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Trends in Food Quality Regulation: Implications for Processed Food Trade and Foreign Direct Investment

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Foreign direct investment (FDI) has been increasing at a faster rate than direct exports of processed foods over the past decades. To what extent does national-level food quality regulation influence these trends? Although unquantified as to its impact, such national-level regulation is frequently cited as a potential source of nontariff barriers to trade for food products. FDI may allow food processors to avoid rules intended to disadvantage imported products by siting production within particular markets. It may also allow more precise and rapid adaptation to domestic quality regulations. We discuss what is known about the effect of national-level regulation on companies' strategies for operating in international markets. ©*1996 John Wiley & Sons, Inc.*

Introduction

Foreign direct investment (FDI) has been increasing at a faster rate than direct exports of processed foods over the past decades.[1] We explore the extent to which national-level food quality regulation influences these trends. Although its impact is currently unquantified, such national-level regulation is frequently cited as a potential source of nontariff barriers to trade for food products.[2] These barriers may be intentional, aimed at favoring domestic production, or merely be the innocent by-products of a country's attempt to serve its consumers by assuring various food quality attributes.

In either case, national-level regulation may influence a firm's strategic choices when considering operating in international markets. For example, FDI may allow food processors, by siting production within a market, to avoid rules intended to disadvantage imported products. More precise and rapid adaptation to domestic quality regulations may be possible due to greater flexibility, better designed plants, superior understanding of the rules, or better appreciation of local demands for goods with differing attributes. FDI could also yield direct food quality benefits to both firms and consumers because of shorter shipping distances

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and less need for preservatives, packaging, or refrigeration.

It is very likely that recent trade agreements and developments will significantly influence national-level regulation of food quality. The North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), which established the World Trade Organization (WTO), are the first attempt to specifically address food quality standards as potential barriers to trade. A guidepost to the dynamics of management of divergent national-level regulation can be found in recent developments in the European Union (EU) associated with establishing a single market. In this new trade environment, the key question is how important will national-level quality regulation be in determining firms' choice of strategy for selling in international markets?

Quality Targets

National-level quality regulation takes on many dimensions or regimes because product quality itself is multidimensional. There is no definitive list of all food attributes because what are important characteristics will vary across circumstances and among consumers. However, several important subsets of quality attributes can be identified (see Table I). Safety attributes are the first important subset including foodborne pathogens, heavy metals, pesticide residues, food additives, naturally occurring toxins, and veterinary residues.[3] The class of regulations called sanitary and phytosanitary (SPS) regulations deal with these attributes. Nutrition attributes form the second group, including characteristics such as fat content, calories, fiber, sodium, vitamins, and minerals. We refer to a third subset of characteristics as value attributes. They include characteristics that are of value to the consumer but are not food safety or nutrition attributes. Examples are purity (lack of nonhazardous contaminants), compositional integrity (i.e., lack of economic adulteration), size, appearance, taste, and convenience of preparation. Package attributes form the final subset, including package materials, labeling, and any other information provided.

Table I. Quality Attribute Space for Food Products.

Quality Attribute Subsets
Food Safety Attributes
Foodborne pathogens
Heavy metals
Pesticide residues
Food additives
Naturally occurring toxins
Veterinary residues
Nutrition Attributes
Fat content
Calories
Fiber
Sodium
Vitamins
Minerals
Value Attributes
Purity
Compositional integrity
Size
Appearance
Taste
Convenience of preparation
Package Attributes
Package materials
Labeling
Other information provided

Many quality concerns embody attributes from more than one of these subsets and have multiple regulatory regimes that apply to them. For example, consumers who purchase organic produce may be concerned with food safety, nutritional, and value attributes. Similarly various growing, processing, and handling technologies may influence multiple attributes (e.g., food irradiation, animal welfare).

How Does Trade Theory Contribute to Understanding the Impact of Food Quality Regulation?

Trade theory provides a foundation for analyzing the impact of food quality regulation on FDI and trade. In its basic form, economic theory suggests

that gains from trade arise when countries specialize in production of those goods to which they are best suited, thereby earning export income that allows for increased consumption. Interdependent trading countries will thus have higher national welfare than autarchic, nontrading countries. This older trade theory has been strongly criticized for ignoring many important market conditions. New trade theory, on the other hand, discusses the effects on trade and investment patterns of imperfect competition, economies of scale, and distortions in factor markets. It is particularly interested in explaining the growing phenomena of intraindustry trade (IIT), which is the two-way exchange of goods in which neither country seems to have a comparative cost advantage.[4] New trade theory also wants to understand the nature of the relationship between IIT and FDI: Are they complements or substitutes?

The new trade theory models advance two quite different explanations of IIT. One emphasizes the interaction of product differentiation and economies of scale. Individuals are characterized as wanting to consume a variety of goods, yet domestic returns to scale are such that varieties from abroad need to be imported to satisfy consumer demands. The second explanation emphasizes the literal two-way trade of identical products, with price discrimination being the driving force (i.e., market segmentation or reciprocal dumping). Domestic firms restrict their supply at home, drive up the domestic price, and then aggressively export. The new trade theory is useful for analyzing quality regulation because it focuses on the many factors that affect the welfare impacts of trade policy. Also useful are trade theory's recent focus on analyzing rent seeking and rent shifting associated with national regulation, the benefits to individual sectors of an economy from trade agreements, and the divergence of outcomes between countries with different per capita income levels.[4,5]

How Recent Trade Agreements May Affect FDI and Processed Food Trade

Barriers to freer trade arising from nontariff sources have become more prominent as progress has been made worldwide on tariff reduction. Parties to recent trade agreements have sought to lower nontariff barriers or at a minimum to assure that progress toward freer trade is not thwarted by increases in nontariff barriers. Nontariff sources of barriers are variously referred to as nontariff barriers to trade (NTBT), nontariff measures (NTM), and technical barriers to trade (TBT).[6] Regulation of product quality can be a major source of NTBT. If such barriers are to be lowered, trading partners must develop methods of regulatory rapprochement. Strategies for rapprochement can be usefully grouped into three categories[7]:

1. *harmonization:* standardization of regulations in an identical form;
2. *mutual recognition:* acceptance of regulatory diversity as meeting common goals (sometimes called reciprocity or equivalency); and
3. *coordination:* gradual narrowing of relevant differences between regulatory systems, often based on voluntary international codes of practice (sometimes called alignment).

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

For processed food products the level of regulatory rapprochement on quality regulation will have significant impacts on patterns of international trade in the next decade. These impacts are particularly important to understand for the United States as the NAFTA and WTO agreements for the first time specifically address food quality, especially SPS regulations, as potential barriers to trade. While the agreements lay out principles for regulatory rapprochement, the details are vague and results far from certain. Many paths of development are possible as the interaction of government and private actions plays out.

The NAFTA and WTO agreements use similar language in their sections relating to SPS regulation. While difficult to characterize in some respects, the language largely amounts to an agreement to coordinate policy, with a longer term

view toward mutual recognition and, ultimately, a basis for harmonization. States are permitted 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 (national treatment). Negotiation among countries as to what constitutes appropriate science and risk assessment corresponds to a coordination form of regulatory rapprochement. The agreements' goal is an equivalency of the *effect* of regulations—not the regulations themselves. This allows greater flexibility to countries based on differing needs and risk preferences but also potentially leaves the door open to using quality regulation as a NTBT. 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 NAFTA and WTO agreements is preventing discrimination and creation of a NTBT based on unjustified quality regulation. To this end, the agreements advocate the adoption and use by member countries of international standards issued under the Codex Alimentarius Commission (Codex), the International Plant Protection Convention, and the International Office of Epizootics. Of these groups Codex is most important for the processed food trade. It was designed to ease the growing strain of interdependence that countries faced due to increasing food trade and was intended to serve as a global food treaty, protecting and promoting SPS standards and nutritional quality for all raw and processed foods. The agreements' ultimate reliance on Codex and other standards suggests a longer term goal of harmonization of regulation between member countries.

However, the prognosis for harmonization of food quality regulation is unclear. Experience in the EU over the past 15 years suggests that harmonization is difficult even among countries relatively closely matched in income levels and regulatory preferences.[8,9] The EU has evolved toward using mutual recognition as its main means of facilitating trade, particularly for value attributes, with harmonization reserved for food safety attributes. 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.[10] NAFTA and WTO are unlikely to achieve this level of rapprochement in the near future because mutual recognition presupposes a high level of underlying agreement on standards between member countries.

That food quality 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%) concerned the broad area of agriculture, with the percentage increasing from about 23% in the 1950s to 47% in the 1980s.[11] Examples of high profile cases that illustrate quality-related trade disputes include the European ban on US cattle treated with synthetic hormones and the US ban of European wine containing residues of the fungicide procymidone. An additional example is the so-called Chicken War of 1978 to 1982 where the United Kingdom placed stricter SPS regulations on poultry imports in an attempt to persuade the French government to lower its subsidies to domestic producers.[6]

More trade disputes related to quality will arise in the coming years for several reasons. First, the WTO's introduction of an agreement on SPS regulation is an attempt to clarify its position and will likely facilitate countries' ability to accuse members of impropriety in SPS regulation. Second, it is believed that there is a pent-up demand for disputes and dispute resolution because many potential disputes were postponed or delayed until the WTO became fully adopted. One possible candidate for such a dispute is the US Delaney Clause because it sets a zero cancer risk standard for food additives and some pesticide residues in food products, while the WTO 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 current levels of food safety protection will result in more complex regu-

latory structures. A timely example is the current movement toward Hazard Analysis Critical Control Point (HACCP) based regulation. The first few challenges of food quality regulations before the WTO will be crucial and should receive much attention as they progress through the various stages of the dispute resolution process.

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

Common trends in firm strategic choice are highlighted by a brief survey of previous empirical studies of IIT and FDI in the food sector. Early work on the factors affecting IIT in agrifood products adapted key econometric studies of other manufacturing industries. This approach allowed Sheldon to summarize most of these factors and was the starting point for a series of studies.[12] For example, Hirschberg et al. investigated the bilateral trading patterns of 30 countries over a 22-year period (1964–1985).[13] They found that various market size variables such as 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 or European Free Trade Area. Similarly, Hartman and colleagues studied variation in IIT over 36 US processed food and beverage industries.[14] Their results stressed the positive effect on IIT of US total trade and economies of scope. In combination these articles yield a list of important candidate variables for analysis of cross-country, cross-industry IIT (see Table II).

Studies of processed foods have developed similar econometric evidence that highlights 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 United States.[15] 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.[16] He further stressed

Table II. 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 Nontariff Barriers to Trade
9. Extent of FDI
10. Market Size and Growth
11. Trading Bloc Membership

the effects of the host country's regulatory practices, emphasizing patent protection and trademark laws as likely factors in determining FDI levels. Ning and Reed highlighted the importance of factors such as host market size, growth rate, and membership in a trading bloc in explaining FDI patterns.[1]

In addition, research by Sheldon and von Witzke provides examples of early work that applies various quality models to trade in food products.[17] They develop a model of quality choice with ex-post verification reenforced by repeat purchases, which is typical of most food purchases by consumers.[17] The model is developed 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 national-level regulations, generating three scenarios of intra-EU trade: trade between two countries with approximately equal incomes, each with two levels of quality standards; trade between countries with single standards, but differing average incomes; and differing incomes between countries, with trade increasing the market size, thereby increasing the standard. Their work also highlights the key role played in the market by consumers' ability to verify standards set by another country. This ability 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

Table III. 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 Nontariff Barriers to Trade (Trading Bloc Membership)

trade agreements on international markets for food.[10]

This research generates a list of factors most likely to influence FDI (Table III). Items 1 to 4 in Table III are "supply" or firm and industry specific factors and items 5 to 9 are "demand" or more country specific factors. This distinction between country specific ("pull") and firm or industry specific ("push") factors was made by Ning and Reed.[1] The pull factors have a protectionist country creating NTBT that discourage IIT and may encourage firms to switch to FDI[17]; the push factors give the primary role to market size in determining FDI.[1] Case studies of food quality issues clearly need to incorporate both sets of factors.

Data challenges abound in analyzing NTBT. For example, in studying FDI by six countries, Ning and Reed 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.[1] While the variable proved significant in a majority of their regression specifications, its aggregate nature does not shed direct light on the importance of differences in national-level regulation. While NTBT appear on the lists in Tables II and III, to date little work has been done to characterize the impact of national-level quality regulation on IIT and FDI. Where partially addressed, the effects are mostly found to be significant. However, the results depend on the variables that often offer very crude, if at all effective, measures of the impact of quality regulation. Clearly the basic models are available for such evaluations and the lists of important factors are a good staring point for econometric studies.

Alternative Firm and Country Strategies Under Trade Agreements

National-level quality regulation and within trade bloc rapprochement influence firms' choice of strategies to increase sales abroad. The major strategies available include export sales, joint ventures, FDI, and licensing. A full model of firm choice should also include the combined use of these strategies, occasionally even in the same country for very similar product lines.

Swinbank addresses the effects of regulatory rapprochement in the form of mutual recognition and harmonization in the EU based on Articles 30 and 36 of the Treaty of Rome.[10] Article 30 was interpreted by the European Court, in cases such as *Cassis de Dijon*, to require the mutual recognition of standards relating to nonsafety attributes among EU members. Conversely, Article 36 provides an exemption to members that allows restrictions on imports on health and safety grounds, suggesting that harmonization efforts are required to create a single market for food. Swinbank characterizes the increased volume of food quality regulation after 1992 as the result of these rapprochement efforts in light of changing technology, tastes, and possibly consumer acceptance of new safety regulations.[10]

The dual application of mutual recognition and harmonization for nonsafety and safety attributes, respectively, has strategic implications for firms operating in countries within and outside trade blocs. Swinbank points out that for quality attributes handled through mutual recognition, there may be incentives to locate in the country within the trade bloc with the lowest standards.[10] 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 introducing a lower quality basic good into their product range.[10] This stimulus may not, however, be par-

ticularly powerful for firms selling branded, differentiated products because they have little incentive to lower quality. In fact, the search for a lower standard country in which to produce may be counterproductive for this type of firm because its future sales likely depend on quality improvement not degradation, even if such 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 rapprochement efforts.

The Treaty of Rome and the NAFTA and WTO agreements use similar language regarding national-level food quality regulation. This has led commentators like Winham and others to argue that the likely rapprochement vehicle for food quality regulation under the newer agreements will be mutual recognition, with an exemption for safety attributes that will necessitate harmonization efforts to prevent food safety from being a stumbling block in trade liberalization.[18] It is not clear how parallel the EU, NAFTA, and WTO experience will be given the very different levels of economic integration incorporated into each and the difficulties that arise with strong forms of rapprochement.

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 the 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 are effectively enforcing their standards or trying to enforce the multiple standards of many other countries as products enter the home market. While some of these difficulties are due to the transitional period we are now in, the ongoing 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; but we are not highly optimistic about the effectiveness of this approach, at least in the next two decades.

The development of mutual recognition as a rapprochement strategy has raised concerns about "competitive deregulation," or within country lobbying by domestic or foreign producers, for lowering regulatory standards.[9,10] Whether there are true incentives for this for processed food products is questionable, in our opinion. However, the influence on firms' lobbying strategies of their mix of export sales versus FDI is important. Firms with FDI in a country should be less hostile to national-level regulation that creates NTBT 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 factor in firms' location decisions.

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 opposition to fragmented state regulations in the United States clearly parallels arguments on the international level. In the United States this argument has led some business groups to recommend the acceptance of stricter federal standards, provided they preempt state regulations.[19] A similar process may occur internationally if the WTO agreement does foster increased use of Codex standards for products moving in international trade. The ability of Codex to respond to these demands to act as the central standards body thus deserves careful analysis. It has a remarkably low budget that supports a very small professional staff.

At this point in time, the impacts of the SPS and TBT sections of the NAFTA and WTO 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.

The Dynamics of National-Level Regulation of Food Quality

Serious efforts are being made worldwide by countries, organizations such as Codex, and private standards groups to harmonize or at least move

toward more harmonious national-level regulation of food quality. The most significant progress on this front has been made within trading blocs, most notably the EU. The complex interaction between national, trade bloc, and global regulatory efforts will influence patterns of trade and FDI 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 may be covered by national-level regulation in the destination country for firms in non-EU countries. While the goal of NAFTA and WTO is to reduce this kind of complexity, in practice the regulatory environment may or may not get less complicated.

National-level performance expectations will increase in the future. Demand for higher quality products increases as income increases; more developed countries seek to increase standards as more evidence, innovations, and consumer acceptance demands.[3,10] Quality regulation has momentum, in both more and less developed countries, making keeping up very difficult for firms and cooperating countries. Simple knowledge of the range of regulations in different markets, their scope, and their importance is lacking. For example, Ndayisenga and Kinsey attempted to determine the total number of NTMs put in place between 1980 and 1991 by high income countries, as well as their frequency and variety across countries and commodities.[2] They found problems with identification (more than 100 NTM were listed) and that the most reliable data source (UNCTAD) was based on "government sources, notifications to GATT of trade measures by member states, and other publications," which greatly limited the usefulness of the data.[2] For evaluating the impact of national-level regulation, such data is particularly limited because health and safety regulations were very rarely included in the reporting.

For firms working under national-level quality 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. One 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 the USDA in February 1995.[20] Adoption of a HACCP-based system could be a real step toward aligning US policy with that of other countries; but the proposed system is complex, relying on sanitary standards and good manufacturing practices to insure effective minimal quality standards, specific process standards for time–temperature treatments, and a lengthy transition period.[21] 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 these rapprochement efforts. National-level regulations are also interacting with increasingly sophisticated private certification programs such as those managed by the International Organization for Standardization. These private certification systems are likely to play an expanded role in food trade in the future.

Concluding Thoughts

Although not yet quantified, we contend that national-level food quality regulation has an important influence on business decisions regarding choice of strategies, such as FDI and export sales, for attaining sales in foreign markets. The nature of its influence is likely to change in the future based on the new treatment of food quality regulation under the NAFTA and WTO trade agreements. Calls for harmonization and mutual recognition would seem to suggest that national-level regulation will lose importance over time. We think this is unlikely to be the case. The demand for food quality will continue to increase as incomes increase. 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. Given the complexity of SPS regulations, we believe the only way to evaluate their effect as NTBT is via detailed case studies that investigate particular quality targets, regulatory regimes, and rapprochement efforts.

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