FOREIGN DIRECT INVESTMENT AND PROCESSED FOOD TRADE

Edited By

Shida Rastegari Henneberry

Papers Presented at the
Conference of NCR-182 "Organization and
Performance of World Food Systems"
Arlington, Virginia
March 9-10, 1995

Sponsored by NCR-182 Committee and Farm Foundation

Published in Cooperation With the Department of Agricultural Economics, Oklahoma State University

March, 1997

TEN

IMPACTS OF FOOD QUALITY AND SAFETY REGULATION UNDER TRADE AGREEMENTS ON FOREIGN DIRECT INVESTMENT AND PROCESSED FOOD TRADE[1]

Neal H. Hooker and Julie A. Caswell

Introduction

Foreign Direct Investment (FDI) has been increasing at a faster rate than direct exports of processed foods over the past decades (see, *e.g.*, Ning and Reed). Here we explore the extent to which national-level food quality and safety regulations may be an influential factor in explaining past trends and, in particular, future developments. While largely unquantified as to its impact, national-level regulation of this type is frequently cited as a potential potent source of nontariff barriers to trade in food products (Kinsey, Ndayisenga and Kinsey, Swinbank). These barriers may be intentionally protectionary, aimed at favoring domestic production, or incidental byproducts of a country's attempt to serve consumers by assuring food quality and safety.

In either case, national-level regulation may influence the choice between strategies to attain sales in a foreign market. For example, FDI may allow food processors to avoid rules intended to disadvantage imported products or to more precisely and rapidly adapt to domestic quality and safety regulations due to greater flexibility, better designed plants, superior understanding of the rules, or better appreciation of local elasticities of demand for goods with differing attributes. Further, FDI could yield direct food quality and safety benefits through shorter shipping distances and less need for preservatives, packaging, or refrigeration.

Recent trade agreements and developments will significantly alter or at least influence national-level regulation of food quality and safety, in turn influencing patterns of FDI and trade in processed food products. The North American Free Trade Agreement (NAFTA) and

[1] This research is funded by a USDA Cooperative State Research, Education, and Extension Service (CSREES) Special Grant to the Food Marketing Policy Center, University of Connecticut and University of Massachusetts.

the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) that established the World Trade Organization (WTO) as of January 1, 1995, for the first time attempt to specifically address food quality and safety standards as potential barriers to trade (see Appendix 1 for a Glossary of Acronyms). Developments in the European Union pursuant to efforts to establish a single market, especially the reliance on limited harmonization and more extensive mutual recognition to smooth differences between national food standards, are a guidepost to the dynamics of trade bloc management of divergent national-level regulation.

The central question, to which we do not yet have an answer, is how important has national-level quality and safety regulation been in determining firms' choice of strategy for selling in foreign markets and how important is it likely to be in the future? Our paper presents a descriptive and conceptual approach to answering these questions.

Quality and Safety Attributes of Food Products

As a background, regulators and those who interact with them tend to use a specific language that is different from that used by economists when discussing food product quality and safety. Economic models view a product as a collection of characteristics or attributes of importance to the buyer. Product quality is the broad term referring to a product's specific combination of levels of important attributes, viewed in the context of product price. Economic models have focused on the conditions under which there is a market for quality emphasizing the role of market structure; asymmetric information on quality between the seller and buyer; the prevalence of repeat purchases and the consequent importance to the seller of maintaining a reputation for quality; and the efficacy of information provision, via methods such as guarantees and labeling (Akerlof, Lancaster, Tirole, Stiglitz).

Most generally then, to economists (and to us) quality is the overall term with safety, nutritional content, size, taste, appearance, etc. being components of quality. In regulatory circles, however, "quality" is used to refer to the non-safety related attributes of food products and "safety" is distinguished and separate from quality.[2] To facilitate our

[2] See, *e.g.*, the recent USDA, Food Safety and Inspection Service (FSIS), Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems; Proposed Rule.

discussion we highlight this distinction, noting also that such a dichotomy does not address factors such as nutritional content; packaging requirements; or compositional standards that may not affect the true quality of a product but may nevertheless result in perceived differences and in trade barriers. Finally, in regard to terminology, the class of regulations that deal with safety issues are generally referred to as sanitary and phytosanitary (SPS) regulations.[3]

Old and New Trade Theory as a Framework

Trade theory provides a foundation for analysis of the impact of food quality and safety regulation on FDI and trade in processed food products. In its basic form, economic theory suggests that gains from trade arise when, due to differing national marginal rates of technical substitution, the opportunity of an expansion away from the domestic production possibilities frontier allows for increased consumption for one or more group(s) of product(s) or people (see, *e.g.*, Houck). In this way the interdependent state compared to the autarkic (no trade) one will have higher welfare (and therefore a compensation criteria would advocate such a switch).

Houck, for example, discusses two avenues for gains from trade, via either the direct effects of exchange or the more indirect route of specialization. The former advances that trade allows buyers access to goods (and services) otherwise unavailable, or at a much reduced cost, and thus increases overall welfare. Specialization on the other hand encourages increased investment in the countries' least-cost industries, at the expense of higher-cost industries. It is in the adjustment process, which is sometimes slow and painful, that welfare losses to some sectors occur for as technology changes, so too does the nature of the comparative advantage, and thus trade patterns. In these situations, import substitution and/or protectionist policies may

[3] SPS regulations are measures intended to 1) protect animal or plant life or health within a territory from risks arising from the entry, establishment or spread of pests, diseases, disease carrying or causing organisms, 2) protect human or animal life or health within a territory from risks arising from additives, contaminants, toxins, or disease causing organisms in foods, beverages, or feedstuffs, 3) protect human life or health within a territory from risks arising from diseases carried by animals, plants, or products thereof, or from entry, establishment or spread of pests, or 4) prevent or limit other damage within a territory from the entry, establishment, or spread of pests.

be advanced in attempts to smooth-over the disadvantages of freer trade. With trade agreements strictly limiting the avenues governments can use to manage trade, such efforts may be clothed in a mantle of protecting consumers from unsafe products.

The older trade theory, as outlined above, has been strongly criticized for its neoclassical basis. Alternatively, the new trade theory developed by Bhagwati, Helpman and Krugman (1985, 1989), Spencer and Brander, and others discusses the effects of imperfect competition, economies of scale, and other factors such as factor market distortions and taxes on trade patterns. This work was motivated by the desire to explain the growing phenomena of intra-industry trade (IIT), defined as the two-way exchange of goods in which neither country seems to have a comparative cost advantage (Helpman and Krugman 1989). Another motivation among researchers has been understanding the nature of the negative, or substitutive, relationship between IIT and FDI.

These models advance two quite different possible explanations of intra-industry trade:

1. Interaction of product differentiation and economies of scale. These models have product differentiation arising from the desire of every individual to consume a variety of goods, yet returns to scale are such that this implies the need to import varieties from abroad to satisfy these demands.
2. Literal two-way trade in identical products with price discrimination being the driving force, *i.e.*, market segmentation, or reciprocal dumping, thus domestic firms restrict their supply at home, driving up the domestic price, and aggressively exporting (Tirole).

The new trade theory provides a useful framework for analysis of quality and safety regulation in that it focuses on the many factors that can affect the welfare impacts of trade policy. Trade theory's recent focus on rent-seeking and rent-shifting associated with national regulation, analysis of the benefits to individual sectors of an economy from trade agreements, and on the divergence of outcomes between countries with different per capita income levels (Krugman, Helpman and Krugman 1989) also contribute to this framework. However, analysis of national-level quality and safety regulation has played relatively little role in the analysis to date, leaving much unknown about its likely effects and their magnitude.

An Overview of How Recent Trade Agreements May Affect FDI and Processed Food Trade

As progress has been made worldwide on tariff reduction, barriers to freer trade arising from nontariff sources have become more prominent. Parties to recent trade agreements have sought, at most, to lower nontariff sources of barriers or, at least, to assure that progress toward freer trade based on tariff reduction is not negated by increases in nontariff barriers. These nontariff sources of barriers are variously referred to as nontariff barriers to trade (NTBT), nontariff measures (NTM), and technical barriers to trade (TBT) (Hillman). Regulation of product quality and safety can be a major source of nontariff barriers to trade. The lowering of barriers to trade posed by such regulation requires that trading partners develop methods of regulatory rapprochement. As discussed in detail below, this rapprochement may involve harmonization of, mutual recognition of, or cooperation on quality regulation.

For processed food products, regulatory rapprochement, or lack thereof, on quality and safety regulation is very likely to have significant impacts on patterns of international trade in the next decade. These impacts are particularly important to understand for the United States now because the NAFTA agreement, in force between Canada, the United States, and Mexico since 1994, and the Uruguay Round GATT/WTO agreement, taking effect in 1995, for the first time specifically address food quality and safety standards (and, in particular, sanitary and phytosanitary (SPS) regulations) as a potential barrier to trade. While the agreements lay out principles for regulatory rapprochement, the details are vague. How this aspect of international markets for food will develop will be the result of government and private actions in the coming years. Many paths of development are possible as "firms adopt business strategies designed to exploit real or perceived benefits, or to counter threats" (Swinbank). Further, other sections of the GATT/WTO agreement, such as those dealing with intellectual property rights as they affect firms' incentives to brand products and domestic price support programs, will be influencing trade in food products. Clearly these policies will interact with the treatment of SPS regulations in determining firms' strategies.

The control or reduction of nontariff barriers to trade arising from national regulation requires a process of regulatory rapprochement between trading partners. Strategies for rapprochement are usefully grouped into three categories (Jacobs):

- *Harmonization:* standardization of regulations in identical form.
- *Mutual Recognition:* acceptance of regulatory diversity as meeting common goals (sometimes called reciprocity [US-Canada Free Trade Agreement] or equivalency [some GATT agreements]).
- *Coordination:* gradual narrowing of relevant differences between regulatory systems, often based on voluntary international codes of practice (sometimes called alignment).

Harmonization represents the closest and most difficult form of rapprochement, with the other categories representing progressively looser forms of coordinated activity. Most trading partners are pursuing a combination of these strategies across different regulatory areas and issues.

Previous trade agreements have addressed rapprochement in the area of quality and safety regulation to varying degrees. Grueff and Bylenga discuss the progression of treatment of sanitary and phytosanitary (SPS) regulation of food products within GATT from the adoption by only about half of the GATT member countries of the Standards Code (Tokyo Round 1973-79) through to the creation of a Working Group on Sanitary and Phytosanitary Regulations and Barriers (Uruguay Round). The Uruguay Round finalized principles for SPS regulation.

The Uruguay Round GATT/WTO and NAFTA agreements use the same language in their sections relating to SPS regulation of food products. While difficult to characterize in some respects, the language amounts to an agreement to coordinate policy, with a longer term view toward mutual recognition and, ultimately, a basis for harmonization. Generally the language allows for "formulation and administration of regulations and standards" by member countries (van Duren, Meilke, and von Massow). This includes the right to prohibit imports from another member country provided such restrictions are based on appropriate science and risk assessment processes and are applied evenly to both domestic and imported products. Negotiation and agreement among member countries as to what constitutes appropriate science and risk assessment corresponds to a coordination form of regulatory rapprochement. The goal is an equivalency of the

effect of regulations—not the regulations themselves. This allows greater flexibility to countries based on arguing differing needs and risk preferences and also potentially leaves a door open to using safety regulation as a nontariff barrier to trade. The WTO provides a dispute resolution procedure that is likely to provide a forum for airing of differences over regulatory approaches.

A major long term goal of the WTO and NAFTA agreements is to prevent discrimination and creation of nontariff barriers to trade based on unjustified safety regulation. To this end, the agreements also advocate, where possible, the adoption and use by member countries of international standards issued under the Codex Alimentarius Commission, a combined United Nations WHO-FAO organization established in 1962. This food code was designed to ease the growing strain of the interdependence countries faced due to increasing food trade. It was intended to serve as a global food treaty, protecting and promoting SPS standards and nutritional quality, for all raw and processed foods. Codex currently has 150 members covering 97 percent of world population. The ultimate reliance on Codex standards under the new trade agreements suggests a longer term goal of harmonization between member countries.

The prognosis for harmonization of food quality and safety regulation is, however, very cloudy. Experience in the European Union (EU) over the past 15 years suggests that harmonization, even among countries relatively closely matched in income levels and regulatory preferences, is extremely difficult (Majone, Pelkmans, and Sun). The EU has evolved to choosing mutual recognition rather than harmonization as the main means of facilitating trade. Mutual recognition mandates that a product deemed of adequate quality in one EU country is legal for sale in another regardless of whether it meets that country's own standards (Swinbank). This level of rapprochement is unlikely to be achieved under the WTO and NAFTA agreements in the near future because it presupposes a high level of underlying agreement on standards between member countries.

That food quality and safety regulation will be a key element in international trade in food products is not speculation. In a breakdown of the number of complaints of unfair trade practices made under GATT from the 1950s through the 1980s; Hudec found that of the 207 cases listed, 89 (43 percent) concerned the broad area of agriculture,

with the percentage increasing from about 23 percent in the 1950s to 47 percent in the 1980s. Several notorious examples of quality or safety related issues highlight the patterns of concern in these disputes, most frequently occurring between the US and Europe. Examples include the European ban on US cattle treated with synthetic hormones and the US ban of European wine containing residues of the fungicide procymidone (General Accounting Office). An additional example is the so-called "Chicken War" of 1978-82 where more strict SPS regulations were placed on poultry imports to the UK in an attempt to persuade the French government to lower its subsidies to domestic producers (Hillman). The recent reappraisal of the Chilean grape ban of 1988, in light of evidence of mishandling of test results, is further suggestive of the impact of safety regulation and enforcement on trade.

It is very likely there will be more trade disputes related to quality and safety in the coming years for several reasons. First, the introduction of an agreement on SPS regulation in the Uruguay Round clarifies the WTO position and will facilitate countries' ability to accuse members of impropriety in safety regulation. Second, it is believed that many potential disputes have been postponed or delayed until the WTO becomes fully adopted and that the next few years may be characterized by a large number of such of disputes. In other words, there is a pent-up demand for disputes and dispute resolution. One possible candidate for such a dispute is the US Delaney Clause which sets a zero cancer risk standard for food additives and some pesticide residues in food products. This may be viewed as actionable under GATT/WTO, which strongly discourages the use of zero tolerance measures if an internationally determined limit is available. Third, innovations in food production, processing, and transportation technologies, and member states' attempts to respond to these innovations while simultaneously improving on current levels of food safety protection, will result in ever more complex regulatory structures. These will be a major challenge to efforts toward regulatory rapprochement and reduction in nontariff barriers to trade.

Do Models of FDI and Trade in Processed Food Products Incorporate Quality and Safety?

A brief survey of previous empirical studies of FDI and IIT in the food sector highlight common trends in firm strategic choice. Early work on

the factors affecting IIT in processed agricultural products adapted previous econometric studies of manufacturing industries to try to explain the specifics of food trade. This allowed Sheldon to summarize most of these factors and was the starting point for a series of studies.

For example, Hirschberg, Sheldon, and Dayton investigated the bilateral trading patterns of 30 countries over a 22-year period (1964-1985), using a weighted tobit model to capture the effects on a standard Grubel and Lloyd index of IIT. They found that various market size variables (gross domestic product (GDP) per capita and the comparative size of GDP between trading partners) proved to be significant determinants of IIT, as were a shared border and membership in either the European Community (EC) or European Free Trade Area (EFTA). Similarly, Hartman, Henderson, and Sheldon studied variation in IIT over 36 US processed food and beverage industries. This more microbased study centered on slightly different measures, yet still stressed the positive effect on IIT of US total trade and economies of scope. Interestingly, the authors' constructed tariff dispersion variable (crudely measuring the differential tariff on imports and exports) proved significant and negative. The first of these two papers looked at the country level, while the second was at an industry or firm level. In combination, they allow construction of a list of candidate variables for cross-country, cross-industry study of IIT. (see table 1)

Table 1. Determinants of IIT

1.	Taste similarity
2.	Product differentiation
3.	Scale economies
4.	Number of firms in (domestic) differentiated goods markets
5.	Oligopolistic interdependence in homogeneous goods markets
6.	Technological factors, vertical differentiation
7.	Proximity of markets
8.	Extent of tariff and non-tariff barriers to trade
9.	Extent of FDI
10.	Market size and growth
11.	Trading bloc membership

Studies of FDI in processed foods have been somewhat sparse. However, some econometric evidence has highlighted factors important to FDI. In one of the earliest works, Handy and MacDonald

used a combination of aggregate and firm level data on FDI flows from the US They found that product differentiation (proxied by advertising and research and development variables), cultural ties, and firm size were significant determinants of FDI. Connor then expanded on this evidence to suggest the importance of tariffs and NTBT, as well as domestic and foreign market structure. He further stressed the effects of host country regulatory practices, emphasizing patent protection and trademark laws as likely factors in determining FDI levels. Ning and Reed stress the importance of factors such as host market size, growth rate, and membership in a trading bloc. Their data highlighted the (initial) move to Europe of US FDI but, stopping in 1989, did not capture any trend to Mexico and Canada in conjunction with the lead-up to and signing of NAFTA. For this, some initial evidence is available from Handy's work, which investigated the changing nature of both IIT and FDI between the US and Mexico up to 1992. Once again the essential aspect of product differentiation is highlighted, as recent increases in both IIT and FDI between the US and Mexico have centered in the branded goods industries. This links the effects of NAFTA with those observed within the EU, where a bias towards intra-EU trade is observed (McCorriston and Sheldon 1989, 1990).

Finally, research done by Sheldon and coauthors provides a few examples of early work applying various quality models to trade in food products. Sheldon and von Witzke develop a model of quality choice with expost verification reenforced by repeat purchases, which typifies most food purchases. The model is further placed in the context of trade between EU member states with different income levels and quality standards. They analyze the importance of income in determining the standards of EU member states, generating three scenarios of intra-EU trade: 1) trade between two countries with approximately equal incomes, each with two levels of quality standard; 2) trade between countries with single standards, but differing average incomes; and 3) differing incomes between countries, with trade increasing the market size, and thereby increasing the standard. The work also highlights the key role in the market of consumers' ability to verify standards set by another country. The ability to verify quality and, more generally, the effectiveness of quality regulation and enforcement, are important elements in quality models and are keys to

understanding the impact of regulation under trade agreements on international markets for food (Swinbank).

Sheldon and Henderson develop a game-theoretic model of the choice of firms to license their branded products rather than produce for export markets. They demonstrate how market structure may affect the study of quality and safety issues. Their work can be adapted to analyze how quality and safety regulation and market structure affect the viability of different firm strategies for entering and prospering in foreign markets. For example, the use of licensing may circumvent any regulatory differences between trading countries, increase flexibility, and reduce management problems associated with meeting multiple quality and safety standards.

The research reviewed above allows us to list the factors most likely to influence FDI (table 2). This borrows heavily from Sheldon's work but once again considers the essential role of market size and growth and formalizes the effect of trading bloc membership on tariff and nontariff barriers to trade. In this format, we can consider items 1 to 4 as "supply" or firm and industry specific factors, and 5 to 9 as "demand" or more country specific factors. This distinction between country-specific ("pull") and firm or industry-specific ("push") factors has been made by Ning and Reed. Case studies of quality and safety issues incorporate aspects of both, with elements of the trade impediments and market size theories. The former has a protectionist country creating NTBT that discourage IIT and may encourage firms to switch to FDI (Sheldon and von Witzke), whereas the latter advocates the primary role of market size in determining FDI (Ning and Reed).

Table 2. Determinants of FDI

1.	Product differentiation
2.	Firm size/export sales and export propensity (extent of IIT)
3.	Scale economies
4.	Number of firms in differentiated goods markets, both at home and abroad
5.	Exchange and interest rates
6.	Market size and growth rate
7.	Cultural ties (taste similarity, extent of previous FDI)
8.	Proximity of markets
9.	Extent of tariff and non-tariff barriers to trade (trading bloc membership)

Data issues abound in the handling of NTBT, as highlighted by Ndayisenga and Kinsey. For example, Ning and Reed in studying FDI by 6 countries lump together all possible nontariff barriers with other bloc membership effects by assigning a dummy variable of 1 if a country is in the EU and 0 otherwise. While the variable proved significant in the majority of their regression specifications, the aggregate nature of the variable does not shed direct light on the importance of national-level regulation that may create NTBT.

While NTBT appear on both lists, generally little work has been done characterizing the impact of national-level quality and safety regulation on IIT and FDI. Where partially addressed, via a grouping under a variable of trading bloc membership or tariff and nontariff barriers to trade, the effects are mostly found to be significant. However, the results are dependent on the measures utilized and such variables offer very crude, if at all effective, measures of the impact of quality and safety regulation. Further, as this type of regulation has not been a central concern of any empirical study to date, researchers have tended to use "data that minimize the influences of the other theories" (Ning and Reed). Clearly the models are available for application and the fairly exhaustive lists of important factors are a good staring point for econometric studies. However, the inclusion of consideration of the impact of national-level quality and safety regulation in the models remains to be done.

The Dynamics of National-level Regulation of Food Quality and Safety

Serious efforts are being made worldwide by organizations such as the Codex Alimentarius Commission and private standards groups to harmonize, or at least move toward more harmonious, national-level regulation of food quality and safety. The most significant progress on this front in the nearer term is being made within trading blocs, most notably within the EU. A complex interaction between national-level, trade bloc-level, and international regulatory efforts will influence patterns of FDI and trade in processed foods in the future. For example, a particular quality attribute of a food product may be covered by mutual recognition of standards between EU members but by national-level regulation in the destination country for firms in non-EU countries. While the goal of WTO and other efforts is to reduce

this kind of complexity, the environment either may or may not get less complicated in practice.

This is the case because national-level regulation will in most cases remain predominant because national governments view the control of the quality and safety of the food supply as a defining responsibility. National regulatory programs are extensive and based on the recognition that food products are multidimensional, including taste, color, texture, safety, and nutritional content (Caswell, Choi and Jensen). Regulatory programs also tend to recognize that for consumers food safety is a special characteristic or attribute because 1) it in large part is a "credence attribute" that the consumer is not able to judge effectively even after purchase and consumption, posing a serious information and verification problem, and 2) food safety has direct acute and chronic impacts on human health. Other important features of safety issues to regulators include possible externalities imposed on society when food risks are not taken into account in private consumption decisions, the public good nature of food quality information, and the reputational costs to manufacturers of food scares.

National-level performance expectations, and regulations as well, will increase in the future. Demand for safer products increases as income increases; more developed countries seek to increase standards as more evidence, innovations, and consumer acceptance demands (Kinsey, Henson and Traill, Swinbank). Quality and safety regulation has momentum, in both more and less developed countries, making keeping up very difficult for both firms and cooperating countries. National-level regulations are also interacting with increasingly sophisticated private certification programs such as ISO 9000. ISO 9000 has been adopted in more than eighty nations and the EU (Surak). It registers particular quality control systems as meeting a certain standard and is considered by many to be the most rigorous standard available for food products. Such private certification systems are likely to play an expanded role in food trade in the future.

Evaluation of the importance of national-level quality and safety regulation as a factor in firms' choice of strategy for gaining sales in foreign countries, and more generally as nontariff barriers to trade, is difficult. Simple knowledge of the range of regulations in different markets, their scope, and their importance is lacking (Ndayisenga and Kinsey). The great variety of regulations in force;

important differences between risk sources related to particular food groups; and the complex interaction of regulation with market forces make overall quantification of quality and safety regulation very challenging. An important reason for this difficulty is that reliable, central sources of data are not available as became clear in recent work by Ndayisenga and Kinsey. The authors attempted to determine the total number of nontariff measures (NTM) put in place between 1980 and 1991 by high income countries, as well as their frequency and variety across countries and commodities. Problems of identification (more than 100 NTM were listed), and the fact that the most reliable data source (UNCTAD) was based on "government sources, notifications to GATT of trade measures by member states, and other publications" greatly limited the usefulness of the data. For our purposes the data is particularly limited because health and safety regulations were very rarely included in the reporting.

For firms working under national-level quality and safety regulation, a very significant problem is that the regulation is dynamic, changing, and in many cases ratcheting up. Efforts at harmonization among countries are not keeping up with the pace of national legislation. An excellent recent example is the HACCP-based pathogen reduction program for meat and poultry products included in a proposed rule issued by the Food Safety and Inspection Service of USDA in February 1995. Adoption of a HACCP based system would be a real step toward aligning US policy with that of other countries and the proposed rule discusses this advantage of the approach. But the proposed system is complex relying on sanitary standards and good manufacturing practices (GMP) to insure effective minimal quality standards; transitional required standard operating procedures to reduce pathogen levels; and a HACCP approach to food safety being phased in over a period of years.

Our point is that regardless of stated intent to coordinate more closely or even to harmonize, national-level regulation has a dynamic and a momentum that frequently overtakes this intent. For example, the US Food and Drug Administration recently published a draft policy outlining its approach to participating in international efforts to harmonize food standards (US FDA). The general principles stated are that: 1) harmonization efforts are consistent with US government policies, and that US interests are promoted abroad; 2) such efforts aid

the FDA's goal of improving domestic public health by increasing the safety of the food supply; 3) the FDA's involvement in international standards setting be open to public scrutiny, and accessible to all interested parties; 4) FDA should accept, where legally permissible, the equivalent standards, compliance activities, and enforcement programs of other countries, provided that FDA is satisfied such standards, activities, and programs meet FDA's goals; and 5) up-to-date scientific and regulatory information be freely exchanged between agencies to facilitate and expedite public health improvements. A close reading of the principles will reveal several potential land mines in the road to harmonization.

Alternative Firm and Country Strategies Under Trade Agreements

National-level quality and safety regulation and within-trade-bloc harmonization or mutual recognition influence firms' choice of strategies to increase sales abroad. The major available strategies include export sales, joint ventures, foreign direct investment, and licensing. A full model of firm choice also includes the likely use of a combination of these strategies, occasionally even in the same country for very similar product lines.

In this vein, Swinbank addresses the effects of regulatory rapprochement in the form of mutual recognition and harmonization in the European Union leading up to and after 1992. Article 30 of the Treaty of Rome has been interpreted by the European Court in cases such as *Cassis de Dijon* to require mutual recognition of quality standards among EU members. Conversely, Article 36 provides an exemption to members allowing restrictions on imports on health and safety grounds, suggesting that harmonization efforts are required to create a single market for food. Swinbank characterizes the increase in food law after 1992 as the result of these rapprochement efforts, in light of changing technology, tastes, and possibly consumer acceptance of new safety regulations.

The dual application of these mutual recognition and harmonization techniques for, respectively, food quality and safety issues, has strategic implications for firms operating in countries within trade blocs and outside them. Swinbank points out that for quality attributes that are handled through mutual recognition there may be

incentives to locate in the country within the trade bloc with the lowest standards. This choice gives the firm maximum flexibility in designing products to be sold in the different countries. Swinbank's argument may hold for firms wishing to exploit economies of scope by increasing their product range and producing a lower quality basic brand (Swinbank personal correspondence) but this suggests exploitation of the lower standard for only a particular product and not for the full product line. This stimulus may not, however, be particularly powerful for firms selling branded, differentiated products since they have little incentive to lower quality. In fact, to search for lower standard countries to produce in is counterproductive for this type of firm since its future sales likely depend on quality improvement not degradation, even if degradation is accompanied by a lower price. Nevertheless, the trade bloc format does generate incentives to locate production within the bloc to take advantage of mutual recognition and harmonization.

It is interesting to note the similarity of language between the Treaty of Rome and that contained in the NAFTA and Uruguay Round GATT/WTO agreements. This has led commentators like Winham and others to argue that the likely rapprochement vehicle for food quality regulation will be mutual recognition, with an exemption clause for food safety, necessitating harmonization efforts to prevent food safety from being a stumbling block in trade liberalization. It is not clear how parallel the EU experience will be with that under NAFTA and WTO, given the very different levels of economic integration incorporated into each.

While location within the bloc can ease many difficulties associated with national-level regulation, it does not eliminate them. For firms and countries alike, one of the central difficulties is enforcement of standards within an open market. Enforcement of mutual recognition, for example, requires a close tracking of source country, which is complicated if transhipment of products is common. Receiving countries are also put in the position of either accepting that other countries' standards are being effectively enforced prior to shipment or trying to enforce the multiple standards of many other countries as the product enters the home market. Mutual recognition, as Swinbank points out, has also led to anomalous situations within countries where it is legal to import products (under mutual recognition) that are illegal to produce domestically. While some of

these difficulties are due to the transitional period, the continuing development of national-level regulation is likely to produce a continuing stream of anomalies that will have to be resolved. International harmonization would begin to eliminate some of these problems. However, we are not highly optimistic about the likely efficacy of this approach, at least in the next two decades.

National-level quality and safety regulations can create nontariff barriers to trade. These barriers may be in conjunction with accomplishing, or attempting to accomplish, bona fide consumer protection goals; may not serve such goals but simply be substituting for tariffs in a country's management of its import and export trade; or may serve both purposes simultaneously (Hudec, Winham). Language on SPS standards included in the NAFTA and WTO agreements is a coordination device intended to control for substitution between trade distorting measures of various kinds and to limit rent seeking (Pelkmans and Sun).

A potential dynamic in response to mutual recognition within the EU, other trade blocs, or internationally is "competitive deregulation." or within country lobbying by domestic or foreign producers for downward regulatory adjustment (Braithwaite, Pelkmans and Sun, Swinbank). Again, whether there are true incentives for this for processed food products is questionable, in our opinion. However, of interest is the influence on firms' lobbying strategies of their mix of export sales versus foreign direct investment. Firms with FDI in a country should be less hostile to national-level regulation that creates nontariff barriers to trade than firms that rely on exports to make sales in the country. Planning FDI to strategically take advantage of regulatory patterns, such as mutual recognition, is a likely important contributing (although as yet unquantified) factor in firm decision making on location.

Another element in firm strategy is the desire of companies to have uniform regulation across borders in order to take advantage of economies of scale and scope. Industry's arguments against the fragmented nature of differing state regulations in the US clearly parallel arguments on the international-level. In the US, this argument has led some business groups to recommend the acceptance of stricter federal standards provided they preempt any state regulations (Caswell). A similar process may occur internationally if the WTO

agreement does foster increased use of Codex standards for products moving in international trade. Avery, for example, states there is "much support within the food industry for the new role of Codex. The internationalization of food standards will help corporations by streamlining export procedures and reining in what many in the food industry have characterized as 'regulatory excess.' Furthermore, harmonization will enable food and agrochemical corporations to concentrate lobbying efforts at the international-level, instead of fighting off national regulation efforts over the globe." The ability of the Codex controlling body, the Codex Alimentarius, to respond to demands to act as the central standards body worldwide deserves careful analysis. It has a remarkably low budget ($5 million, with 83 percent coming from the FAO), which supports only 5 professional staff.

At this point in time, the impact of the quality and safety sections of the WTO and NAFTA agreements on FDI and processed food trade are unclear. The new WTO agreement may, over time, lower the incentive for FDI due to quality regulations as mutual recognition takes hold and some harmonization moves forward. Under NAFTA, sovereignty retained by the countries under the agreement effectively allows for the retention of idiosyncratic regulations and, perhaps, some need for continued FDI. NAFTA theoretically uses Codex standards as the minimum food safety requirements for traded goods. However the agreement includes the right to prohibit imports from another NAFTA country, provided such restrictions are based on appropriate science and risk assessment processes. Early work on the link between the US and Mexico (Handy, Wall Street Journal) shows that NAFTA has tended to increase both US exports to and sales of US affiliates (FDI) in Mexico.

The Case for Case Studies

As our discussion shows, nontariff barriers to trade due to national and trading bloc level regulatory policy are thought to be important but little hard evidence on their influence exists. The lack of overall quantification is due to the lack of data bases that enumerate and evaluate this type of regulation (Ndayisenga and Kinsey). This lack of information and the complex interaction of many food quality and safety regulations for any single product class or line argue for case

studies as the most fruitful means to investigate the dynamic effects of quality and safety regulation on FDI and the processed food trade.

The choice of case studies should be guided by the issues that are likely to affect firms' strategic choices and are likely to be the basis of trade conflicts in the first decade of implementation of NAFTA and WTO. Due to the multidimensional nature of the issues, without care confusion quickly arises in discussion of possible nontariff barriers to trade arising from quality and safety regulation, in particular SPS regulation. The minimum set of dimensions to consider in safety and nutrition case studies includes:

1) Risk source (*e.g.*, microbial pathogens)
2) Food group (*e.g.*, meat and poultry products)
3) Processing and packaging technology (*e.g.*, irradiation)
4) Regulatory treatment (*e.g.*, process standards and inspection)
5) Trading group (*e.g.*, WTO, NAFTA, EU).

Three of these dimensions roughly correspond to the types of committees used by Codex to organize its international food standards work. Codex has three types of committee (Codex Alimentarius Commission): 1) horizontal, concerned with broad issues that cover all food classes, *e.g.*, food additives; 2) vertical, covering particular food groups, *e.g.*, fats and oils, meat hygiene; and 3) regional, with 5 committees each covering a continent. The selection of hazard or food group under a trade agreement then allows for some simplification of policy interactions.

We suggest use of risk source (horizontal issues) and food groups (vertical issues) as the two most important classification factors to create a matrix of case study areas (see table 3). An expanded list of (largely) horizontal areas of concern in food safety compiled by the Committee on Food, Agriculture, and Forestry Research of the Federal Coordinating Council for Science, Engineering, and Technology includes: microbial hazards/parasites/disease agents; drug residues; pesticide residues; naturally occurring toxicants; environmental contaminants/industrial chemicals; heavy metals; radionuclitides; decomposition and filth; biotechnologically produced/altered food; food processing and storage; food additives; food packaging and packaging materials; diet and nutrition; and food production issues (preharvest to harvest). Our list of risk sources more closely mirrors

the abbreviated list of the seven major health concerns used in the field of economics (Henson and Traill): foodborne poisoning organisms; heavy metals; pesticide residues; food additives; naturally occurring toxins; veterinary residues; and nutritional imbalances.

Table 3. Matrix of Potential Risk Sources and Food Groups

Potential Risk Sources[a]	Food Groups[b]				
	Fruit / Vegetable	Cereal / Pulse / Legume	Fish / Fishery Products	Meat / Poultry Products	Dairy Products
Microbial Pathogens					
Veterinarian Drug Residues					
Pesticide Residues					
Food Additives					
Environment Contaminants					
Naturally Occurring Toxins					
Nutritional Imbalances					

[a]Definitions based on Codex Subject Committees.
[b]Definitions based on Codex Commodity Committees.

The case studies should include a high level of specificity. For example, in the area of microbial pathogens in meat and poultry products, a case study should analyze the impact of the proposed adoption of Hazard Analysis Critical Control Point (HACCP) based safety assurance programs, likely to not be identical, by various trading partners. It is important to analyze the impact of methods of regulatory rapprochement on country-country and firm-country relationships. For example, it is key to know whether mutual recognition has led to countries with consistently low or high standards across food groups or risk sources, or whether individual countries present mixed patterns of regulation. For example, does the interaction of the rapprochement policy and comparative advantage dictate that one country has a low standard for say meat and poultry but a comparatively more rigorous standard for fruits or vegetables?

In addition, how is the type of regulation (*e.g.*, process, performance, or information standards) adopted at the national-level influencing patterns of FDI and processed food trade? In this vein the US FDA, in a recent policy statement, advanced that the "development of a horizontal standard which applies to multiple types of products is generally, but not always, given higher priority than the development of a vertical standard which applies to a limited range of products." It

also stated that standards that advocate a product's performance rather than its design are preferred. An additional important consideration in case studies is to represent the entire range of types of country-country match ups in the food trade (*e.g.*, trade between more developed countries, such as OECD members, that are members of different trade blocs and trade between more and less developed countries).

Case studies should analyze the impacts of all aspects of the principles laid down in the WTO, NAFTA, and other agreements to determine which are critical for particular risk sources and food groups. The list of these principles is extensive. Lupien summarizes them for WTO as follows: 1) a country cannot, under both Codex and WTO, impose a higher safety standard on imports than on domestically produced goods; 2) any standard set for imports should be independent of the source country; 3) certification procedures in the source country should be accepted as "equivalent"—a key aspect to be based on the Codex Codes of Practice for Hygiene and Technical Requirements; 4) exporting countries should be kept informed of any regulatory changes; 5) "unreasonable" or excessive requirements that would place an unnecessary cost on exporting countries, particularly developing countries, should be avoided; 6) the avoidance of nonacceptance by the destination country of pest control practices based on internationally accepted good agricultural practices (GAP) in the source country; 7) banning the use of "zero tolerances for residues of agricultural and veterinary chemicals, and food additives for which there are internationally determined limits available"; and 8) all food labeling and packaging requirements should closely conform to those set out in the Codex General Standard.

Finally, in case studies, particular attention should be given to the impact on trade patterns of differences in import and export requirements between countries. For example, the United States is the only country that requires food exporters to meet all the requirements of the destination country as well as the domestic standard. This technically exceeds the legal authority of the government and has strong implications. Firms dealing with a variety of safety standards must be clear where the product is destined and are then unable to switch countries mid process. Also, if returns to scale are such that a company can only afford one or a very few plants globally, it may

prove efficient not to site in the US as it may not be possible to serve all countries.

Consideration of the impacts of quality and safety regulation on patterns of processed food trade essentially adds a layer of complexity to studies of particular product categories. This layer contributes to understanding of the role and importance of factors such as economies of scale, product differentiation, the extent of the market, and market structure, on patterns of FDI and trade in processed food products.

Concluding Thoughts

Although not yet quantified, it is our contention that national-level food quality and safety regulation has an important influence on business decisions regarding choice of strategies, such as FDI and export sales, for attaining sales in foreign markets, at least for some categories of processed foods. The nature of its influence is likely to change in the future based on the new treatment of food quality and safety regulation under the recently initiated NAFTA and Uruguay Round GATT/WTO trade agreements. Calls for harmonization and mutual recognition would seem to suggest that national-level regulation will fade in importance over time. In our view, however, this is unlikely to be the case. The demand for quality and safety will continue to increase as incomes increase and national governments are the first in line to respond to this demand with new regulations. The demand and new national regulations are likely to outstrip harmonization efforts on an ongoing basis, leaving national regulations with an enduring influence on patterns of trade in processed food products.

References

Akerlof, G.A. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics* 84 (1970): 488-500.

Avery, N. "Diet for a Corporate Planet: Industry Sets World Food Standards." *Multinational Monitor* 14 (7) (1993): 12-15.

Bhagwati, J. "The Generalized Theory of Distortions and Welfare." *Trade, Balance of Payments and Growth*, ed. J. Bhagwati, R. A. Mundell, R. W. Jones and J. Vanek. Amsterdam: North Holland (1971).

Braithwaite, John. "Prospects for Win-Win International Rapprochement of Regulatory." *Regulatory Cooperation for an Interdependent World.* Paris, France: Organization for Economic Cooperation and Development (1994): 201-222..

Caswell, Julie A. "The Policy Environment for Food Safety and Nutrition: Regulating Quality and Quality Signaling." *Re-Engineering Marketing Policies for Food and Agriculture,* ed. Daniel I. Padberg, FAMC 94-1. College Station, TX: Texas A&M University (1994): 57-69.

Choi, E. K. and H. H. Jensen. "Modeling the Effect of Risk on Food Demand and the Implications for Regulation." *Economics of Food Safety*, ed. J. A. Caswell. Elsevier Science Publishing Company. New York, NY (1991).

Codex Alimentarius Commission. *Procedural Manual.* Seventh Edition. Rome, Italy: FAO/WHO (1989).

Connor, J. "Research Puzzles Arising from the Internationalization of US Food Processors." Occasional Paper #1, Organization and Performance of World Food Systems: NC-194 (September, 1989).

Committee on Food, Agriculture, and Forestry Research. "An Overview of Federal Food Safety Research." Report by the Federal Coordinating Council for Science, Engineering, and Technology (January 1993).

General Accounting Office. *International Food Safety: Comparison of US and Codex Pesticide Standards*. Washington, DC General Accounting Office (August 1991).

Grueff, J. and S. Bylenga. "Harmonizing Food Safety and Other Health Related Regulations for Agricultural Trade." *Food Review*. ERS-USDA 12 (3) (1989):37-39.

Handy, Charles R. "US Foreign Investment and Trade Prospects in Mexico's Agribusiness Sector." Occasional Paper #51, Organization and Performance of World Food Systems: NC-194 (October 1993).

Handy, Charles R. and James M. MacDonald. "Multinational Structures and Strategies of US Food Firms." Occasional Paper #1, Organization and Performance of World Food Systems: NC-194 (September 1989).

Hartman, Darcy A., Dennis R. Henderson and Ian M. Sheldon. "A Cross-Section Analysis of Multilateral Intra-Industry Trade in the US Processed Food and Beverage Sectors." Occasional Paper #38, Organization and Performance of World Food Systems: NC-194 (July 1992).

Helpman, E. and P.R. Krugman. *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy.* MIT Press, Cambridge, MA (1985).

Helpman, E. and P.R. Krugman. *Trade Policy and Market Structure.* MIT Press. Cambridge, MA (1989).

Henson, S. and B. Traill. "The Demand for Food Safety, Market Imperfections and the Role of Government." *Food Policy* 18 (2) (1993): 152-162.

Hillman, Jimmye S. *Technical Barriers to Agricultural Trade.* Westview Press, Boulder, CO (1991).

Hirschberg, J. G., Ian M. Sheldon and J. R. Dayton. "An Analysis of Bilateral Intra-Industry Trade in the Food Processing Sector." Occasional Paper #37, Organization and Performance of World Food Systems: NC-194 (July 1992).

Houck, J. P. *Elements of Agricultural Trade Policies.* Macmillan Pub. New York, NY (1986).

Hudec, R. E. *Enforcing International Trade Law: The Evolution of the Modern GATT Legal System.* Butterworth Legal Publishers. Salem, NH (1993).

Jacobs, Scott H. "Regulatory Cooperation for an Interdependent World: Issues for Government." *Regulatory Cooperation for an Interdependent World.* Paris, France: Organization for Economic Cooperation and Development (1994): 15-46.

Kinsey, Jean.. "GATT and the Economics of Food Safety." *Food Policy* 18 (2) (1993): 163-176.

Krugman, P. R. *Rethinking International Trade.* Cambridge, MA: MIT Press (1991).

Lancaster, K. *Variety, Equity and Efficiency.* New York, NY: Columbia Univ. Press (1979).

Lupien, J. R. "Technical Harmonization of International Trade Agreements." *Food Technology* 47 (3) (1993): 106-114.

Majone, Giandomenico. "Comparing Strategies of Regulatory Rapprochement." *Regulatory Cooperation for an Interdependent World.* Organization for Economic Cooperation and Development. Paris, France (1994): 155-177.

McCorriston, Steve and Ian M. Sheldon. "Imperfect Competition Trade Policy and Processed Agricultural Products." Occasional Paper #3, Organization and Performance of World Food Systems: NC-194 (December 1989).

McCorriston, Steve and Ian M. Sheldon. "Intra-Industry Trade and Specialization in Processed Agricultural Products: The Case of the US and EC." Occasional Paper #7, Organization and Performance of World Food Systems: NC-194 (March 1990).

Ndayisenga, Fidele and Jean Kinsey. "The Structure of Nontariff Trade Measures on Agricultural Products in High-Income Countries." *Agribusiness* 10 (4) (1994): 275-292.

Ning, Yulin and Michael R. Reed.. "Locational Determinants of the US Direct Foreign Investment in Food and Kindred Products." *Agribusiness* 11(1) (1995): 77-85.

Pelkmans, Jacques and Jeanne-Mey Sun. "Towards a European Community Regulatory Strategy: Lessons from 'Learning-by-Doing'. " *Regulatory Cooperation for an Interdependent World.* Paris, France: Organization for Economic Cooperation and Development (1994): 179-199.

Sheldon, Ian M. "Intra-Industry Trade and Specialization in Processed Agricultural Products: Theory and Issues." Occasional Paper #2, Organization and Performance of World Food Systems: NC-194 (October 1989).

Sheldon, Ian M. and D. R. Henderson. "The International Licensing of Branded Food Products: A Game-Theoretic Analysis." *Journal of Agricultural Economics* 43 (3) (1992): 368-380.

Sheldon, Ian M. and S. McCorriston. "Imperfect Competition and Strategic Trade Policy in the Food Industries." Occasional Paper #5, Organization and Performance of World Food Systems: NC-194, (March 1990).

Sheldon, Ian M. and H. Von Witzke. "On the Economics of Food Quality Standards and Integration in the European Community." Occasional Paper #29, Organization and Performance of World Food Systems: NC-194 (January 1992).

Spencer, Barbara and James Brander. "International R&D Rivalry and Industrial Strategy." *Review of Economic Studies* 50 (1983): 707-722.

Stiglitz, Joseph C. "Imperfect Information in the Product Market." *Handbook of Industrial Organization*, Vol. 1, ed. Richard Schmalensee and Robert Willig. New York: North-Holland (1989): 769-847.

Surak, John G. "ISO 9000 for the Food Processing Industry." Unpublished Manuscript, Department Food Science, Clemson University, Clemson, SC (1995).

Sutton, John. "*Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration.*" Cambridge, MA: MIT Press (1991).

Swinbank, Alan. "Industry Note: Completion of the EC's Internal Market, Mutual Recognition, and the Food Industries." *Agribusiness* 9 (5) (1993):509-522.

Tirole, J. *The Theory of Industrial Organization.* Cambridge, MA.: MIT Press (1988).

United States, Food and Drug Administration. "International Harmonization; Draft Policy on Standards; Availability." *Federal Register* 59 (227) (Nov. 28, 1994): 60870-60874.

United States Department of Agriculture, Food Safety and Inspection Service. "Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems; Proposed Rule." *Federal Register* 60 (23) (Feb. 3, 1995): 6774-6889.

Van Duren, E., K. Meilke, and M. Von Massow. "North American Free Trade Agreement and the Agrifood Sector: A Canadian Perspective." Working Paper Series, University of Guelph, Canada (January 1994).

Wall Street Journal. "NAFTA, So Far, So Good." R1-14: (October 28, 1994).

Winham, G. R. *The Evolution of International Trade Agreements.* Toronto, Canada: University of Toronto Press (1992).

Appendix 1

Glossary of Acronyms

Codex	Codex Alimentarius Commission (also CAC)
EFTA	European Free Trade Area
EU	European Union (formerly EEC/EC)
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
FDI	Foreign Direct Investment
FSIS	Food Safety Inspection Service
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GATT	General Agreement on Tariffs and Trade
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis Critical Control Points
IIT	Intra-Industry Trade
NAFTA	North American Free Trade Agreement
NTBT	Nontariff Barriers to Trade
NTM	Nontariff Measures
OECD	Organization for Economic Cooperation and Development
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
UNCTAD	United Nations Conference for Trade and Development
USDA	United States Department of Agriculture
WHO	World Health Organization
WTO	World Trade Organization