GLOBAL FOOD TRADE AND CONSUMER DEMAND FOR QUALITY

Edited by
Barry Krissoff
Mary Bohman
and
Julie A. Caswell

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Barry Krissoff
Mary Bohman

Economic Research Service/USDA
Washington, D.C.

and

Julie A. Caswell

University of Massachusetts
Amherst, Massachusetts

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PREFACE

Consumers have always been concerned about the quality, and particularly the safety, of the foods they eat. In recent years this concern has taken on additional prominence. Consumer focus on food safety has been sharpened by reports about new risks, such as that posed by "mad cow" disease, and about more familiar sources of risk, such as food-borne pathogens, pesticides, and hormones. At the same time, some consumers are increasingly interested in knowing more about how their food is produced and in selecting products based on production practices. Some of the questions consumers are asking include whether food is produced with the use of modern biotechnology, whether it is organically produced, how animals are treated in meat and egg production systems, and whether food is produced using traditional methods.

Recent trends also show increased consumer demand for a variety of food products that are fresh, tasty, and available on a year-round basis. This has fostered increased global trade in food. For example, consumers in temperate climates such as North America are able to buy raspberries throughout the year, and Europeans can enjoy South American coffee. Trade in processed food products is actually increasing more rapidly than trade in agricultural commodities, further addressing the demand for variety among consumers. Trade may also make food more affordable. However, trade may also threaten the ability of consumers to purchase the products they want because imported products are less safe, are produced in undesired ways (e.g., with the use of hormones), or do not meet other quality standards. Thus the question arises of how well the global food trade serves consumer demand for quality.

Trade presents both an opportunity and a challenge in meeting consumer demand for products increasingly differentiated by a wide range of quality attributes. Companies profit from selling new products or supplying quality characteristics that consumers want and for which they will pay a premium. For example, supermarket chains in Britain responded to concerns about biotechnology by pledging to remove products made with the use of biotechnology from their shelves. Many quality characteristics pose a challenge in marketing because they are difficult or impossible for consumers to verify even after consumption (in economics, these are known as credence goods). Here companies must rely on information such as certification, labeling, and brand names to reassure consumers. In some cases, trade can increase problems in conveying information about quality to consumers as products travel over longer distances and, frequently, through more hands.

Both consumers and businesses have turned to government for policies to meet demands for quality, to provide information about quality, and to facilitate trade where quality standards differ among countries. For example, some consumer organizations have called for government action ranging from bans on certain types or qualities of products to mandatory labeling. Business has asked the government to define, establish, and provide quality standards or third-party certification because of the government's credibility with consumers. Both expect government to play a prominent role in reconciling different standards for quality across countries, although their expectations for this role differ. Consumers want to be assured that trade in food products will not threaten quality standards or pose new risks. Industry wants to know that imported products will not unfairly compete against domestic products and that its own exports will enjoy ready access to markets in other countries. Governments' choices of policy options have implications for consumer and producer welfare, the structure of the food industry, and the flow of foods across international borders. The possibility exists too that consumer concerns about quality will be exploited by business to promote policies regarding imports that are protectionist and pose barriers to trade rather than provide legitimate consumer protection.

Another important issue in the global food trade is the trade relationship between industrialized and developing countries. The regulations of industrialized countries are becoming stricter and are expanding into new areas such as biotechnology and organic foods. Standards and regulations diverge across industrialized countries because of differences in income, tastes, risk preferences, geography, culture, and religion. The divergence between industrialized and developing country standards is even greater. In this environment, are developing countries disadvantaged in meeting the quality criteria to be able to import into industrialized countries? How developing countries respond to export challenges and opportunities is an important aspect of the interaction between consumer demand and the global food trade.

While economists have begun to analyze the relationship between consumer demand for quality and international trade, there has not been a systematic treatment of the various components of the issue. This volume helps fill that gap. In 2000, the International Agricultural Trade Research Consortium (a group of agricultural trade economists) and Regional Research Project NE-165: *Private Strategies, Public Policies, and Food System Performance* (a group of agricultural consumer and industrial organization economists) jointly organized a conference on the economics of trade and consumer demand for quality. The conference was cosponsored by the Economic Research Service of the U.S. Department of Agriculture and the Farm Foundation. Participants included leading researchers and practitioners from North America, Europe, Latin America, and Asia.

Leading experts in international trade, political science, and consumer demand were commissioned to contribute overview papers to frame the issues. Three case studies were also commissioned based on a review of proposals submitted to the organizing committee. These case studies focus on European Union (EU) animal welfare policies, food safety problems in the trade of Guatemalan raspberries to the United States and Canada, and the development of the beef export sector in Uruguay. Each applies economic theory to explain private and public responses to issues associated with global trade in food products. In addition, papers were selected for presentation at the conference from the many that were submitted. Several of the selected papers are included in this volume. All the commissioned papers, case studies, and selected papers were peer-reviewed and edited for

inclusion in this book. While discussants' comments are not published, the authors have incorporated these comments into the revised versions of their papers.

The book begins with the overview papers designed to define the issues and lay out alternative conceptual models. The case studies follow, showing how some of these concepts can be applied to real-world problems and also raise challenges for future theoretical analysis. For example, the animal welfare case points to the need for additional research to incorporate ethical issues into trade models, while the Guatemalan raspberry case highlights the need to pay more attention to the public good aspects of food safety reputations. The papers in the final section of the book tackle specific issues and develop new conceptual and empirical approaches. Topics include development of models of the impacts of divergent food safety regulations on trade and of agricultural price support policies on the quality of products produced and consumed. These papers place a strong emphasis on the role of standards, certification, and labeling in trade in differentiated food products, including those differentiated on the basis of the use or nonuse of biotechnology, organic production methods, and geographically distinct production practices.

An important objective of this book is to survey and extend the available economic tools to analyze the interface between trade and consumer issues. For example, Bureau, Jones, Gozlan, and Marette survey the economic literature that has been applied to trade and quality issues, while Caswell, Noelke, and Mojduszka unify the economic and marketing literature approaches to analyzing quality and quality assurance. Orden, Josling, and Roberts and Lohr and Krissoff develop empirical trade models to analyze differences in the effects of domestic regulation of the poultry and organic markets, respectively. Alston and James show how quality can be incorporated into models of agricultural policies, while Roe and Sheldon develop a model of vertical differentiation in markets with trade and imperfect competition or information.

The first section of the book presents four chapters that provide overviews of the international trade, political science, and consumer demand dimensions of the nexus between trade and consumer demand for quality. Bureau and his colleagues (Chapter 1) start by presenting a discussion of the most controversial issues involving trade, regulation, and quality: the role of risk and the use of the precautionary principle, the approach to the introduction of biotechnology, animal welfare policies, and the use of geographical indications on labels for food products. Their analysis of the economic literature finds that, in general, the different demands for quality across countries do not undermine the potential benefits from free trade. However, three sources of market failure—imperfect competition, imperfect information, and risk—can create specific cases where trade reduces welfare. In order to maintain public support for trade liberalization, Bureau and colleagues conclude that rules governing international trade need to be consistent with consumer demand for quality. While not without its pitfalls, cost-benefit analysis is proposed as an economic framework that could be used to evaluate cases in which differences in demand for quality potentially conflict with trade liberalization. The authors argue that application of cost-benefit analysis to trade and quality conflicts is lagging 20 years behind its application to environmental disputes.

Victor and Weiner (Chapter 2) place trade and consumer issues in the context of the politics underlying the transformation of world trade rules in the Uruguay Round that led to the formation of the World Trade Organization (WTO). They characterize the process as a "sea-change in international law" from an exclusive focus on controlling producer dis-

tortions of trade (e.g., tariffs and quotas) to asserting some international jurisdiction over domestic regulations, such as on food safety, that may constitute protectionism rather than legitimate consumer protection. The new areas of oversight are no longer simple border measures such as tariffs but include domestic regulations covering core functions of governments. A dispute settlement process that follows a strict timetable and produces definitive judgments now enforces WTO rules. This process does not permit governments to ignore decisions against their regulations, which may require unpopular changes in domestic policies, although countries have the option of maintaining their policy and paying compensation to affected trading partners. The broader scope of the WTO juxtaposes the opportunity to reduce trade barriers with the potential for strong domestic opposition to the prescribed resolutions of trade disputes. The beef hormone case is cited as an example where dispute decisions by the WTO and implementation of trade sanctions only serve to strengthen EU resolve to maintain current regulations. Victor and Weiner argue that too many intractable cases like the beef hormone case could undermine the WTO itself. They offer several solutions that involve trade-offs between using objective criteria to establish credible international legal precedent and not forcing governments to choose between domestic political opinion and international trade rules.

Caswell, Noelke, and Mojduszka (Chapter 3) unify the economic and marketing literature approaches to analyzing quality perception and quality assurance. They begin by contrasting the strengths and weaknesses of each approach. Economic models frequently assume a one-dimensional view of product quality based on whether buyer information about quality is of a search, experience, or credence nature. Search goods are products for which consumers can obtain information to judge quality prior to purchase, experience goods are those for which quality can be judged after purchase and use, and credence goods are those for which quality cannot be accurately judged even after purchase and use. They argue that this breakdown is a powerful tool for analyzing the role of quality and quality signaling in markets but is too narrow for understanding the full scope of quality and quality assurance activities in markets. Marketing models allow for a richer definition of quality and provide valuable insights into the purchase decisions of consumers. Goods can have multiple attributes with different quality levels and information environments. For example, the tenderness of beef is an experience attribute, but the conditions under which the animal was raised is a credence attribute. Empirical applications of marketing models find that consumers base decisions on both the appearance of a product (called intrinsic cues) and information provided about the product such as labels (extrinsic cues). Caswell, Noelke, and Mojduszka argue that a unified quality framework that systematically analyzes several dimensions of quality and quality assurance is particularly important in a trade environment where the dimensionality of the issues grows rapidly as buyers in different countries place different values on individual attributes of food products.

Unnevehr (Chapter 4) focuses on the challenges facing developing countries in exporting food products, particularly to industrialized countries. This ability is a key dimension of the impact of demands for quality on international trade and on the prospects for individual countries to participate in this trade. She examines how developing countries can meet the food safety, sanitation, and good agricultural and manufacturing practice standards of the higher income countries and the possible roles of the private and public sectors in achieving these standards. For the private sector, the key is managing food safety hazards through vertical coordination from the farm to the export market. For the public

sector, the roles may include policymaking, provision of information, prevention and control of hazards, and investment in infrastructure and research. Decisions about intervention need to take into account private actions because public actions are unnecessary if they simply displace private activities. Unnevehr finds factors supporting public intervention to facilitate developing country exports include the lack of information about private actions, the fact that hazard control provides a public good, and potentially large spillover benefits for domestic consumers. Unnevehr's approach to assessing the roles of the public sector in quality assurance is very relevant to the two case studies on trade in raspberries from Guatemala and beef from Uruguay.

The second section presents three in-depth case studies that assess specific food quality issues. Each case study has some common elements. They all examine demands for quality attributes and private industry and public response to those demands. They analyze the implications of changes in production and distribution processes that were established based on quality concerns. They also address the effects on competition and global trade, not just for the countries that are directly involved in buying and selling but for third-country competitors as well.

In the first case study, Blandford and his colleagues (Chapter 5) focus on the interest of European consumers in protecting animal welfare. Although in surveys consumers do not mention animal welfare as frequently as other concerns about hormones or genetically engineered food, both government legislation and private initiatives have emerged regarding the treatment of farm animals. In the European Union, minimum animal welfare standards are determined by legislation, and the scope and level of these standards have been increasing. Standards have been established for chickens, pigs, and veal calves. Some in the private sector have chosen to go beyond the minimum standards in response to consumer demand and are backed by government labeling standards. For example, there has been an increase in the demand for and sale of free-range eggs in response to concern about confining chickens in specialized housing with limited space, a production method common in modern intensive agriculture. Stricter animal husbandry standards are likely to increase costs for EU producers and may pose trade difficulties such as a reduction in the ability of EU producers to compete in international markets. EU industry and government may have an interest in restricting imports into the EU to only those foreign producers that follow the stricter standards or in requiring labeling of production practices, which may be difficult to verify and enforce. Ultimately, consumer willingness to purchase and pay a premium for animal-friendly production practices will determine the extent to which consideration of animal welfare attributes will be incorporated into production practices.

The second and third case studies, by Calvin and colleagues (Chapter 6) and Marshall and colleagues (Chapter 7), address food safety and quality issues related to the ability of developing countries to export to industrialized countries. In each case, the public and private sectors worked together to meet the quality demands of the industrialized countries. Calvin and colleagues examine the reaction of Guatemalan growers, public officials, and the international community to U.S. and Canadian outbreaks of cyclosporiasis, an illness caused by the foodborne pathogen *Cyclospora*. Outbreaks of cyclosporiasis traced to Guatemalan raspberries were reported in the United States and Canada in the spring and early summer of 1996 and again in 1997. Calvin and colleagues explain how the Guatemalan Berry Commission and the Guatemalan government, in conjunction with U.S. and Canadian health and food safety agencies and the Food Marketing Institute (an association

that represents retail buyers), developed a specific plan of excellence for agricultural practices to address the problem. The United States allowed entry of raspberries produced under the Model Plan of Excellence beginning in the spring of 1999. The plan also establishes a process for traceback to individual growers, a critical element in a foodborne illness outbreak. Other exporters of raspberries to the United States, such as Chile and Mexico, as well as U.S. producers have also adopted higher standards of food safety readiness, although the disease has only definitely been traced to Guatemalan raspberries. Guatemala lost U.S. raspberry market share to Mexico, although it is not clear whether the change is related exclusively to food safety problems or to a combination of food safety and other profit-related considerations.

Marshall and colleagues examine the development of Uruguayan beef exports to the European Union. Uruguayan public and private sector interests have worked to position the beef industry favorably in order to expand exports to the European Union. The opportunity occurred because of the EU ban on imports of beef produced with hormones and requirements for the traceability of products. The reliance of the Uruguayan industry on pasture grazing systems rather than feedlot operations and the establishment of the Dicose system for traceability produced beef consistent with European demands. In addition, the pronouncement of Uruguay as free of foot-and-mouth disease in 1995, based on sanitary improvements, also promoted the export potential of the industry. Marshall and colleagues also describe the efforts of a cooperative to offer incentives to producers to go beyond the base quality requirements. In contrast to the study of Guatemalan raspberries, which focused on public and private sector reaction to a foodborne illness outbreak, Chapter 7 shows how the public and private sectors in a developing country can work proactively to augment exports.

The third section of the book presents six papers covering specific issues and methodological challenges in modeling the interface between trade and quality. The section begins with two papers by Orden, Josling, and Roberts (Chapter 8) and Alston and James (Chapter 9). Orden, Josling, and Roberts develop a model of world poultry markets that takes into account traditional barriers to trade such as tariffs as well as potential barriers arising as a result of regulations intended to protect human and avian health. They explicitly recognize that the world market is differentiated into low- and high-value products, and that a small number of countries are the major players in the trade. This approach allows the authors to evaluate the effects of sanitary barriers related to avian and human health in the context of the broader set of economic factors and policy decisions that affect trade flows. Based on an analysis of different scenarios of policy change, the authors conclude that there may be sufficient opportunities for arbitrage (i.e., opportunities to divert sales to other markets) so that imposition of stricter sanitary standards in one market may not have a significant impact on exports. However, the size of the impact and its distribution among countries depend on how widespread such restrictions become in the market. Thus Orden, Josling, and Roberts argue that multicountry trade arbitrage should be considered in assessing the impact of safety-related standards.

Alston and James point out that the assumption that agricultural commodities are homogeneous, an assumption almost universally made in trade modeling, may no longer hold in our global food economy. Commodities are in fact becoming more differentiated. When this differentiation is taken into account, analysis of alternative trade regimes may provide substantially different results than under the assumption of homogeneity. Alston

and James develop a theoretical multimarket model that allows for quality differences. They then undertake numerical simulations to demonstrate how alternative policy scenarios could influence the wheat market in the European Union when it is differentiated based on quality. For example, they demonstrate that with a per unit import tariff reduction, consumption of the low-quality product is greater and the reduction in consumption of the high-quality product is smaller than would be predicted without taking quality differentiation into account. Furthermore, total consumption and the average quality of products consumed may change in different ways than as predicted in the no-quality differentiation case.

The last four chapters focus on the role of differentiation via standards, certification, and labeling on quality and quality assurance in international markets. Roe and Sheldon (Chapter 10) present a generalized model of vertical quality differentiation in a trade environment. The following three chapters deal with specific examples of the use of certification and labeling in markets with international trade: Golan and Kuchler (Chapter 11) discuss labeling of foods produced with the use of biotechnology, Lohr and Krissoff (Chapter 12) analyze the operation of organic standards that differ across countries, and Zago and Pick (Chapter 13) examine the welfare impacts of differentiation of food products based on geographical origin.

Roe and Sheldon focus on the role of labeling programs in markets for products with credence attributes that are vertically differentiated. In such markets, consumers agree on what constitutes high and low quality and will purchase products of different quality, when they can identify that quality, based on their income levels. In the absence of trade, Roe and Sheldon's model shows that credible private or public certification and labeling programs can increase welfare by allowing consumers to evaluate quality and facilitating the existence of a market for high-quality products. In addition, they explore whether and how this effect is altered based on whether the labeling program is binary (if the product meets a threshold level of quality it can be labeled) or continuous (products are rated and labeled on a continuous scale). They then address the effect of trade among countries with the same income levels (e.g., north-north trade) on industry structure, trade levels, and consumer welfare with both types of labeling programs and harmonization versus mutual recognition of labeling programs among countries. Roe and Sheldon conclude, based on their modeling efforts, that the consumer welfare effects of trade depend on the circumstances in individual cases.

Golan and Kuchler address the contentious issue both within the United States and between the United States and its trading partners of whether or not biotech agricultural products should be labeled. Economists tend to argue that labeling and market differentiation of biotech and nonbiotech commodities and food product would expand consumer welfare. Golan and Kuchler argue that, although labeling may redress problems of asymmetric or missing information, thereby increasing consumer welfare and market efficiency, labeling will rarely be sufficient to correct problems of production externalities. They demonstrate that production externalities associated with biotech cultivation and production reduce the value of labeling as a tool to increase market efficiency. The observation that labeling is not a "cure-all" solution helps shed light on a basic confusion underlying the biotech labeling debate.

Lohr and Krissoff consider the trade and welfare implications of multiple regional and national organic standards that have been enacted worldwide. The authors suggest that

establishing credibility of a single minimum standard can reduce consumers' costs of obtaining information about the production process—an otherwise unobservable characteristic—and improve consumer welfare. To illustrate, Lohr and Krissoff simulate a partial equilibrium model of trade in organic wheat between the United States and Germany. The authors examine six cases—no equivalency in standards (the status quo), equivalency of standards with complete or incomplete import acceptance, exporters certifying in the importing country with complete or incomplete import acceptance, and exporters paying educational costs with incomplete import acceptance. When there is less uncertainty about standards, importing country consumers are better off accepting imports as equivalent to domestically produced organic foods. Moreover, the authors show that strategies to reduce resistance such as educational programs or foreign certification add costs to production that reduce quantity traded and impose welfare losses on exporting country producers and importing country consumers.

Zago and Pick (Chapter 13) examine the issue of quality differentiation based on linking a food product or its attributes to specific geographic origins. In the European Union, the goal of this linkage is to provide higher incomes to farmers and improve the quality of food items enjoyed by consumers. Zago and Pick develop a model to analyze the actual effect of EU regulations establishing and protecting products with geographical indications and products with designations of origin on producer and consumer welfare when the attributes being certified are credence in nature. They consider the case before and after regulation (including *ex post* labeling) that distinguishes the variety of the product offered. An interesting aspect of Zago and Pick's specification is that they allow high-quality producers (those with the designation) to exercise a degree of market power. They then compare the producer and consumer welfare effects given a competitive market for low-quality producers and a monopolistic market for high-quality producers. Moreover, with a goal of the EU regulations being to improve welfare in rural communities, Zago and Pick discuss the implications of these policies for producers in different geographic regions.

Overall, the chapters of this book underline the complex relationship between global food trade and consumer demand for quality. Trade can offer benefits to consumers in the form of access to products at lower prices, in greater variety, throughout more of the year, at higher quality. At the same time, trade can pose risks—for example, from products that are less safe or that undermine the quality of foods offered in the domestic market. Governments enact policies to manage these positive and negative effects, and may also be pressured to use quality, particularly safety, regulation to protect domestic industries. The WTO trade disciplines attempt to oversee this decisionmaking process at the national level to ensure that regulations serve legitimate ends. However, the WTO must tread lightly or risk losing support in countries that wish to enact stricter regulations on an increasingly broad array of food product attributes. The weight of the analysis presented here clearly shows that the welfare impacts of global food trade, in markets where consumer demand for quality is increasingly differentiated, deserves detailed and nuanced consideration.

Mary Bohman
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Barry Krissoff

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The International Agricultural Trade Research Consortium (IATRC) is an organization of more than 180 economists from 25 different countries, interested in research, policy analysis, and current developments in international agricultural trade. The objectives of the IATRC are to enhance the quality and relevance of international agricultural trade research and policy analysis; encourage collaborative research; facilitate communication among trade researchers and analysts drawn from universities, government agencies, and the private sector; and improve public understanding of international trade and trade policy issues. Each summer, the IATRC sponsors a symposium on a topic related to trade and trade policy from which proceedings are published. Additional information about the IATRC is available at http://iatrcweb.org.

NE-165 does research on the impacts of changes in strategies, technologies, consumer behavior, and policies on the economic performance of the food system, and on how private and public strategies influence improvement in food safety and other quality attributes. It has over 100 members around the world, primarily from universities and government agencies, and a core research group at the Food Marketing Policy Center located at the University of Connecticut and by subcontract at the University of Massachusetts. NE-165's specific research areas in the food system are industrial organization, competition policies, strategic decisionmaking and marketing, cooperative strategy, consumer risk perception and demand, risk assessment and benefit–cost analysis, and food quality and safety. Additional information about NE-165 is available at http://www.umass.edu/ne165.

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