. These market-induced developments should not be confused with deliberate, discriminatory NTBs that are created primarily to protect the interests of domestic producers and may or may not improve the quality or safety of food.

New methods to identify and reduce NTBs in international trade are crucial to the advancement of world trade and to the functioning of the GATT. At the same time, acknowledging and accommodating pervasive externalities in food markets is necessary for successful international trade and for the long-run health of consumers around the world.