Full Information Product Pricing Regimes: Policy Implications for U.S.-Mexico Sustainable Commerce

by

Luis F. Luna-Reyes
Universidad de las Américas Puebla

David F. Andersen
University at Albany, State University of New York

Deborah Lines Andersen
University at Albany, State University of New York

Douglas Derrick
University of Nebraska at Omaha

Holly Jarman
University at Albany, State University of New York

Puentes Consortium Project

April 26, 2012

Abstract

Current trends in making supply chains more transparent and bringing information usually not available to the consumer and other players into the market are changing the ways in which consumers make decisions about the goods and services they buy. One example of these changes is the networks of consumers, producers, and other players in the supply chain sharing value-adding information packages about the social and environmental impacts of the products they exchange, or Full Information Product Pricing (FIPP) Networks. Our current research suggests that these FIPP Networks have the potential to promote market-driven approaches to international trade systems, which may work as a complement to more traditional state-led trade systems, such as the North American Free Trade Agreement (NAFTA), in promoting sustainable trade. We envision that such an approach should involve collaboration among government, supply chain and sustainability experts, industry associations, and consumer organizations sustained by a technological architecture to support interoperability and information sharing. We discuss important trade-offs related to costs and sustainability, privacy, and access to information. The paper finishes with a set of recommendations involving the creation of a governance system to promote this market-driven approach to sustainable international trade.

Resumen

Algunas tendencias actuales están promoviendo mayor transparencia en la cadena de suministro trayendo información que no estaba típicamente disponible para los consumidores y otros actores en la cadena de suministro. Estas tendencias están cambiando la forma en la que los actores en la cadena de suministro toman decisiones sobre los bienes y servicios que consumen. Un ejemplo de estas tendencias son las redes de consumidores, productores y otros actores que comparten paquetes de información relacionados con los impactos sociales y ambientales de los productos que intercambian, o Redes de Precio de Información Completa (RPIC). Nuestra investigación sugiere que estas RPIC pueden promover enfoques de mercado para facilitar el comercio internacional, que sirvan como complemento para sistemas de comercio liderados por el Estado como el TLCAN para facilitar el comercio sustentable. Nuestra visión de este enfoque involucra la colaboración entre el gobierno, expertos de la cadena de suministro y sustentabilidad, asociaciones industriales y organizaciones de consumidores, apoyados por una arquitectura tecnológica para compartir información y facilitar la interoperabilidad. En este artículo, discutimos algunos compromisos importantes que deben realizarse en términos de balance entre costos y sustentabilidad o entre privacidad y acceso a la información. El artículo termina con una serie de recomendaciones para la creación de un sistema de gobierno que promueva estos enfoques de mercado para el comercio internacional sustentable.

I. Information Asymmetry, Full Information Networks, and Sustainable Trade

Information asymmetry has frequently been identified as an important element to explain market dynamics (Akerlof 1970). In some markets, some players (usually the sellers) have better information than others about product quality (usually the buyers). Although in most markets it is possible to find "good" and "bad" products, both kinds of products have to be sold at the same price because consumers have difficulties telling the difference between them. This phenomenon can also introduce several issues of externalities in production methods (e.g., pollutants from production, exploited workers) that might not be fully incorporated into final market prices.

Although information asymmetries decline over time as markets grow and mature due to quality information acquired by repeated use (Wankhade and Dabade 2006), some products such as tomatoes, coffee, or beef are less likely to experience such dynamics because they are not always linked to information other than price. As an alternative strategy to reduce information asymmetry, a growing number of consumers and producers are increasingly paying attention to information about where, when, how, and by whom our food and goods are produced. We are calling such sets of relationships between consumers and producers "Full Information Product Pricing (FIPP) Networks."

Although non-price information is sometimes a requirement to import goods and services (for example, in the case of food safety), there is not a single way to handle information and requirements to find the right balance between promoting commercial exchange and creating protective trade barriers. In state-led trade systems, multilateral, regional, or bilateral negotiations produce trade agreements that are enforced by dispute settlement mechanisms in the World Trade Organization (WTO). Multilateral rules say little in general about non-price information related to social, health, or labor standards. Regional or bilateral agreements sometimes incorporate these issues as narrow sets of standards or as side agreements to the main text. Many states also unilaterally adopt formal trade preferences, which allow governments to restrict trade from states that they claim violate non-price principles, and promote trade from states who uphold them.

The North American Free Trade Agreement (NAFTA) contains important side agreements designed to ensure that firms active in the NAFTA region observe fair labor practices and strive to minimize the environmental impacts of their activities—(1) The North American Agreement on Environmental Cooperation (NAAEC), and (2) The North American Agreement on Labor Cooperation (NAALC). The Commission for Environmental Cooperation and the Commission for Labor Cooperation are two trilateral organizations established within NAFTA to monitor and promote these agreements. Although both commissions share many success stories, sometimes it is difficult to distinguish between legitimate domestic regulations—which protect workers, public health, or the environment—and barriers to trade.

This state-led trading system coexists with a growing number of market and network-based regulatory and product certification systems. Such systems include standards produced by the International Organization for Standardization, industry-wide accreditation bodies, or non-governmental product certification schemes. These non-state systems are already an alternative to the state system, and governments can play a greater role in forming or influencing non-state regulatory and certification systems. Although governments already have well-established standards for public consultation, supporting non-state systems offers the potential of involving consumers in the decision structure by building systems that encourage consumer participation in creating expectations about how corporations should act. In fact, organizations such as GoodGuide, Barcoo, the Citizens' Market, NuVal, or WeGreen are already promoting such consumer involvement by promoting more sustainable or ethical consumption patterns.

In this paper, our objective is to discuss the potential for market-driven approaches to complement more traditional state-led trade systems in promoting sustainable trade. To accomplish this objective, we introduce six ideal types of FIPP networks. We then analyze the implications of each system type across a series of policy domains: governance, oversight and control, consumer-to-producer connections, information collection and dissemination cost, data quality and independent verification, and consumer trust. Of particular import in our research, our sixth type of FIPP system involves a set of technologies to enable the delivery of information about products to end consumers at the point of sale. We discuss the key trade-offs and

institutional changes needed to implement the sixth type of FIPP system, before finishing with policy recommendations.

II. Research Supporting this Project

The research that supports this paper emerges from the ongoing work of the North American Digital Government Working Group, a consortium of researchers exploring the impact of product labeling, data architectures, and government-sponsored information policies on the market share of organic, fair trade, and eco-friendly products in the NAFTA region. In these alternative markets, price is often complemented with information, transmitted through trusting networks or certification labels that convey the conditions under which a product is produced and distributed.

Our full research team has been involved to date in five interlinked streams of work that explore how FIPP regimes can be supported and encouraged by market and government action in domestic, international, and especially bilateral trading regimes such as the NAFTA agreements. Since our work originated with the North American Digital Government working group, it continues to be centered on the case of coffee grown in Mexico, and roasted and consumed in the United States and Canada.

Case Studies of Existing FIPP Systems. As part of this work, we have completed a number of case studies from the NAFTA region (Zhang et al. 2008), where producers created and sustained a FIPP network to deliver products to end consumers with a value-adding information package that allowed them to appeal to specific consumer preferences for products with better social or environmental impacts while at the same time realizing a price premium.

Analysis of Trust Relationships within FIPP Networks. As an extension of this case study work, we completed an analysis of types of consumer-producer trust relationships and their drivers and inhibitors (Luna-Reyes et al. 2009; Luna-Reyes et al. 2011). This case-based work reinforced the experimental work of Komiak and Benbasat (2006) and demonstrated the importance of trust in FIPP networks, and in the adoption and use of online recommendation agents by end consumers.

Focus on Coffee Grown in Mexico and Sold in the United States. We deepened one of our cases by conducting more extensive interviews with coffee producers in Mexico, creating a more detailed focus on the extended supply chain that supports the production and distribution of coffee between a single coffee cooperative in Puebla, Mexico, and the consumer market in Canada and the United States. We developed a preliminary simulation model to understand the dynamics of the coffee supply chain, seeking to understand how consumer preferences for the whole "micro world" that produces coffee (including characteristics of producer, wholesaler, and retailer organizations) might be different from simple consumer preferences for the final product itself (Andersen et al. 2008).

Identification of Five "Ideal Type" FIPP Systems. Based on our field research, we have identified five different existing types of FIPP systems that are listed below. All these types provide certain advantages and limitations for producing scalable transnational FIPP regimes that can approximate the trusted exchange of information that has traditionally occurred in face-to-face trusted networks.

- Face-to-face producer-to-consumer networks, such as local farmers selling to local buyers in a trusted relationship with no additional members in the supply chain. This system does not scale well to mass consumer markets.

- Voluntary certification organizations, which include early organic food producer certification regimes, and various Fair Trade Organizations (coffee, chocolate, craft goods), and rely on standards established by non-government organizations such as the Fairtrade Labeling Organization (FLO) or the Fairtrade Federation. These seek to approximate the trusted conditions of traditional markets. A problem of these systems is the diversity of standards and maturity of certification systems across organizations (Whitmore et al. 2010).

- Government-sanctioned certification regimes rely on national norms, laws, and regulations, usually implemented through independent certification organizations accredited by government and international standards. The United States Department of Agriculture (USDA) and the Conseil des appellations réservées et des termes valorisants (CART-V) in Quebec constitute examples of such authorities for organic products. All

participants in the supply chain need to be certified, and these government institutions have the faculties to trace goods and products, identifying the certifying agency inside their own borders. In this system, different countries develop and sanction their own laws and regulations. Producers take the burden of multiple certifications, complying with each country standard.

- Consumer-driven social computing systems are networks of consumers who research environmental, social, or ethical practices in organizations, sharing the information with other consumers, so they can make their buying decisions. These networks use the Internet or other electronic media to communicate and disseminate their findings, and some of them incorporate social media and Web 2.0 applications in their strategies. Examples of these networks are associations such as El Poder del Consumidor in Mexico (http://www.elpoderdelconsumidor.org/).

- Proprietary supply-chain-driven systems are produced by private sector organizations (such as Walmart) in order to differentiate their products. These systems need global databases of products as well as a method for assessing product characteristics and rating them across an array of options.

The next section compares these five ideal types of FIPP regimes in terms of their key features: their underlying values, governance, connections between consumers and producers, costs, data quality, and consumer trust.

III. Policy Domains for this Discussion

Table 1 presents a comparative overview of the underlying values and five crosscutting issues that frame the effectiveness of the five differing types of FIPP regimes. The first column on the table shows the underlying values behind the system. The "gold standard" is face-to-face communication and interactions in a close community. Voluntary certifications rely on producer decisions to join an organizational network committed to specific environmental, ethical, and social values. Although international organizations promoting voluntary certification exercise some influence in product commercialization opportunities, certification only becomes mandatory when government sanctions the certification system. In the case of consumer

communities, information flows as a result of consumers' shared interests and values. Finally, proprietary systems respond to the interest of a company to differentiate itself from its competitors, attracting new customers.

In terms of governance, trust in face-to-face networks of producers and consumers reduces the need for oversight and control. In the case of voluntary certification systems, it is common to have shared governance among several organizations representing consumers, retailers, and producers. The governance body decides collectively on certification standards and processes of oversight and control. Government-regulated FIPP systems rely on governance by government agencies such as the USDA or CARTV. Government agencies regulate and provide oversight and control in such systems. Consumer networks are loosely coupled systems usually grouped under the umbrella of an NGO leading the effort and providing some guidance related to rules for sharing information and participating in the network. Proprietary systems governance can be of two types. In the case of luxury products, it is usually the governing body of a single corporation. The case of Walmart, on the other hand, promotes the integration of the supply chain under the leadership of a dominant retailer.

Table 1. Cross-cutting Policy Issues across Various Types of Full Information Product Pricing (FIPP) Regimes (Whitmore et al. 2010)

FIPP Type	Underlying Values	Governance and Oversight	Who Pays? (and financial incentives)	Data Quality and Independent Verification	Consumer Trust	Implica-tions
Face-to-face producer-to-consumer networks	Replicate traditional communities of trust	Individuals know and trust each other	Personal connections and trust dominate supply chain	Trusted information integrated into final product price	Trusted relationships obviate need for data verification	"Gold standard" based on personal knowledge and trust
Voluntary Certification Organizations	Producers certifying compliance with standards	Typically NGOs linked to producer organizations with some retail networks	Certification focuses on producers/ consumer confidence critical	Producer organizations or co-ops pay fees to certifying agencies	Voluntary self-reporting with diverse verification standards	Depends on reputation of certifying organization at consumer sites
Government-sanctioned Certification Regimes	Government certifies compliance with standards	Government agencies with legal mandate and sanctions	Often entails complete monitoring of complete supply chain	Taxpayers support consumer protection functions, producers pay fees to certifying agencies	Data quality and independent verification and inspection key components	Usually high, can be tempered by cynicism about industry lobbying efforts
Consumer-driven Social Computing Systems	Consumers inform each other of compliance with standards	Loose networks of like-minded consumers	Consumers provide opinions on producer and supply chain practices	Typically low cost, with consumer input to populate evaluations	No independent check on data quality beyond crowd sourcing	Social networks typically create high consumer trust
Proprietary Supply-Chain-Driven Systems	Commercial interests align with consumer confidence	Corporate integration by dominant retailer or vertically integrated supplier	Data systems track some aspects of production for complete supply chain	Tracking systems incorporated into production/ distribution costs	Profitability depends on reliable supply chain data, but no third party verification	Consumers must assess information sources and corporate intentions
Scalable Internet-enabled Open Source System (I-Choose Prototype)	Open access to reliable inspection and certification information	Mixed governance by standards bodies (ISO), industry, and possibly government-led sanctions	Certification and inspection information provided via common standards on the Internet	Internet infra-structure sponsored by supply chain operators (who capture a price premium)	Third party consumer advocates actively policy information—possible government sanctions for fraud	Key issue for these systems to succeed—likely linked to social computing systems to gain trust

In terms of connecting producers and consumers, the different FIPP types also vary by the mechanisms used. Face-to-face networks connect producers and consumers directly during transactions. Voluntary certification systems connect producers and consumers through a trusted seal, and sometimes by sharing personal knowledge among retailers, producers, and consumers. Trust in the network and the seal are key in the process. Government certification systems also rely on a seal showing compliance with standards. Unlike voluntary systems, government has the capability to trace products along the supply chain. Proprietary systems usually have the capability to trace some data related to the production process in the supply chain.

Costs and incentives in each of the ideal types of FIPP systems are shared in different ways between producers and consumers. In the case of the face-to-face networks, the cost is low because the system relies mainly on trust. Consumers are willing to pay a premium price because of their personal knowledge of the producer and the production process. Consumer social networks also have very low costs, and consumers assume the cost of research in exchange for valuable information from other consumers in the network. In voluntary and government certification systems, producers and other participants in the supply chain pay the cost of certification with the incentive of getting a premium price in exchange. In the particular case of government-sanctioned systems, taxpayers cover the cost of control and oversight. Finally, in proprietary systems, participants in the supply chain pay the costs.

Data quality varies among different kinds of FIPP systems. Personal contacts in face-to-face networks offer high data quality with no need of third party verification. Both certification systems look to provide high data quality, and also both rely on independent verification of such quality. However, voluntary certification systems have much more variability in data quality mainly because of differences in standards and processes. In consumer networks, data quality and verification are in charge of the network itself. Proprietary systems require high data quality to promote consumer trust and profitability. However, there are no independent third party verification mechanisms.

The final column in the table provides an overall indicator for the system—consumer trust—which plays a key role in all FIPP systems. In our larger research project, we are interested in

how using advanced technologies such as cloud computing, interoperable data architectures, and social computing systems can support the development of scalable systems that approximate some of the desirable properties of the smaller-scale networks that we studied in the four cases. Trust, all three forms of trust—institutional, calculative, and relational—will play a large role in all forms of FIPP customer-oriented systems and networks.

It seems clear to us that adding social computing components to such systems can be a good way to build relational trust by empowering consumer activists to play a more prominent role in FIPP-oriented markets. Research on trust in large-scale systems indicates that most individuals trust peers over faceless certification agencies. For example, the Centers for Disease Control (CDC) reports that most individuals take to heart its advice on a communicable disease such as H1N1 flu more readily when it is forwarded to them from a peer-computing site rather that when downloaded from an official CDC site. But what information can social computing sites use to develop reliable ratings? Peer ratings based on consumer experiences with the product alone will not work since FIPP packages, by definition, report on unobservable attributes of products (e.g., when produced, by whom, and under what conditions).

Simple and straightforward certification systems will probably not work because as we have seen in the cases, peers often distrust government and other official certification sources. The answer may rest in some combination of system features such as providing online unconfirmable meta-data about certifiers, providing information about how certifiers are certified, by allowing consumer advocates to rate certifiers as well as producers and supply chain operators, and perhaps even providing a legal status for some portion of the FIPP information package (with stiff penalties for providing false information or misusing such information as in the case of U.S. Securities and Exchange Commission [SEC] prosecutions for insider trading).

IV. The I-Choose Prototype as a Sixth FIPP, Point-of-Sale Information System Ideal-type

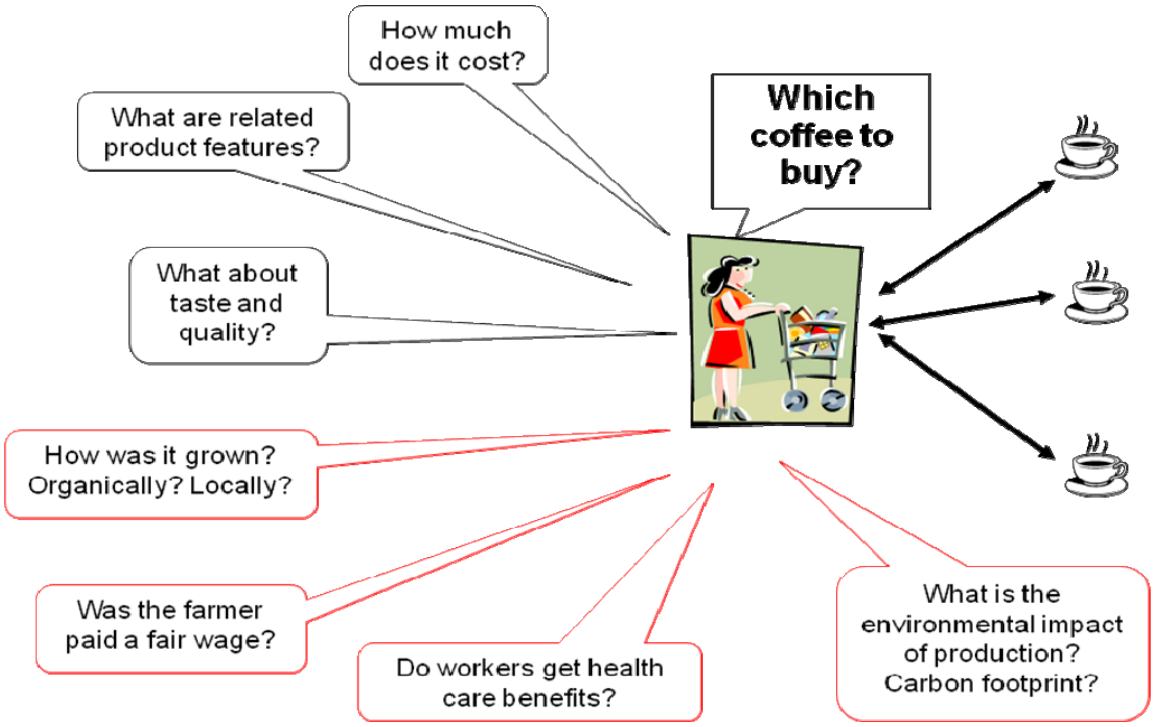
Our current research is focused on creating a prototype system that might be used to explore the creation of a sixth type of ideal type FIPP network—a more fully scalable FIPP network that uses Internet-based information standards and social computing systems to deliver product

information from producers to end consumers (Luna-Reyes et al. 2011). This prototype system is envisioned as a creative combination of many of the elements in already existing ideal types of FIPP systems, especially those elements that drive consumer trust in the information being delivered through the online system. We call this prototype the I-Choose system. Our initial focus is on coffee grown in Mexico and sold in Canada and the United States. This enables us to give our initial prototype a relatively tight research boundary with a product with fairly advanced product labeling and inspection standards. To illustrate this focus, Figure 1 presents the dilemma of a conscientious consumer, Ellen Richardson, who is trying to decide which brand of coffee to purchase. Of course, Ellen is concerned about all of the search attributes of her coffee that she can discern directly by inspection in the supermarket: cost, quality, degree of roast (from mild to dark), and other product features such as packaging, visual appeal, and placement on the shelf.

However, Ellen may also be interested in a number of other unobservable credence attributes of her coffee—features about her coffee that are not known to her but known within the supply chain and not brought to the marketplace. She may be interested in these credence attributes and seek information about them by asking questions such as: How was her coffee grown—organically? locally? Was the farmer paid a fair wage? Do workers who processed her coffee get health care benefits? What is the environmental impact of its production? What is the carbon footprint of her coffee's production methods? Ellen is one of the consumers who is willing to pay a price premium for coffee that is produced in ways consistent with her values. Unlike search attributes, gathering information about credence attributes imposes significant monetary and cognitive costs on consumers such as Ellen.

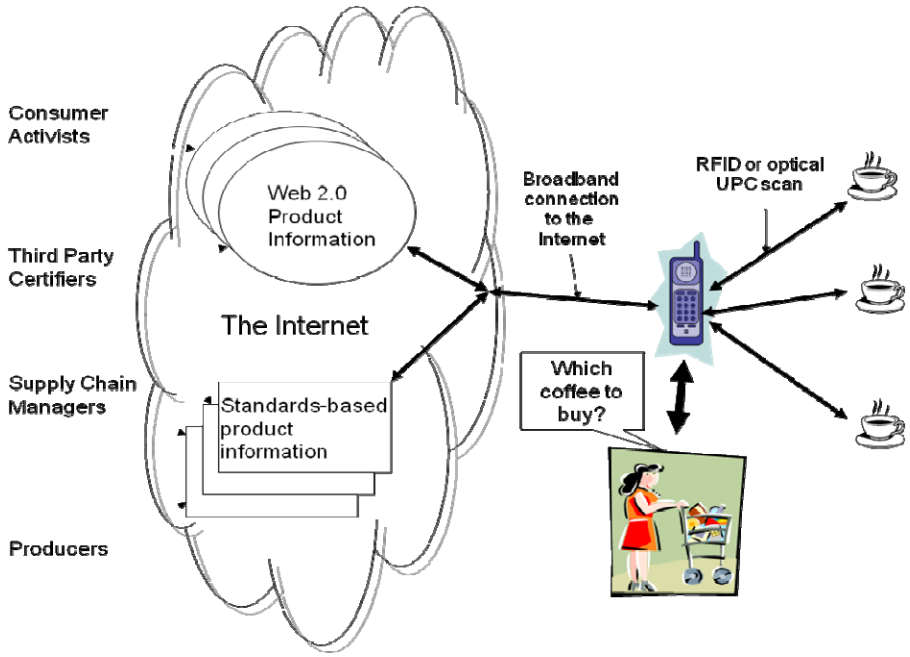
Thus one of the goals of the I-Choose system is to alleviate these costs for Ellen as she seeks answers to the above questions so that she can make a value-consistent coffee purchase.

Figure 1. I-Choose: Supporting Value-Based Consumer Decisions (Luna-Reyes et al. 2011)



As illustrated in Figure 2, the I-Choose system has three basic operational components. First, we envision that Ellen will be shopping with a handheld shopping support device such as a smart phone. This component of the system already exists, and most are already being augmented by various existing apps. Ellen will be able to scan the Universal Product Code (UPC) of her purchase (or perhaps a radio frequency identification [RFID] tag) so that her smart shopping device can uniquely identify the product. Her smart phone device will then connect to the Internet and look up information on her chosen product, using an advanced consumer preference app to sort through the information packages available for each uniquely identified product in order to do true comparison shopping. Hella and Krogstie (2010) describe some of the details of an ontology-based shopping support system currently in prototype stage, a precursor to the system that Ellen will probably be using.

Figure 2. Major Components of I-Choose: A Socio-Technical System to Support Values-based Consumer Decisions Using Trusted Information (Luna-Reyes et al. 2011)



The remaining two major components of the I-Choose system remain under development and are the subjects of our current research efforts. The first of these is a standards-based product information data architecture. It will allow multiple stakeholders to seamlessly, reliably, and easily exchange data, to assemble in real time an information package describing details of Ellen's coffee purchase as well as most any other UPC or RFID-identified purchase that Ellen may choose to make.

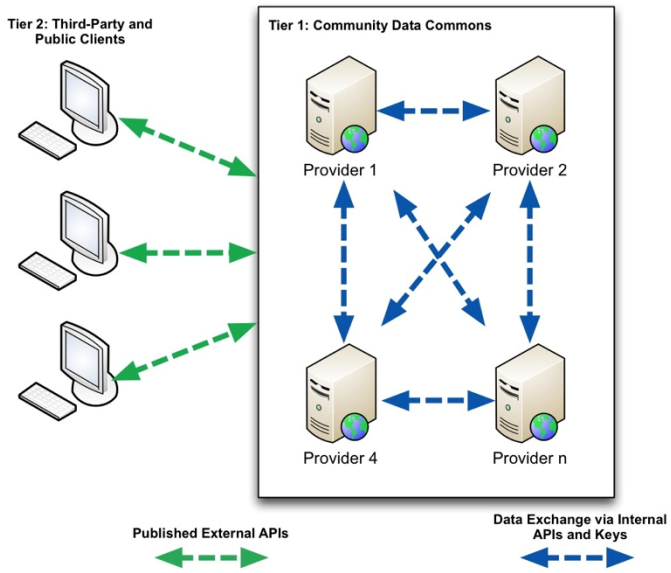
Our current research explores the feasibility of using OWL-based ontologies attached to an XML-based information package to facilitate interoperable data exchange between key stakeholders. We visualize that at least four classes of stakeholders will share competing interests in how these information packages are assembled. Some producers will be highly motivated to fully divulge the details of how they have produced their products out of a hope that they will be able to charge a price premium for their products. Some retailers may be motivated to release less information about their suppliers out of a need to protect information about supply sources and production methods associated with the products that they will sell. Third-party certifiers will strive to create trusted certifications and evaluations, meeting standards and policies

sometimes imposed by government regulation of their information environment and sometimes working to meet information and certification standards enforced by voluntary NGOs or even private-sector enterprises. Finally, consumer advocates will want to play the role of checking, simplifying, and parsing complex information packages to deliver trusted information to ordinary consumers.

We envision a two-tiered standard for data sharing that is developed through an iterative process by the various members of the I-Choose community (Figure 3). The two tiers consist of:

- An agreed upon set of data that is shared within and verified by the community (called the *data commons*)
- A subset of the data commons that is available to the public and third-party developers via standardized web-service APIs

Figure 3. Two Tiers of Data Sharing



In the data commons, the participating members will agree to an interface and data specifications for a Web service that each member must implement to be considered part of the community. The standard for data exchange will be an encapsulated set of internal (i.e., community) Web APIs. These community specifications will be a defined set of Hypertext Transfer Protocol

(HTTP) request messages coupled with the definition of the structure of the expected response messages. The data common's standard will specify data responses that are complete, consistent, and accurate and will evolve over time based on the community's desires. The standard will also specify the standardized web port for data exchange and the exact format of the requests and responses (e.g., Extensible Markup Language [XML], JavaScript Object Notation [JSON]).

Each participant in the data commons community will be responsible to implement the agreed upon standard by developing and deploying the Web service specification. This will allow each organization the ability to maintain its own database systems, but facilitate the free flow of information between the community members. The producers will issue data keys to other members of the community, which will control access to the data commons. Each producer will be able to ensure the privacy and integrity of its data and members of the community can self-regulate and verify other members by simply sending the agreed upon data requests to members' Web services and then examining the returned responses to ensure compliance with the standard. A similar process will be applied to provide access to third parties and the public. A "non-keyed" data request format will be published as the standard, which will allow the release of a subset of data to non-community members. The advantage of using these Web services APIs is that it will allow for development of "mashups" using the public data from the community for easy comparison and consumption. A mashup is an application or Web page that combines and uses data from multiple sources. Mashups can provide fast and easy integration using the published community APIs and data sources from the various producers. This architecture will also allow mobile device developers to create mobile applications that leverage all of these new sources of information.

This final component of the I-Choose prototype system and research program is animated by the power of Web 2.0 social computing platforms in order to produce trusted and easy-to-understand information. We believe that ordinary users simply lack the time and ability to fully grasp and effectively parse the full complexity of an ontology-based data interchange system. Certification and verification structures, designed to add trust to these systems, will undoubtedly add complexity to the data architecture, paradoxically perhaps leading to lower levels of consumer trust in such complicated information systems. We believe that the future of trusted information

for end consumers rests in social computing networks. The combination of standards-based data architectures to support interoperable data exchange with Web 2.0 social computing systems will produce scalable, trusted information linking end consumers to producers and their supply chains.

V. Tools for Rethinking Bilateral and International Trade Relationships

An enormous amount of data about the provenance and safety of the products we buy, our health care, education, financial transactions, and many other activities regulated by governments are held by private organizations. Much of this data is fragmented and separate from publicly assembled datasets. As our I-Choose system shows, sharing key elements of these data through a collaborative and consensual system could potentially promote more credible and more sustainable commerce. The combined, trusted data that result from such a system could be used as an evidence base for policy decision-making, in market differentiation mechanisms, or to overcome fragmentation in some sectors that causes costs to rise.

But the use of technology to facilitate the sharing of private data also presents a number of challenges. This section explains the trade-offs associated with governing a potential I-Choose system, and discusses how they might be overcome.

Existing Trade Governance and Non-Price Information

In the modern context, it is inaccurate to speak of a single form of governance for international trade. A hierarchical global system—created by states, consisting of binding legal rules, and headed by a formal international institution, the World Trade Organization (WTO)—exists alongside a growing number of market and network-based regulatory and certification systems covering many products and services. There is a rapidly growing literature on these systems, which include standards produced by the International Organization for Standardization (ISO), products produced by transnational private sector regulators such as financial product rating agencies, industry-wide accreditation bodies, international commercial tribunals, and non-governmental product certification schemes (Auld et al. 2010; Büthe 2010; Bartley 2003; and on voluntary programs Coglianese and Nash 2001; Darnall, Potoski, and Prakash 2010).

In terms of how they handle non-price information, there is an important distinction between state and non-state regulatory systems. The state-led system intentionally separates economic issues from the social and environmental consequences of trade, with the aim of identifying and eliminating trade barriers (Jarman 2009; Jarman et al. 2011). The very purpose of non-state systems, however, is often to combine price and non-price information in order to increase the desirability, and the value, of the goods being traded (on coffee, for example, see Fridell 2007). At the moment, these two types of systems are not particularly compatible. As FIPP usage grows, however, it may become increasingly difficult, or less desirable, to separate price and non-price information, challenging the existing state-led trading system, and presenting governments with a range of new regulatory choices.

The state-led system regulates global trade at the macro level via a set of legally binding rules. Multilateral, regional, and bilateral negotiations between states produce trade agreements, which are enforced by dispute settlement mechanisms in the WTO, and some regional trade agreements. The resulting multilateral rules say comparatively little about the social, human rights, public health, or environmental aspects of trade, while bilateral and regional agreements, where they do address these issues, incorporate them as narrow sets of standards that are often divorced from realities on the ground. International Labor Organization (ILO) standards such as prohibitions on forced or child labor, and commitments to uphold multilateral environmental or human rights agreements are sometimes incorporated into the text of trade agreements, or included as side agreements to the main text (see Destler and Balint 1999; Elliott 2003; Greenhill, Mosley, and Prakash 2009). Many states also unilaterally adopt formal trade preferences (General Systems of Preferences, or GSPs), which allow governments to restrict trade from states that they claim violate key non-price principles, and promote trade from states that uphold them.

Outside of these low-level, commonly agreed upon standards, the state-led system finds it difficult to distinguish between legitimate domestic regulations, which protect workers, public health or the environment, and barriers to trade. In fact, trends in WTO dispute rulings suggest that over time the state-led system is moving away from a nondiscrimination approach, where states agree not to discriminate against foreign producers and to treat trading partners equally,

toward the elimination of more broadly defined trade barriers (Trachtman 2003; Vranes 2009). This makes conflicts over domestic regulatory standards increasingly more likely.

For governments, the alternative to an increasingly conflicted state-led trading system might ultimately be to play a greater role in forming or influencing non-state regulatory and certification systems. Perhaps, as we have seen with organic products, governments will attempt to harmonize standards between emerging FIPP systems. In this sense, FIPP information could, in turn, provide an evidence base for the formulation of new product standards and regulations.

Governments already have well-established standards for public and interest group consultation on trade, public health, and environmental issues—requirements to publish their actions and hold public meetings, as well as established advisory group systems, which bring select stakeholders into regular contact with officials. Some of these public meetings, such as recent meetings to discuss the 2011 Food Safety Modernization Act (FSMA), already make extensive use of online tools. But great potential exists for governments to do more to bring consumers into the negotiating process—to make them part of the decision-making structure, not just an adjunct to it. For trade in goods, this means building a system that encourages broad consumer participation in formulating expectations for how corporations should act, incentives to support compliance with those expectations, and encouraging innovation among producers, suppliers, and entrepreneurs.

There are two key tradeoff dilemmas that regulators must take into consideration. First, governments and regulators must understand the commercial context surrounding FIPP systems, balancing cost considerations with information requirements. Second, there is a key trade-off between protecting private information and ensuring broad access to the system. Additionally, such considerations need to be balanced within a governance framework. We will introduce some recommendations related to governance in the last section of the paper.

Balancing Cost and Sustainability

The key question facing commercial actors engaging in the creation and provision of FIPP systems is, what is the necessary and desirable level of information that can be provided at a reasonable cost? Producers and retailers are interested in participating in FIPP systems because

of their potential to differentiate their products within crowded markets. Providing trusted information about the origins of a product to consumers can enhance a company's sustainable credentials against its competitors. But there are many questions about where the cost of such systems will fall within the supply chain. Will costs of product traceability fall on the producer or the consumer—directly through prices or indirectly via taxation? Where should these costs fall to establish and maintain a successful FIPP system?

Our functional and usage explorations above indicate that some common standards are necessary; harmonization of certain product information is required for the system to work. But establishing these standards may not be as onerous as it looks. The 2011 Food Safety Modernization Act already requires the Food and Drug Administration (FDA) to establish "a product tracing system to receive information that improves the capacity to effectively and rapidly track and trace food that is in the United States or offered for import into the United States." The European Union's Basic Food Law of 2002 requires information such as the names and addresses of suppliers, product descriptions, and delivery dates. In Germany, cattle receive a "passport" with this information, while in Belgium meat is labeled with bar codes containing the required data. It is not such a stretch to imagine that producers and suppliers might want to build on these skeleton information frameworks, providing additional data on production and shipping in the same formats, in exchange for the commercial advantages of accessing large communities of interested consumers. If all parties trust a system (e.g., I-Choose), the commercial benefits to companies in participating, rather than going it alone, may be significant.

Agreeing on the necessary data standards need not involve imposition. Handling this problem requires delicate negotiation and collaboration within a framework that engenders trust between organizations, as well as between consumers. Any governance system that aims to promote FIPP will need to bear this commercial context in mind. Overzealous regulation may turn off producers and retailers if the price is not right. At the same time, government-funding constraints critically shape regulatory capacity and direction. A key example is recent legislation[1] directing the FDA to improve product traceability, with the particular goal of improving food and drug

[1] FDA Food Safety Modernization Act, 2011, H.R. 2751. http://thomas.loc.gov/cgi-bin/bdquery/z?d111:H.R.2751

safety. The FDA may not currently have the capacity or resources to make this mandate work. A danger exists that such systems will be seen as purely or mostly revenue raising mechanisms, charging large registration fees for entry, with little real oversight exercised. For this reason, it is important to stress the need for broad participation in, and ownership of, any governance structure.

Balancing Privacy and Access to Information

The second dilemma is how to balance individual and commercial privacy with appropriate and broadly applicable open access to information. On the one hand, the promise of FIPP lies in the ability of such systems to provide, in theory, open and seamless access to a wide range of data. As the discussion of our "I-Choose" ideal type shows, Ellen is reliant upon broad participation from other consumers, companies and NGOs in her decision-making process. Technological social media integration must be balanced by broad participation from individual consumers and NGOs if the system is to be successful.

Broad participation is a key factor to the success of an I-Choose project. Small and medium enterprise formation (SMEs), small developers, and other groups may lack expertise and need support to participate in the scheme, while producers and suppliers with fewer resources may have little access to the Internet or technology. Current use of information systems and technologies varies in an important way not only across FIPP networks, but also among members of the network. For instance, coffee cooperatives' traceability systems of organic and fair trade coffee are very carefully designed paper-based systems, while retailers like Walmart are heavily investing in advanced hardware and sophisticated information systems. Any governance mechanism would need to incentivize producers and suppliers with fewer resources to act collectively in order to overcome these difficulties. One important suggestion was that any governance system should incorporate the promotion and facilitation of collective agreements between organizations with different levels of resources that are participating in the same FIPP system, setting out clear and equal relationships between the parties.

One further barrier to access is the ability of consumers to access information in their own language. Any governance system should consider the need to promote crowd-sourced

translation of various data. There are also important legal requirements in some cases. In Canada, for example, there are legal requirements to translate official information into both French and English. Translation may impose additional cost burdens in jurisdictions with multiple language requirements.

It is not just necessary to provide open access to information. FIPP systems are also about trust in that information and the organizations that provide it. To support that goal, there are some participants that we would want to deter. The explosion in recent years of the number of organizations using the Internet to make money illegitimately will affect online FIPP systems as well. Consumers should have the right to be protected from organizations that want to use such systems for direct marketing and scams. Additionally, in order for them to trust the system, consumers should have the right to expect that important personal information will be kept private in such open systems.

VI. Binational Public Policy Recommendations at the City, State, and Federal Levels

Governments already play an active role in providing FIPP information to markets by requiring labeling (e.g., FDA mandated food labeling), by providing certification standards ("USDA Organic" certification), and by providing for legal procedures associated with consumer protection, especially the litigation of complaints in markets characterized by information asymmetries (e.g., automobile "lemon laws"). In non-consumer contexts, government rules and regulations can legally certify the content of information packages such as SEC-mandated certification and regulation of stock portfolio prospectuses, up to and including providing severe penalties for falsification or misuse of information (e.g., insider trading) (Luna-Reyes et al. 2009).

In addition to how they are already involved, governments at city, state, and federal levels might be interested in FIPP practices for several additional reasons. FIPP networks are important to governments because they are important for promoting national exports, SMEs, and regional development. In the North American market, for example, imported cantaloupes were recalled from the market after the Food and Drug Administration found out that they were contaminated

by salmonella (Schmidt 2007). Walmart and other retailers have pushed their importers to sign contracts to guarantee that their products are not contaminated (Barrioneuvo 2007). Moreover, restrictions on importing products into the United States are increasing over time (Eamich 2007). One of the most important aspects of regional economies is the development of their production chains. FIPP networks offer alternative organizational forms to promote local and regional development. Exploring and understanding FIPP practices offers an opportunity to explore policies to promote this kind of development.

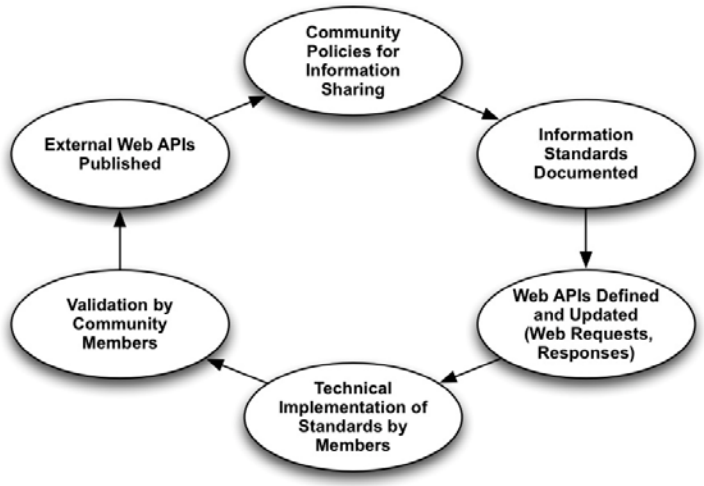
Fair trade practices attract wealth to regions and localities, improving communication between producers and end consumers through interorganizational networks (Powell 1990). Additionally, FIPP practices constitute a production alternative with low environmental impact because of their organic and social practices.

Information and Communication Technology (ICT) provides tools to facilitate and promote the development of these kinds of production and distribution chains. Technological capabilities of the Internet, together with traceability technologies, allow the producer to communicate relevant information about its product, adding value to the consumer by providing information that is not traditionally shared through market mechanisms. Current ICT has the potential to improve the necessary relationships in the networked environments inherent in FIPP systems (Papazoglou and Ribbers 2006).

On the other hand, FIPP networks recognize the importance of the locality and the region as natural places to promote economic development in the global world, integrating localities into the information society. In this society, competing for a place in the global network leads to a space in which cities and regions interact in the search for development (Catells 1996). While there are many reasons why government already does intervene and may intervene in the future, our research to date focuses on information-intensive strategies as they relate to trust development and information asymmetries.

We envision an iterative approach for developing and technically implementing the data sharing standards, as shown in Figure 4 below.

Figure 4. Iterative Process for Policy and Technical Standard Development and Implementation



The aim of any FIPP governance system should be to create a policy environment that can support, sustain, and aggregate innovative sustainability initiatives and build trusted relationships between participants. At the heart of this system must be a balance between mechanisms, which enable "hard" regulation, partnership building, and wider participation.

One way to do this might be to establish a North American Traceability Council (NATC), with representation from stakeholders (Jarman et al. 2011). Its members should include—at the least—government representation, sustainability and green supply chain experts, industry associations, and consumer organizations, with mandatory representation from or on behalf of producers and consumers with fewer resources. The NATC should be as "virtual" as possible to minimize costs to participants. The Council members would work together to set the binding minimum information standards that will allow the system to function, based on existing information standards for traceability in the three countries.

The NATC could then oversee the negotiation and implementation of a "virtual ISO," which is not just negotiated in private by interested parties, but is regularly reviewed by NATC and "consumer champions"—active consumers who participate regularly in reviewing products and organizations. The ISO would become a living set of process management standards for

providing, handling, and using product data. It would be regularly updated with input from stakeholders, consumers, and regulators. Companies, NGOs, or government bodies could be certified under this ISO if they consistently meet the requirements for peer and consumer review. Evidence from scholars of global policy suggests that ISO standards, such as ISO 9000, are popular with companies as means to differentiate themselves in the marketplace, and seen as both flexible and fairly objective.

Within the framework of the virtual ISO, companies could nominate key substantive parameters and set benchmarks against them. Participating companies would be free to use the aggregate information in their product marketing, creating their own labels and so on, but under advisement from the NATC and guidelines established through the ISO. Results of peer review would become incorporated into future versions of the ISO. This is not a pipe dream—elements of this system are currently being implemented in several other countries. France, for example, is carrying out a traceability experiment involving sustainable benchmarking by 160 companies (Barroux 2011). The European Commission is watching this experiment carefully in order to inform its own policy choices.

This peer review process would be matched by consumer review. Information from participating consumers acting in social networks—such as product and company reviews, or location information enabling better supply chain mapping—could contribute to the evidence base for future versions of the ISO and for benchmarking exercises. Consumers could opt to comment on and review products, producers, and other suppliers. They would benefit by seeing what others have recommended and use this to assist their purchasing choices. Companies, on the other hand, would gain the opportunity to "test" the sustainability of their products among participating consumers and create better connections. NGOs could submit information into the system about certification, inspection, and production practices. Reviews and reports would be verified and ranked by other participants. Consumers who submitted highly ranked product reviews consistently would become "consumer champions." Results from consumer comments could be aggregated and accessed by all participants. Significant consumer concerns would be addressed through the peer review process.

In the long run, these governance structures should promote North American partnership agreements between organizations, which lay out what the expectations are for participants. The aim here would be to promote model agreements to participating certifiers, supply chain operators, producers, and other participating groups, which draw on innovative experiments in intellectual property law and practice. While it may or may not be desirable to require such agreements, participants in the NATC process could at least become model organizations, putting pressure on each other to address these ownership issues, and sharing best practices. Given the current enormous resource cost to companies of acquiring and defending patents, any FIPP governance structure should embrace the potential inherent in these experiments.

In this way, I-Choose is an example of a socio-technical system consisting of a series of negotiated and agreed upon technical and organizational standards to allow data sharing and interoperability to increase the necessary transparency into supply chains to allow all participants in the chain to make the necessary decisions to promote sustainable trade.

References

Akerlof, G.A. 1970. “The market for “lemons”: Quality uncertainty and the market mechanism.” *The Quarterly Journal of Economics* 84(3): 488-500.

Andersen, D. F., L.F. Luna-Reyes, A. Whitmore, J. Zhang, and R. Roy. 2008. “Exploring the Dynamics of Full Information Product Pricing Networks: The Case of fair Trade Coffee in Mexico.” Paper presented at the 2008 International Conference of the System Dynamics Society, Athens, Greece, July 20-23.

Auld, G., B. Cashore, C. Balboa, L. Bozzi, and S. Renkens. 2010. “Can technological innovations improve private regulation in the global economy?” *Business and Politics* 12(3): 1-39.

Barrionuevo, A. 2007. “Food imports often escape scrutiny.” *New York Times*, May 1.

Barroux, R. 2011. “L’étiquetage environemental fait ses premiers pas.” *Le Monde*, October 6.

Bartley, T. 2003. “Certifying forests and factories: States, social movements, and the rise of private regulation in the apparel and forest products fields.” *Politics and Society* 31: 433–464.

Büthe, T. 2010. “Private regulation in the global economy: A (P)Review.” *Business and Politics* (12)3: 1-38.

Catells, M. 1996. *The Rise of the Network Society*. Oxford: Blackwell.

Coglianese, C. and Nash, J., eds. 2001. *Regulating from the Inside: Can Environmental Management Systems Achieve Policy Goals?* Washington, D.C.: Resources of the Future.

Darnall, N., M. Potoski, and A. Prakash. 2010. “Sponsorship matters: Assessing business participation in government- and industry-sponsored voluntary environmental programs.” *Journal of Public Administration Research and Theory* 20: 283-307.

Destler, I. M. and P.J. Balint. 1999. *The New Politics of American Trade: Trade, Labor and the Environment*. Washington, DC: Institute for International Economics.

Eamich, A. 2007. Statement of Dr. Richard Raymond Regarding Increased Testing and Re-inspection of Imported Meat and Poultry Products from Canada, November 27. Accessed June 4, 2008, from http://www.fsis.usda.gov/News_&_Events/NR_110307_01/index.asp

Elliott, K. 2003. "Labor Standards and the Free Trade Area of the Americas." Working paper, Institute for International Economics.

Fridell, G. 2007. *Fair Trade Coffee: The Prospects and Pitfalls of Market-driven Social Justice.* Toronto: University of Toronto Press.

Greenhill, B., L. Mosley, and A. Prakash. 2009. "Trade-based Diffusion of Labor Rights: A Panel Study." *American Political Science Review* 103(4): 169-190

Hella, L. and J. Krogstie, J. 2010. "A Profile Ontology for Personalised Mobile Shopping Support." 1st International Workshop on Adaptation, Personalization and Recommendation in the Social-semantic Web (APRESW), Heraklion, Greece, May 31. Available at http://ir.ii.uam.es/apresw2010/papers/apresw2010-paper05.pdf

Jarman, H. 2009. "Imagined Commodities: Trade and policies in the European Union and United States." PhD thesis, London School of Economics and Political Science.

Jarman, H., L.F. Luna-Reyes, J. Zhang, A. Whitmore, S. Picazo-Vela, D.L. Andersen, G.K. Tayi, T.A. Pardo, D.F. Andersen, and D. Sayogo. 2011. "I-Choose: Consumer choice, digital government, and sustainability in North America." Paper presented at the Fall 2011 APPAM Research Conference, Washington, D.C., November 3-5.

Komiak, S.Y.X. and I. Benbasat. 2006. "The effects of personalization and familiarity on trust and adoption of recommendation agents." *MIS Quarterly* 30(4): 941-960.

Luna-Reyes, L. F., J. Zhang, R. Roy, D.F. Andersen, M. Andersen, J. Arcelus de Diego, et al. 2009. "Information Strategies to Support Full Information Product Pricing: the Role of Trust." Paper presented at the Hawaiian International Conference on System Sciences-42, Hawaii.

Luna-Reyes, L.F., Z. Jang, A. Whitmore, H. Jarman, S. Picazo-Vela, D.L. Andersen, G.K. Tayi, T.A. Pardo, and D.F. Andersen. 2011. "Full information product pricing: An information strategy for harnessing consumer choice to create a (12% more) sustainable world." Working paper, Center for Technology in Government, Albany, New York.

Papazoglou, M.P. and P.M.A. Ribbers. 2006. *e-Business: Organizational and Technical Foundations.* Chichester: Wiley.

Powell, W.W. 1990. "Neither market nor hierarchy: Network forms of organization." *Research in Organizational Behavior* 12: 295-336.

Schmit, J. 2007. "U.S. food imports outrun FDA resources." *USA Today*, March 18.

Trachtman, J.P. 2003. “Lessons for the GATS From Existing WTO Rules on Domestic Regulation.” In *Domestic Regulation and Service Trade Liberalization*, edited by A. Mattoo and P. Sauvé, 57-82. Washington, DC: World Bank and Oxford University Press.

Vranes, E. 2009. “The WTO and Regulatory Freedom: WTO Disciplines on Market Access, Non-Discrimination and Domestic Regulation Relating to Trade in Goods and Services.” *Journal of International Economic Law* 12(4): 953-987.

Wankhade, L. and B.M. Dabade. 2006. “Analysis of quality uncertainty due to information asymmetry.” *International Journal of Quality and Reliability Management* 23(2): 230-241.

Whitmore, A., D.F. Andersen, J. Zhang, and L.F. Luna-Reyes. 2010. “A policy framework for evaluating full information product pricing (FIPP) regimes.” Proceedings of the 11th Annual Digital Government Conference, Puebla, Puebla, México, May 17-20.

Zhang, J., R. Roy, M. Charbonneau, L.F. Luna-Reyes, I. Lopez Dávila, J. Arcelus de Diego, et al. 2008. “Exploring Digital Government Initiatives to Expand Full Information Product Pricing (FIPP) Networks in NAFTA.” Paper presented at the 9th Annual International Digital Government Research Conference, Montreal, Canada, May 18-21.