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Chapter 4

The Growing Demand for Food Quality

Implications for International Trade

Jean D. Kinsey* and James P. Houck**

It is quality rather than quantity that matters.

Seneca (4 B.C.- A.D. 65)

Introduction

Increased concern over food quality and safety 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 placing new demands on the foods they eat. In addition to providing physical energy and preventing nutritional deficiencies, foods now should improve physical fitness and longevity. They should deliver fresh, good taste in a convenient form. They should be grown, processed, and packaged in ways that help to preserve the environment and, above all, they should not contribute to chronic and degenerative diseases.

Food is no longer automatically defined solely as a source of positive nourishment, but also as a potential source of ill health. Individual

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nutrients and characteristics of food are evaluated by consumers for both their positive and negative contributions to health. These new concerns and demands are part of an irreversible structural change in all affluent countries. They will also become increasingly important in developing countries.

Growing demand for higher quality foods leads to a higher demand for effective government regulation of food quality and safety. This situation paves the way for more nontariff trade barriers (NTB's) even as international trading partners try to harmonize standards across international borders to promote freer trade. This chapter briefly outlines trends in NTB's and discusses the potential economic effects of the demand for food quality attributes on international trade. Then, various approaches to phytosanitary regulations within and among nations are discussed. Finally, a model for arranging food quality characteristics along a continuum is presented as a basis for thinking about quality (appropriate) regulation and when it might lead to a deliberate or inadvertent NTB.

Phytosanitary Regulations and Trade

With increased economic integration of world economies, including expanding trade in foodstuffs, the question of the phytosanitary characteristics of traded products becomes important in several dimensions. International agencies concerned with human health and consumer rights develop and exchange information about potential and real hazards accompanying traded products. The Food and Agriculture Organization (FAO) of the United Nations (UN) 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 other agricultural products in developing countries. The political reality of the need to protect consumers' health, and producers' income, forms the core of many debates in international trade negotiations. Meanwhile, around the world, the demand for safe and wholesome food ratchets upward as does the demand for and supply of a larger variety of food in more convenient forms.

As the value of consumers' time increases, their demand for health and safety regulations also increases. In the food sector, the demand for value-added services shifts out as the value of household time increases relative to the price of these services and the demand for "insured quality"

increases with income and the labor force participation of both men and women (Waldorf, 1964). Busy consumers do not have time to educate themselves about each newly discovered risk, ingredient, and attribute. They want to know their food is safe, whether imported or not. This demand transcends the private marketplace to a demand for government regulations. It opens the door to an infinite variety of phytosanitary trade issues. Just a few examples over the past few years are the European Community's (EC) ban on beef treated with growth hormones and its prohibition of pork variety meats from the United States, the U.S. rejection of Australian beef contaminated with pesticide residues, recent U.S. and Canadian disputes over "equivalent" meat inspection, the alleged contamination of Chilean grapes imported to the United States, and the United Kingdom's requirement that all fluid milk be packaged on premises authorized by a local inspector.

The General Agreement on Tariffs and Trade (GATT Article XX(b)) includes a longstanding agreement that phytosanitary regulations, 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 (Bredahl and Forsythe, 1988). A dilemma occurs when we cannot tell if such a regulation genuinely protects the health and safety of consumers or if it masquerades as such to protect the economic interests of domestic producers. The latter, of course, is an illegitimate nontariff trade barrier.

There is also an institutional dilemma. The GATT has traditionally concentrated on decreasing tariffs through multilateral trade agreements. Over the last 20 years, the importance of this function has diminished as more and more countries formulate bilateral trade agreements and as tariffs have decreased from an average of 40 percent to 8 percent (Nogues and others, 1980; Litan and Suchman, 1990; Laird and Yeats, 1990). In the latter respect, the GATT has been extremely successful. In the place of tariffs, however, has come a dramatic increase in nontariff trade barriers. Only some of these NTB's are related directly to phytosanitary concerns. With bilateral agreements and with GATT's apparent inability to deal with current nontariff trade barriers in the agricultural sector, there is a great need for an impartial international dispute settlement mechanism for exporters who believe they are unfairly blocked from trade by another country's health and safety standards.

Independent courts or arbitration panels have been established to hear disputes between individual countries. The European Court has settled

several disputes among member countries in the EC. A new panel, formed to oversee U.S./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. The code has never been accepted for such guidance by trading countries. How individual countries might surrender sovereignty in the health and safety of their citizens to an international court is hard to imagine. However, they often find that their economic interests are reasonably well served by an arbitration judgment.

A large part of the problem is that negotiating positions are based on extensions of national rules and policies that are extremely diverse (Bredahl and Forsythe, 1988). Simply arranging the issues and the information in ways that render them negotiable would be a major step toward harmonizing phytosanitary standards (Winham, 1986, p. 85). In this vein, alternative ways to identify, discuss, and analyze nontariff trade barriers growing out of increased demand for high-quality food are the main topics in the balance of this chapter.

Nontariff Barriers to Trade

The decline in average tariffs levied by developed countries can be attributed largely to concessions made during numerous multilateral trade negotiations within the GATT (Nogues and others, 1986; Laird and Yeats, 1990). As tariffs have declined, nontariff trade barriers have proliferated. Nontariff trade barriers include a variety of measures deliberately 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 (Houck, 1986, chap. 8). Nontariff trade barriers include voluntary export restraints, embargoes, antidumping 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 (table 1).

"Type II" nontariff trade measures restrict trade inadvertently or incidentally to their primary purpose. They differentially restrict trade only when the standards in the importing country are stricter than those

Table 1--Classification scheme for different forms of nontariff trade measures on imports with food products recording the highest increases

| Type I measures (trade-distorting intent for imports) | Type II measures (secondary trade- restrictive intent) |
|--|--|
| <p>A. Quantitatively operating:</p> <ol style="list-style-type: none"> 1. Global import quotas 2. Bilateral import quotas 3. Restrictive licensing 4. Liberal licensing 5. Voluntary export restraints 6. Embargoes 7. Government procurement 8. State-trading practices 9. Domestic-content regulations <p>B. Operating on prices/costs:</p> <ol style="list-style-type: none"> 1. Variable import levies 2. Advance deposit requirements 3. Antidumping duties 4. Countervailing charges 5. Subsidies to import competitors 6. Credit restrictions on importers 7. Tax benefits for import competitors 8. Discriminatory internal freight costs 9. International commodity agreements 10. Orderly marketing arrangements* | <p>A. Quantitatively operating:</p> <ol style="list-style-type: none"> 1. Communications media restrictions 2. Quantitative advertising restrictions <p>B. Operating on prices/costs:</p> <ol style="list-style-type: none"> 1. Packaging and labeling regulations* 2. Health and sanitary regulations* 3. Safety and industrial standards 4. Border tax adjustments 5. User taxes and excises 6. Customs clearance procedures 7. Customs classification procedures 8. Customs valuation procedures 9. Exchange restrictions 10. Disclosure regulations 11. Government-provided entrepreneurship research and development financing and related aids for import-competing industries. |

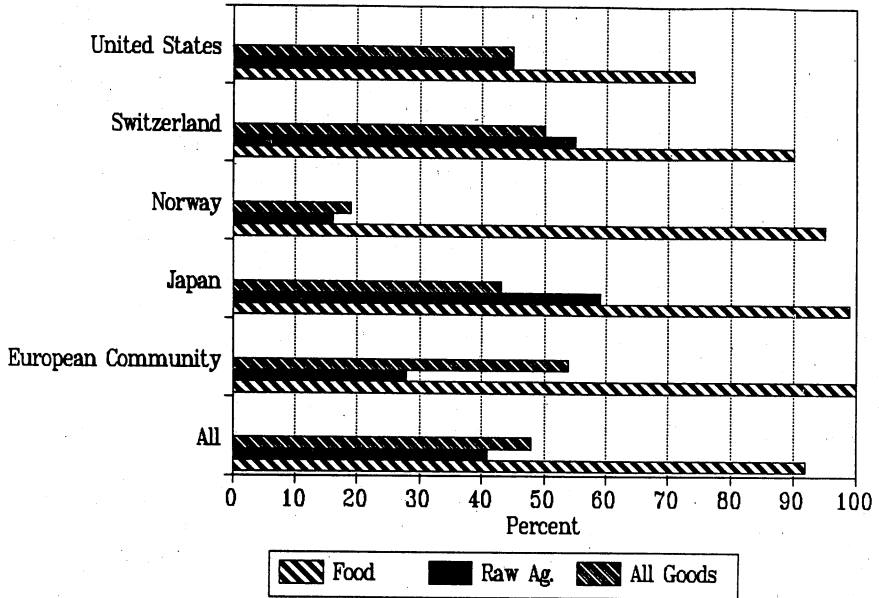
* Most likely to be associated with food.

Sources: Laird and Yeats (1990) and Walter (1972).

of the exporter, making the imported products unacceptable to local consumers and regulatory agencies. In practice, "type II" regulations often can be designed intentionally to discourage imports of products that compete with local producers. Although this case violates the spirit and the rules of the GATT, both intentional and inadvertent "type II" nontariff trade barriers will probably increase as nations' food quality standards ratchet upward.

Figure 1

**Percent of Trade Value Affected By
Nontariff Trade Barriers - 1986**



Source: Laird and Yeats, 1990.

Using data from a variety of sources, Laird and Yeats (1990) traced the percentage of transactions (frequency) and the percentage of import values (coverage) that were subject to NTB's between 1966 and 1986 in 18 OECD countries. Over all developed countries, the frequency increased from 17 percent to 54 percent of all transactions being affected with food products recording the highest increases, from 36 percent to 89 percent. After food, raw agricultural products experienced some of the largest increases, especially in textile fibers and crude animal and vegetable materials.

In value terms, NTB's affected 56 percent of food imports in 1966 and 92 percent in 1986. Nontariff trade barriers affected 25 percent of the value of all imports in 1966, almost doubling to 48 percent 20 years later. In raw agricultural products, NTB's grew from affecting 4 percent of the value to 41 percent. NTB's are very prominent in the international food trade. Figure 1 shows the percentage of the traded value of food, raw

agricultural products, and total goods affected by NTB's in 1986. As high as these figures may look, they undercount total NTB's. Nontariff barriers which actually prohibited trade from occurring were not counted because no transactions could have been made.

About 17 percent of U.S. import transactions were subject to countable NTB's in 1986. Of these, about 30 percent were "type II" NTB's. Of the products covered by "type II" NTB's, food accounted for 34.5 percent of the transactions in the United States compared with about 25 percent in Japan (Laird and Yeats, 1990, p. 318). In both countries, about 16 percent of all transactions subject to "type II" NTB's can be attributed to raw agricultural products (fig. 2).

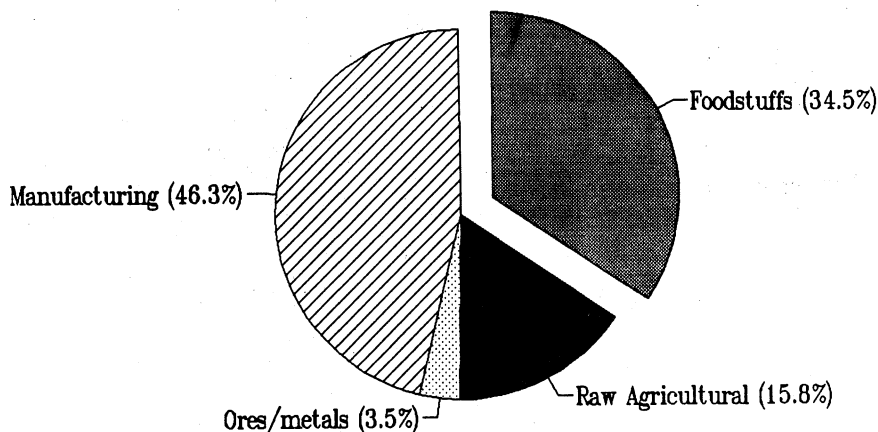
We cannot tell what portion of the "type II" NTB's are directly attributable to health and safety standards, but packaging, labeling, advertising, and disclosure regulations are often closely related to health and safety concerns. Many of the NTB's that apply to food and agricultural products are "type II" in nature. Sixty percent of NTB's on food and 95 percent of those on raw agricultural products were of "type II" in the United States in 1986 (fig. 3). That is, they could be interpreted as secondary barriers, measures whose primary purpose is not to protect domestic industries from foreign competition but to protect domestic consumers generally or provide them with truth in labeling, advertising, or packaging.

A big problem in trade negotiations is to determine when "type II" NTB's are intentional and when they are secondary. If a health and safety standard exceeds that demanded by domestic consumers or is more stringent than that applied to domestic suppliers, it is clearly intended to restrict trade. If so, such a standard is "unfair," and a potential exporter should be able to appeal its 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 trade barrier would be the main function of an international court, one might ask if and when 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, serves as a de facto barrier to trade. This standard will be part of the market demand signal to trading partners. They must either provide that quality at a competitive price or relinquish that market.

Figure 2

Percent of U.S. Type II NTB's
Applied to Various Products, 1986



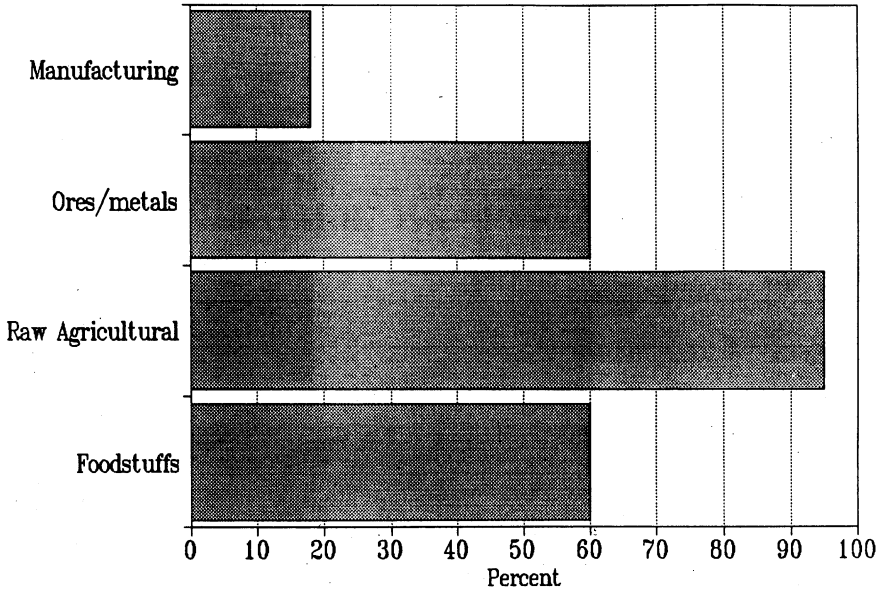
Source: Laird and Yeats, 1990.

What follows in this section is a relatively simple way to view the trade effects of a "type II" NTB within the familiar partial equilibrium demand and supply context. For simplicity, assume that D and S in figure 4 are the domestic demand and supply schedules for a food product (Q) with a given set of health and safety attributes (A). The international price for this product, with the given attributes and initial quality standards is P_1 . In this case, imports will be equivalent to line ab.

Now imagine that new, higher quality standards are mandated by domestic authorities for the health and safety attributes of the final product. In terms of figure 4, per unit costs increase and the supply function shifts to

Figure 3

**Percent of Product's NTBs
Affected By Type II NTBs, US, 1986**



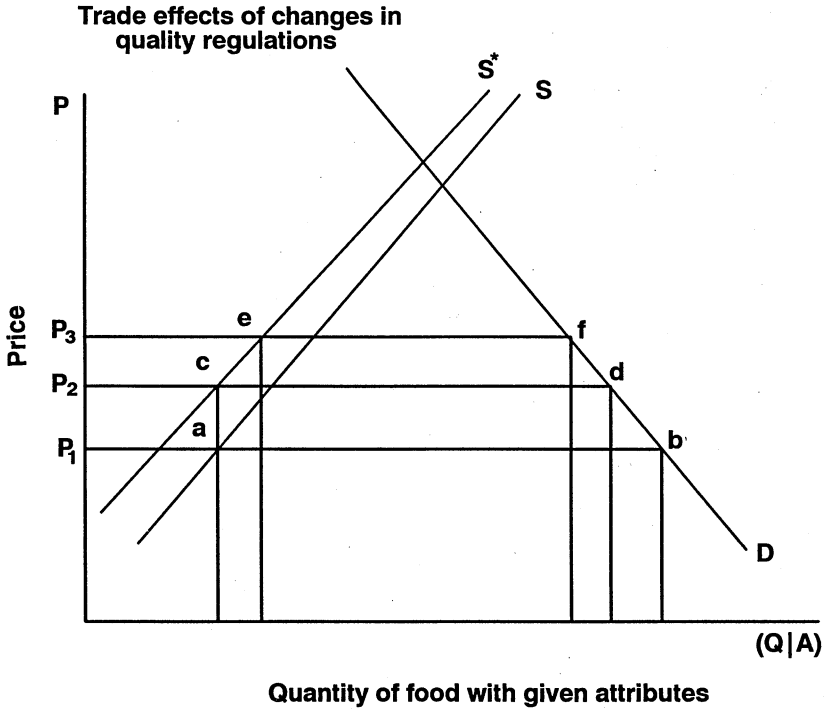
Source: Laird and Yeats, 1990.

S' inside the country. If foreign sellers also can accommodate the new regulations with the same cost increases, then the international price of the product with the new quality standards will move up to P_2 . This price increase will shrink the total quantity demanded of the basic product somewhat (from b to d), but will allow domestic sellers to produce as much as before, the fall in quantity demanded being absorbed from imports which now are equal to cd.

If foreign sellers cannot match the domestic industry's costs in providing the new quality standards, then the international import price will increase beyond P_2 , to perhaps P_3 . Foreign sellers will be crowded out because total demand quantities fall and because domestic supplies

**The Growing Demand for Food Quality:
Implications for International Trade**

Figure 4



expand (from a to e) behind the differential cost structure of the new requirements. In figure 4, imports fall from ab to ef.

As long as the new requirements are equally mandated on domestic and foreign goods and are defensible using widely agreed upon criteria concerning health and safety, these regulations are not NTB's in the discriminatory sense. However, if the standards are written or applied so that foreign goods must meet stricter or costlier regulations or must sustain higher trading costs not associated with actually creating the higher quality required, then a discriminatory NTB may be said to be in place.

Thinking of quality attributes as commodities themselves rather than as product characteristics mandated by regulation is often useful. These quality attributes can be argued to have their own supply and demand functions which are subject to market forces, to government regulation, or to both. Once the price and quantity of a set of quality attributes are

determined per unit of the basic commodity, then further economic analysis can proceed.

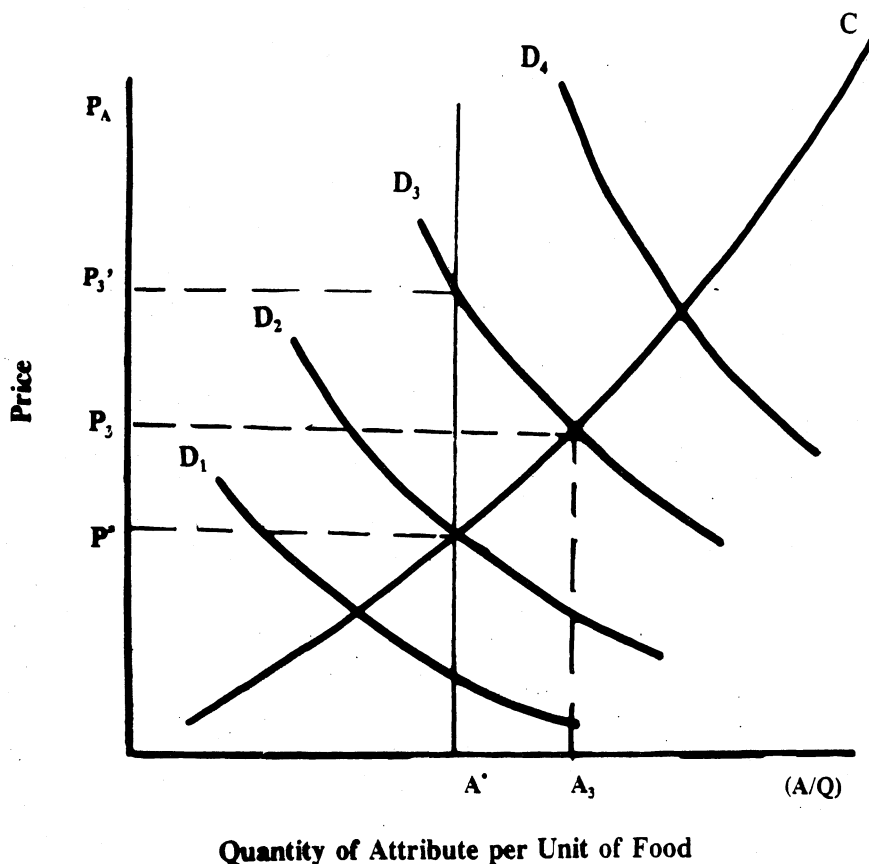
Consider figure 5 where C is a single marginal cost curve (supply function) for providing quality attribute A per unit of a basic food product, Q. In this instance, A could be various levels of safety such as a gradual reduction in chemical residues in a food product. Or A might be the number of quality inspections conducted per unit of output as a food product was processed. This function, C, is consistent with the rising marginal and average cost curves hypothesized by von Witzke and Sheldon (1990) in a recent paper focusing on suppliers' incentives to cheat on quality standards when market information is asymmetric.

The various demand functions, D, represent consumers' private willingness to pay for various amounts of A at differing incomes. Because improved quality and safety are superior products with respect to income change, the demand for them will shift up and out as people and nations become more affluent (Falconi and Roe, 1991). 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 (that is, nonrival or nonexclusive (Randall, 1983)), then the intersections of the various demand curves and cost (supply) functions will signal market equilibriums for A per unit of Q as incomes and quality increase; little government regulation is 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 sensible.

First, one might plausibly expect that as the demand curves for superior quality and safety per unit of product shift out, they will become less elastic. Then, following the reasoning advanced by von Witzke and Sheldon (1990) concerning markets in which information about quality is asymmetric, the higher, less elastic demand curves should increase the incentive for sellers in affluent markets to charge buyers for higher quality attributes than are actually present. This suggests the need for minimum quality standards in such markets. Suppose we are considering the situation reflected by D_2 in figure 5. A minimum quality standard of, say, A^* might be sensible. This standard would prevent sellers from cheating on quality below the open market value of P^* .

Figure 5

**Demand for Quality Attributes per Unit of Food
and Quality Regulation**



If the quality attribute being demanded is perfectly transparent to consumers (information is symmetrical), there would be no need for the minimum standard to change as incomes and demand increase. If, however, the quality attribute is not transparent to consumers, or it is

nonexclusive or nonrival, 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. Sellers could also charge prices in between P_3' and P_3 , deliver quality somewhat higher than at A^* , and still capture excess profits. This action would lead to both higher prices and higher quality in the products, but less quality than would occur with full symmetry of information. If D_3 were even less elastic than shown here, the opportunities for sellers to cheat by charging higher prices to higher income consumers would only increase.

In the context of international trade, foreign suppliers who can meet standard A_3 at the internally driven price will be able to sell in this market. Those who cannot will seek outlets with less stringent quality standards. Hence, the ratcheting up of demand for high-quality foods will surely segment international markets further, making multilateral trade negotiations even more difficult than they are now.

Tobey (1990) suggests that markets for environmentally dirty products will open up to countries or producers who operate and trade in territories with low-quality standards. Thus, some producers in high-quality markets will be at a competitive disadvantage in selling to developing countries. The same is likely to happen with respect to trade in foodstuffs. In figure 5, for instance, suppliers who met quality standard A_3 , could not profitably sell 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, but will not necessarily be considered discriminatory NTB's.

As long as income and preferences (influenced by education and information) drive the demand for food quality, and as long as an affordable domestic supply or suitable substitutes continue to be available, the outcome will be the same whether these trade barriers are intentional or inadvertent. The costs of supplying the higher and segmented qualities must be evaluated in terms of foregone resources and their relationship to the benefits realized by the world's consumers in healthier, longer, and more productive lives. Estimating these benefits is a complex and lengthy analytic process, beyond the scope of this chapter. But they cannot be ignored in the total scheme of trade negotiations. Some benefits of safety and quality are important even when the market demand is not sufficiently high to command them.

The approach taken by various nations to setting minimum quality standards and enforcing them can become a contentious matter in 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. As various studies of the political economy of trade negotiations have shown, harmonized standards (or ways to enforce standards) do not necessarily lead to freer trade. Moreover, the gains from trade partly depend on how special interest groups are represented in a society's utility function (Roe and Graham-Tomasi, 1990).

Health and Safety Protection Policies

Governments respond to consumer/citizen demands for protection from harmful products in three fundamental ways: (1) laissez-faire, or free market competition, (2) legally binding grades and standards, enforced by government inspectors or by consumers through civil or criminal suit, and (3) "soft law," which sets legal standards but depends on the cooperation of economic agents for enforcement. An international example of the third is the Codex Alimentarius established by the United Nations. It provides a set of minimum safety standards for traded goods which serve as voluntary guidelines.

Legally binding standards are enforced via regulatory law where producers are held liable for unsafe products by government agencies or by property rules whereby consumers seek redress through the courts. Protection through government agencies usually is designed to prevent accidents from happening by preventing harmful products from reaching the market. The attitude of Japanese consumer protection agencies, for example, is to prevent accidents before they occur by eliminating risks from consumer products (Vogel, 1990). That particular consumer protection philosophy dictates very strict product standards, and it substitutes for elaborate redress systems often followed by Western civil courts and consumer complaint bureaus. Prevention and redress represent fundamentally different approaches to consumer protection, illustrating why harmonization of methods of providing safety will not happen readily.

There are four basic methods to develop and implement international food standards (Gerard, 1987; Deville, 1978; Patterson, 1990): (1) nations agree on a particular standard of identity for a specific product which is then enforced at the national level, (2) an institutional structure is established to develop standards that can be submitted to participating nations for their approval and/or compliance, (3) existing international governmental agencies such as FAO or OECD develop technological standards as with the Codex Alimentarius, and submit them for individual country approval, and (4) nations recognize each other's consumer protection methods as providing equivalent standards.

The first has proven largely unworkable. The second might evolve through a history of case law developed by international courts. This method is being used in bilateral negotiations with limited success. The third is in place and has been used in EC harmonization, but it has been widely criticized for its inferior quality standards. The fourth method has been pursued with some vigor in recent trade negotiations. For example, in the United States, most safety standards are based on inspection and certification of production or processing methods. This method is seen as a more efficient way of ensuring quality products than either the European or Japanese method of inspecting final product characteristics.

The United States has proposed that trading partners agree to honor each others' phytosanitary standards as long as they provide an "equivalent" level of safety. U.S. trade negotiators have argued, for example, that the inspection and certification of meat and poultry processing plants in the United States should be accepted as providing a level of safety which is "equivalent" to specific tolerances of microbial contamination set in other countries. Agreeing to accept each other's safety standards and/or opening up each other's processing plants to foreign inspectors for certification would go a long way toward harmonizing the various methods of ensuring food safety.

Two of the three major goals for the GATT Committee on Trade and Agriculture during the Uruguay negotiations were to (1) harmonize health and safety regulations and (2) base processes and production methods on equivalent standards (Bredahl and Forsythe, 1988). However, the question of ensuring equivalence remains contentious as the meat quality disputes between the United States and both Canada and the EC illustrate.

Since harmonizing around specific levels of quality attributes and around the methods of ensuring safety seems difficult, perhaps nations could talk about appropriate regulations and enforcement mechanisms (both domestic and international) based on the degree to which food quality attributes, or their diminution, would increase the public welfare.

Food Quality Attributes and Quality Regulation

Food quality attributes can be placed along a continuum that encompasses attributes related to nutrition, safety, health, longevity, and even aesthetics. This continuum goes from the most negative, potentially lethal attributes to the most positive and desirable ones. It provides a way to identify other parallel continuums of various regulatory concerns with collective public and private goods and NTB's (fig. 6). Moving from left to right, from negative quality attributes to increasingly positive ones, the public goods nature of these attributes changes and tends to diminish. That is, the attributes move from being nonexclusive and nonrival collective goods (bads) to exclusive and rival private goods. Eliminating or decreasing the negative characteristics at the left end can be considered a public good. Few countries could object to regulations that reduce the risks of death and long-term illness. Such regulation secures individual expectations about the protection of his/her person from physical attack, invasion, and nuisance (Randall, 1983). The benefits to public regulation of such negative attributes are especially high because many of these attributes cannot be made transparent or exclusive at a reasonable cost. In addition, regulations that preserve or improve the health and longevity of the population, if consistently administered, can hardly be seen as an unfair NTB. Secure property rights provide only a sounder basis for conflict-resolving trade (Randall, 1983).

At the far right side of figure 6, the quality attributes can be classified as (almost) pure private goods. They are typically "transparent" to consumers. They can be known and identified through sensory perception, conventional wisdom, or voluntary or mandatory information labeling. The costs of making these attributes exclusive are relatively low. Therefore, as Randall (1983) argues, any "externality" that may be present will not persist. The private market will determine the efficient quantity exchanged.

These exclusive and rival attributes require little government regulation in the form of inspection, but some agency must still be accountable for the truth of the information on the labels and in the advertising. These attributes need not become trade barriers except that discriminatory affluent consumers will demand this superior quality. If they cannot discern the quality readily, they will also demand government certification of the quality. (A* in figure 5 drifts to the right.) With adequate or symmetrical information, however, the laissez-faire approach should work well to control the domestic and international markets for these attributes.

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 percent) for fruit liquors sold in Germany (Venables, 1986; Fallows, 1988). In 1980, the Dutch tried to ban French brioche for not having the right shape and, therefore, likely to mislead consumers. Belgium, similarly, tried to ban the import of margarine not displaying a cubic shape. All these cases were heard and settled in the European Court. A minimum of labeling would clearly make these attributes transparent and consumers' demand could determine the efficient amount purchased in the private market.

The quality attributes in the middle of the continuum are not always transparent and are often nonexclusive and nonrival. These conditions cannot be corrected at reasonable costs with current technology. Products with these attributes will cause the most activity in NTB negotiations, especially negotiations about acceptable levels of risk and how to regulate those risks. Debates about zero tolerance versus de minimus standards versus cost/benefit analysis are underway in the United States and will be magnified at the international level. Imprecision in scientific measurement and uncertainty about the outcome from exposure to newly discovered risks further complicate these debates and decisions. The outcome from exposure to allegedly hazardous substances is different in various climates and depends on the rest of the diet as well. For example, because sulfur dioxide is used to preserve wines in France, and French people drink a lot of wine, it seems reasonable to restrict the use of sulfur dioxide in other foods because cumulative effects could be harmful. In countries where little wine is consumed, this action may not be important (Fallows, 1988).

Figure 6

Continuum of food attributes

| | | | |
|--|---|--|--|
| | | | Convenient, tasty, conveys status |
| | | | Extends life, expands vigor |
| | | Improves health | |
| + | | Improves nutrition Sustains health | |
| - | | Risk of cancer or early death | |
| | | Short-term illness | |
| Lethal | | Illness or long-term disability | |
| Public goods nature - Examples | | | |
| Negative: Public goods (not transparent) (nonexclusive and nonrival) | Semipublic goods: Effects uncertain (semi-transparent) (nonexclusive and/or nonrival) | Private goods: (transparent) (exclusive and rival) | |
| Bacterial pathogens poisons, toxins, carcinogens | Pesticide residues fats, cholesterol hormones, additives, antibiotics | Ingredients, prices, taste, color, origin, calories, size, shape | |
| Nontariff trade barriers | | | |
| NTB's uncommon Wide agreement on regulations | NTB controversial Inadvertent trade barriers increasing | Trade barriers inadvertent or blatantly discriminatory | |

Food quality attributes in the center of the continuum include nutritional characteristics such as saturated fat, cholesterol, carotene, and 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 and the cost of exclusion, and on consumers' and governments' preferences for longrun 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 overprovided unless taxed or restricted in some way. With the wide range of opinions about the seriousness of the negative externalities in the middle of the continuum, harmonization of these attributes will probably not be widespread. Rather, a more segregated market, similar to the one depicted in figure 5, will likely result. Accusations among nations concerning deliberate NTB's will be most abundant over these attributes. The 1989 EC ban on hormone-treated meat is a good example. The recent coalition of U.S. soybean producers and U.S. consumers against tropical oils could be seen as a private market-induced NTB. Restrictions of imported foods based on detectable pesticide residues could also move into the private goods range with adequate information and effective demand for pesticide-free produce.

Along the continuum, attributes generally become more transparent, more positive, and more likely to be a private (exclusive) good. As the costs of exclusion and information decrease, chances increase that the private benefits of free choice will exceed the social benefits of restriction. The need for restrictive regulation diminishes, but it is replaced with the need for truth in labeling and some public oversight to ensure its credibility. The more transparent the attributes, the more efficiently the private markets for them will operate. Likewise, the more transparent and credible government quality regulations are for domestic sellers, the more obvious it will be when quality-related trade barriers are intentionally discriminatory.

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 NTB's that are created primarily to protect the interests of domestic producers and may or may not improve the quality of generally available food.

Such discriminatory NTB's, based on quality or product attributes, may raise the monetary returns to domestic producers by restraining imports. But if they do not also increase the quality of the generally available food supply (especially in terms of the attributes at the left end of the figure 6 continuum), then too many negative attributes will probably continue to be provided and marginal social costs will exceed marginal social benefits despite government regulation.

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