

TRADE BARRIERS AND FOOD-SAFETY STANDARDS

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It has thus become increasingly difficult to delineate the boundaries between a nation's sovereign right to regulate and its obligation to the international community not to restrict trade gratuitously. (Trebilcock and Howse 1999, p. 135)

Trade negotiations on standards are not about doing away with them, as with tariffs, because standards serve a social purpose. (Hufbauer *et al.* 2002)

1. Introduction

International trade in agricultural and food products remains one of the most sensitive issues in the commercial relations of nations. For agricultural products, the principal traditional issues are: the lack of market access caused by tariffs and tariff rate quotas; the levels and nature of domestic support, much of which is still provided through trade-distorting instruments; and assistance to exports in the form of subsidies. There remains a considerable gulf between governments on each of these topics in the current trade negotiations taking place in the World Trade Organization (WTO). Trade in agricultural products is also curtailed by sanitary and phytosanitary (SPS) barriers but, since the introduction of the WTO Agreement on the Application of Sanitary and Phytosanitary Measures in 1995, with a few exceptions (e.g., the Canada-Australia salmon case), there does not appear to have been too much disharmony in the context of reducing tensions in the areas of plant health and animal health. Indeed, in the current negotiations, there have been no proposals to re-open the Agreement on those grounds (IATRC 2001, p. x).

For international trade in food products, food safety (and quality) is perhaps the major issue, although disquiet in developing countries about the continued use by developed countries of escalating tariffs, remains important. In the context of food safety, the SPS Agreement has been less successful in resolving disagreements (e.g., the EU-U.S. beef hormones case) because of the fundamental tension that exists between consumers' preferences and consumer protection on the one hand and consumers' gains from trade on the other (IATRC, 2001, p. viii). Moreover, the Agreement was motivated originally by the need to constrain the protection afforded to producers from import barriers and not by protection for consumers from imports (Perdikis *et al.* 2001). It is clear from the various

negotiating proposals which have been put forward to the WTO Committee on Agriculture as part of the agricultural negotiations, that food safety, as well as other aspects of food (e.g., geographic indications, shelf-life labelling and GM foods), is regarded as an important “non-trade” concern by a number of countries.¹

With the rapid pace of technological change in the food processing industry, with improved transportation and with increasingly international supply chains, the perception is growing that imported food may be a source of increased health risks for food consumers. The erection of import barriers by governments to regulate that risk and to secure the health of their human populations, is also governed by the SPS Agreement.

It is important to make a distinction between the objectives of trade negotiations in the traditional areas and those on SPS matters. In the former, the aim is to secure a movement towards freer international markets by reducing trade barriers in order to increase national incomes everywhere: in the latter, the aim is to define a set of standards or regulations which will be minimally trade distorting but which will yet achieve different countries’ social objectives about the extent to which their citizens are exposed to unsafe or low-quality foods. In the context of the traditional areas, the welfare gains from trade liberalisation are assumed to apply generally, as a principle, across all products and all countries; in the second, because of market failure, the welfare gains need to be evaluated on a case-by-case basis without there being any presumption of general application.

In matters to do with sanitary and phytosanitary measures, the issue is the extent to which individual governments should be constrained in defining their domestic regulations, regulations which may reduce the benefits from trade for other countries should such regulations prove to be unnecessarily strict. The onus appears to be on the importing countries to define their barriers to imports in a way which is consistent with the Agreement; there does not appear to be any requirement, other than commercial self-interest, on exporting countries to ensure that the food which they export is safe (Charnovitz 2002).² The SPS Agreement curtails not only what a government may do ‘at the border’, the traditional view of trade policy, but also what a government may do

¹ See IATRC (2001, Table 1.2) for a list of the proposals.

² The Codex Alimentarius Commission has produced a Code of Ethics for International Trade in Food, one of the principles in which is that no food should be in international trade which contains anything injurious to health (Charnovitz 2002, p. 225).

‘within the border’. Hence, the SPS Agreement is a substantial departure from the original activities of the GATT which stopped at national borders.

In the traditional areas of trade negotiations for agricultural products it is assumed that there are no market failures. In the area of food safety, there is a potentially serious market failure in the form of imperfect information amongst consumers in importing countries. The implications of imperfect and asymmetric information are outlined (Section 2).³ The SPS Agreement is underpinned by standards which are defined by one of three international organisations or through a risk assessment undertaken by a national government. For internationally recognised standards dealing food safety and human health, the relevant organisation is the Codex Alimentarius Commission (CODEX).⁴ The key elements of the Agreement are explained (Section 3).⁵ One element of the risk assessment undertaken by the Codex Alimentarius Commission or by national governments is estimation of the probabilities of certain risks. However, the way in which these probabilities are used in assessing the risks involved in consuming a particular food product and in defining the risk management strategy, may not be appropriate. An elaboration of this observation is provided (Section 4). A summary and some conclusions are presented (Section 5).

2. Some Economic Issues on the Demand Side

Consumers in developed countries increasingly are demanding year-round access to a wide variety of high quality (safe) foods. The demand for a particular food product depends upon consumers’ preferences for the observed and unobserved characteristics embodied in that food, as well as upon its price and their incomes. One of the most important unobserved characteristics is that of food safety. The lack of food safety may arise from a number of possible sources, e.g., from residues of veterinary drugs, from pesticide residues, from food additives, from pathogens, from heavy metals, organo-chemical pollutants and from prions (e.g., BSE) (Buzby 2001, p. 55). Recently, the topic of GM food has become another source of concern about food safety (see Feldmann *et al.* 2000).

³ An economic framework for modelling the more general issue of technical barriers to agricultural trade is provided in Roberts *et al.* (1999).

⁴ For matters to do with plant health the relevant organisation is the International Plant Protection Convention and for animal health it is the International Office of Epizootics.

⁵ For the wider issue of food attributes, of which food safety is a part, the Agreement on Technical Barriers to Trade (TBT Agreement) is the more relevant Agreement. These wider issues are not pursued here but see IATRC (2001).

Consumers' perceptions about food safety can be unduly, irrationally and negatively influenced by well-publicised disagreements amongst scientific experts and by accidents. They may take some time to be revived following such events. Where these accidents occur in imported food, then the detrimental effects on the exporting country may be long term. It is in the interests of governments in both importing and exporting countries to ensure that irrational changes in consumers' preferences do not undermine the gains from trade for both sets of countries. The economics of the issue of food safety for consumers in importing countries and firms in exporting countries will now be pursued in more detail.

2.1 Consumers in Importing Countries

The existence of unobserved characteristics of foods implies that consumers do not have perfect information about the products that they consume. In economic theory, it is often assumed that both the many producers and the many consumers have perfect information and that the resulting competitive market outcome is socially optimal. However, in many respects, food safety is a credence characteristic, i.e., a characteristic which, at least in the short run, the consumer cannot identify even after the product is consumed and, therefore, has no information about it.⁶ This lack of perfect information causes a market failure in the absence of government intervention. Moreover, it also has implications for the size and sign of the gains from trade which, as conventionally measured, assumes perfect information. In particular, the gains are diminished and, in principle, may even be negative, if the imported product has sufficiently undesirable credence characteristics (OECD 1999, p. 38). The doubt about safety that is created in consumers' minds reduces their average willingness to pay for the food item, the domestic demand function then shifts leftwards and, as a consequence, imports fall. Because there is no credible way for exporting firms or exporting countries to signal the quality of their product to foreign consumers because of the credence characteristic, the importing country government may have a role to play in implementing regulations on

⁶ Goods are usually put into one of three categories. "Search" goods are those for which the consumer can assess the quality prior to purchase and can obtain perfect information, perhaps through costly searching. "Experience" goods are those for which an assessment about quality can be made only after consuming the good. For a more general and theoretical discussion of the market failure to which lack of perfect information gives rise, see Tirole (1988, chapter 2.3).

imports which will remove the doubt in consumers' minds. These regulations of course must be consistent with the SPS Agreement.⁷

2.2 Firms in Exporting Countries

When importing firms or countries have imperfect information about the safety of food exports from individual exporting firms or exporting countries, there is information asymmetry and market failure. In the absence of any government intervention in either importing or exporting countries, importers may use the country of origin as a measure of the minimum amount of food safety to be expected. Hence, no exporting firm in a given country has an incentive to provide a higher quality product than the minimum level for that country, especially if, as usually assumed, high-quality costs more to produce than low quality. For those firms which decide to provide a high quality product, their efforts are undermined by the firms which produce low-quality products. Hence, the mix of quality produced will not match the consumers' preferred mix and high-quality food will be under-produced for export, thus leading to a socially sub-optimal situation. In such circumstances, it may be recommended to the government in the exporting country that it introduces regulations for minimum quality in its food exports. Such regulations have been shown to be socially optimal for the exporting country and, moreover, they will increase the volume and price of exports because they prevent the reduction in consumers' willingness to pay in the face of imperfect information. Thus, regulations provide information to importers which the market alone cannot provide and they help to solve the market failure caused by asymmetric information and credence characteristic of food safety.

Export regulations may take a variety of forms. For example, a government agency might operate a quality control process through inspecting products prior to export and providing a certificate of standard.⁸ This certificate signals to the importers that the food product is at least at some minimum level of safety, assuming of course that the agency is credible. An alternative approach is to provide quality assurance procedures. One well-known set of such procedures is Hazard Analysis Critical Control Point (HACCP). HACCP is a set of principles which are applied to help identify hazards and

⁷ An alternative to implementing regulations as a way of providing information is the use of labelling. For an assessment of labelling in international trade in a vertically differentiated product, see Roe and Sheldon (2001) and for a discussion that consumers may lose from labelling in an internationally traded good, see Creane (1998).

⁸ For a thorough discussion of export regulations and whether they ought to be implemented by a government agency or by private firms, see Wills and Harris (1994).

the points in a production process at which it is most beneficial to carry out controls which reduce risks (OECD 1999, p. 20).⁹ Another private control strategy is third-party certification such as that provided by the International Organization for Standardization (e.g., ISO 9000) (Buzby 2001, p. 64). In the case where the missing information is an experience, rather than a credence, characteristic, private quality assurance schemes may work. However, to do so credibly, the exporting firms involved must be able to signal the quality to importing firms and consumers by establishing a reputation for quality which they can guarantee. This signal or guarantee may take the form of a ‘hostage’, i.e., the exporting firm can prove to the import buyer that the gains to the former from cheating are less than the losses incurred from forfeiting its hostage. The hostage might be sunk costs in specialised plant and equipment or might be the sunk costs incurred in developing relationships with importing firms.¹⁰

3. Elements of the SPS Agreement

Any regulations which a government imposes on imported food must be consistent with the *WTO Agreement on the Application of Sanitary and Phytosanitary Measures* (WTO 1995, pp. 69-84). In the Agreement, a sanitary and phytosanitary measure is defined as any measure applied:

- (a) to protect animal or plant life or health within the territory of the Member from risks arising from entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;
- (b) to protect human or animal life or health within the territory of the Member from risks arising from additives, contaminants, toxins or disease-carrying organisms in foods, beverages or feedstuffs;
- (c) to protect human life or health within the territory of the Member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or
- (d) to prevent or limit other damage within the territory of the Member from the entry, establishment or spread of pests. (Annex A, 1a)

Under the Agreement, Members have the right to use these measures (Article 2:1) but only to the extent shown necessary by scientific evidence (Article 2:2). Members are encouraged to base their measures on international standards (Article 3:1), although they

⁹ In practice, different countries use different standards with the HACCP approach and this has caused trade problems (OECD 1999, p. 20).

¹⁰ Another way to overcome the credibility of quality signalling is for the exporting and importing firms to vertically integrate. For a discussion, see Vetter and Karantininis (2002).

may set their own, higher standards, if there is scientific justification based on an assessment of risk (Article 3:3).

Article 5 of the *Agreement* is headed “Assessment of Risk and Determination of the Appropriate Level of Sanitary and Phytosanitary Protection”. Risk assessment is defined as:

[t]he evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing member according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health arising from additives, contaminants, toxins or disease-causing organisms in food, beverages and feedstuffs. (Annex A, 4).

The appropriate level of sanitary and phytosanitary protection is defined as “[t]he level of protection deemed appropriate by the Member establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within the territory.” (Annex A, 5). This definition is sometimes abbreviated to the ‘acceptable level of risk’.

In essence, if a Member chooses to impose more constraining standards, with respect to imports, than those established by the three international organisations, then the Member is obliged to undertake a formal risk assessment, paying particular attention, *inter alia*, to scientific evidence, relevant processes and production methods, and to relevant inspection, sampling and testing methods (Article 5:2). In the case of risks associated with plants and animals, economic factors, including losses from production and costs of eradication, should be taken into account. In the case of risks associated with humans, there is no provision to take economics into account. Moreover, any measures should not be more trade restricting than necessary to achieve the appropriate level of protection (Articles 5:2–5:5). It is recognised that relevant scientific evidence may not always be available and provisional measures may be adopted but there is also an obligation on Members to obtain the necessary data in order to complete an objective risk assessment (Article 5:7).

4. The Decision-Theoretic Framework

The food-safety system has three elements: risk communication which involves consumers and their perceptions of risks; risk management which involves products, firms and governments; and risk assessment which involves science (Phillips and Wolfe 2001, p. 3). The discussion so far has touched on elements of each. The amount of

information which consumers have about the safety of imported food depends upon risk communication; the provision of that safety by exporting firms depends upon risk management in exporting countries; and the regulatory import barriers imposed by importing country governments depends upon risk assessment undertaken either by them or through their acceptance of the internationally defined standards.

Measuring risk requires the estimation of probabilities. Probabilities are usually interpreted as a measure only of the likelihood of an event, e.g., the presence in imported food of a health hazard. However, in many situations in which risk assessment is undertaken to establish the safety of food, such a restricted interpretation may well be inadequate. In such situations, probabilities may be vague or imprecise because the scientific evidence may be ambiguous or it may not even exist. The users of these probabilities may be averse to uncertainty, i.e., they are averse to making decisions based upon ambiguous or imprecise probabilities. If so, then a probability ought to be interpreted as having two dimensions, namely, the implication of the evidence and the weight of evidence, i.e., how much faith there is in the likelihood of the event. When probabilities are used in a situation in which consumers are uncertainty averse, they really ought to be incorporated into a decision model which enables them to be used in this more comprehensive way. One such approach is that provided by Choquet expected utility in which probabilities are not additive and they convey both the implication of evidence and the weight of evidence.¹¹

However, implicit in the SPS Agreement is the notion that all that matters is the measurement of risk as a probability and that this measured probability need then only be compared with some other value of the probability which measures the *a priori* “acceptable level of risk”.¹² By contrast, economists tend to use a framework for decision making under risk or uncertainty which incorporates expectation and utility, a framework which is obviously more general than that implicit in the Agreement. Moreover, in such a framework, utility would be defined from the viewpoint of the food consumer, whereas in the Agreement, consumers play absolutely no part at all in terms of their preferences;

¹¹ For a more detailed account of aversion to uncertainty in the context of the SPS Agreement, see MacLaren (2001). Economic theory has provided several alternative decision-theoretic models which are relevant to uncertainty aversion, e.g., rank-dependent expected utility, prospect theory, regret theory, theories based on lexicographic orderings, and Choquet expected utility. For a survey, see Camerer (1995).

¹² Interestingly, in the Appellate Body ruling in the Australian salmon case, it was stated that there is no requirement that a risk assessment need be expressed as a quantitative conclusion (Charnovitz 2002, p. 214). This ruling seems oddly inconsistent with a scientific approach to risk assessment.

they are only considered as people whose health may be at risk from imported food.¹³ Another criticism often levelled at the Agreement is that it is not based on the precautionary principle. However, this criticism is not valid because, as noted above (Section 3), under Article 5:7 of the Agreement governments can introduce provisional measures until more definitive scientific evidence can be made available upon which to base sounder import standards.¹⁴

5. Conclusions

Barriers to international trade in agricultural and food products exist for several reasons, one of which is to ensure food safety. Food safety is a credence characteristic and this attribute causes market failure through imperfect and asymmetric information. One way in which government intervention in importing countries can improve upon the market outcome is to impose trade regulations as a way of providing the missing information. Any such regulations need to be consistent with the SPS Agreement.

It is also in the interests of governments in exporting countries to overcome the market failure by putting in place regulations to ensure that their exports of food meet minimum levels of food safety. The issue for them is whether their regulations should be enforced through public or private agencies. Because of the credence characteristic of food safety, it is not possible for private firms credibly to commit to the provision of high-quality food exports in the absence of regulation.

In the application of the SPS Agreement to the area of consumer health and food safety, there is no scope for consumers' preferences to be taken into account. The consistency of import regulations is based on risk assessment involving only estimates of probabilities. There is no place for consumers' preferences about risk or for economic considerations. This omission is perhaps the outcome of the original negotiations based upon pragmatism and the need to get agreement but it is an inherently unsatisfactory aspect of the Agreement. A better approach would be to incorporate consumers' preferences and non-additive probabilities into a more comprehensive decision-making framework. The link between food-safety standards, trade barriers and the gains from trade would then be better defined.

¹³ For a wide-ranging discussion of the role that economics might play in the SPS Agreement, see Anderson *et al.* (2001).

¹⁴ Another way of considering this principle in a modelling context is to think of it in terms of unforeseen contingencies (see Dekel *et al.*, 1997).

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