International Agricultural Trade
Research Consortium

Consumer Demand for Traceability

by
Jill E. Hobbs*

Working Paper #03-1

This paper was presented at the IATRC Annual Meeting, December 15-17, 2002, Monterey, California. The Theme Day focused on "Consumer-Driven Agriculture and Trade."

*Jill Hobbs is an Associate Professor in the Department of Agricultural Economics at the University of Saskatchewan.

Correspondence regarding this paper should be addressed to:

Jill E. Hobbs
Department of Agricultural Economics
University of Saskatchewan
Saskatoon, Saskatchewan
S7N 5A8 Canada
e-mail: jill.hobbs@usask.ca

April 2003
ISSN 1098-9218
Working Paper 03-1

CONSUMER DEMAND FOR TRACEABILITY

Jill E. Hobbs*
Associate Professor
Department of Agricultural Economics
University of Saskatchewan

Prepared for the Theme Day "Consumer Driven Agricultural Trade" at the International Agricultural Trade Research Consortium Annual Meeting, December 15-17 2002

* Department of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5A8, Canada. Email: jill.hobbs@usask.ca

CONSUMER DEMAND FOR TRACEABILITY

FOOD SAFETY AND FOOD QUALITY

Consumers have become more discerning in their food consumption choices. Food safety and food quality issues have moved to the forefront of consumer concerns, industry strategies, and in some cases, government policy. A variety of private sector and public policy traceability initiatives have emerged, partly with the objective of reducing consumer information asymmetry with respect to food safety and food quality attributes. This paper examines the role of traceability systems in the food industry and distinguishes between ex post traceback systems and ex ante quality verification systems. Examples of voluntary private sector livestock traceability systems and public sector traceability programs are discussed, including the trade implications of mandatory traceability and labeling. The paper presents preliminary results from experimental auctions measuring consumer willingness-to-pay for traceability, food safety and on-farm production assurances.

A series of high profile food safety scares has heightened public awareness and concerns over food safety, for example the Bovine Spongiform Encephalopathy (BSE) crisis in the UK beef industry; in the US, *E. coli* O157:H7 outbreaks attributed to ground beef (Jack-in-the-Box; Tyson meats); in Scotland, the deaths of 22 senior citizens linked to *E. coli* O157:H7 contaminated meat purchased from a local butchers shop; in Belgium, the scare created by the contamination of animal feed with potentially cancerous dioxins in 1999; in Australia, the 'Garibaldi' incident in 1995 in which *E. coli* O157:H7 from a contaminated meat sausage resulted in several illnesses and the death of a child.

Food quality has become more important, particularly the widening dimensions of 'quality'. This is partly supply driven as a result of technological change and increased product differentiation possibilities. It is partly demand driven, with increased consumer interest in a wider array of intrinsic and extrinsic food attributes. Intrinsic quality attributes include palatability, nutrition, the functional (health) properties of food, etc. Extrinsic quality attributes include elements of the production environment, such as farm animal welfare, environmental stewardship, organic food. Many of these are credence attributes that cannot be detected by consumers without some form of quality signal, such as a label.

Often the same is true of food safety. Unless severe product deterioration has occurred, consumers cannot detect food safety hazards through sensory means prior to purchase. Occasionally food safety can be an experience attribute if a consumer experiences a food borne illness immediately following consumption of a specific food item. Usually, food safety has credence attribute properties. Clearly, this was the case for BSE in the UK beef industry – it was impossible for a consumer to know whether they had consumed BSE-infected beef immediately after consumption.

Consumers incur information costs in determining whether an experience or credence attribute may be present. Market failure can arise as a result of information asymmetry if the market adversely selects lower quality (or unsafe) food in the absence of information signals to consumers. Grossman (1981) argues that the market has a self-correcting mechanism if quality disclosure is costless. Sellers of high quality products have an incentive to disclose quality. Therefore, non-disclosure implies low quality. This self-correcting mechanism hinges on the ability to (costlessly) verify product quality

disclosures ex post. McCluskey (2000) shows that profit-maximizing producers can gain from deceiving consumers with false quality claims. Repeat-purchase relationships and third-party monitoring are necessary for efficient markets in high quality credence goods. Efficient markets in credence goods require credible product quality signals. Traceability systems facilitate the provision of quality signals to consumers. Yet (as will be argued below), many of the emerging livestock traceability systems appear ill designed to provide credible ex ante quality signals to consumers.

PRIVATE SECTOR TRACEABILITY PROGRAMS

Voluntary labeling by firms, sometimes supplemented by third party certification, can be used to identify credence attributes. If there is a market premium for 'safer' food, there is an incentive for firms producing products with enhanced levels of food safety to identify this attribute in a label. Irradiated meat products in the US are a good example. A credible monitoring and enforcement mechanism is necessary to reduce the risk of cheating through mislabeling. A self-policing industry quality assurance or safety labeling program could be effective if those firms producing 'high quality' (or demonstrably safer) food are able to censure those firms who free-ride on the certification program through false or misleading labeling. In the absence of an effective self-policing mechanism the market failure problem persists for products with negative quality or safety attributes. A firm will not voluntarily disclose low quality.

Private sector traceability initiatives in the livestock sector include individual supply chain initiatives and industry-wide programs. Supply chain partnerships delivering traceability have emerged in the UK beef industry, largely as a result of the

loss in consumer confidence following the BSE crisis. One example is Tracesafe, a small farmer-owned company that has developed a network of cattle breeders and finishers who rear cattle to specific production guidelines. The production protocols specify the purchase of feed from a set of contracted feed mills and include an extensive system of on-farm record keeping. Tracesafe differentiates its beef on the basis of its ability to trace the history of individual meat cuts to the animal of origin, with an implied safety assurance. The beef is sold in specialist retail outlets and restaurants under the Tracesafe brand name (Fearne, 1998).

The meat processing sector has also recognized the potential role of traceability in bolstering consumer confidence in food safety, and as a product differentiation strategy. Michael McCain, President and CEO of Maple Leaf Foods Inc. (a major Canadian pork and poultry processor) recently referred to traceability as the "holy grail of the food supply chain". Maple Leaf is currently funding the development of DNA identification technology to facilitate the traceback of meat to the farm of origin (Powell, 2002). Pressure from export markets, particularly the Japanese market, appears to be a significant driver for this development.

In other cases, private sector traceability initiatives are a result of pressure from downstream food retailers. A desire to reduce risk exposure or reduce the transaction costs of monitoring product quality or downstream production methods are the motivators. This does not necessarily mean that traceability information is made available to consumers on retail packages. UK supermarkets require their beef suppliers to be members of accredited quality assurance programs, although the meat may not be traceable to the specific farm of origin. The Canadian retailer Sobeys requires its

suppliers to demonstrate that specific production, processing, transport and handling processes have been implemented. While traceability back to the farm may not be an explicit requirement, it can be a necessary condition for providing information on production and processing methods (Hobbs, 1996; Fearne, 1998; Bredahl et al. 2001).

Industry-wide private sector traceability programs have also been introduced by industry associations or producer groups. The Canadian Cattlemen's Association established the Canadian Cattle Identification Agency (CCIA). In July 2002, the CCIA implemented a national cattle identification system to facilitate the traceback of cattle in the event of a food safety problem. The industry initiated CCIA as a risk reduction strategy. Prior to the introduction of the traceback system, the identification and tracing of animals in the event of a major crisis on the scale of BSE would have been virtually impossible.

Cattle leaving the herd of origin are issued a unique ID number displayed on a CCIA tag with a barcode. Tags are distributed by authorized service centers that record which ID numbers are allocated to which producers. The unique ID number is maintained to the point of carcass inspection in the packing plant. Monetary penalties for non-compliance can be imposed on producers. In the event of a food safety problem, the Canadian Food Inspection Agency (CFIA) (a Federal government agency) initiates a traceback procedure. CFIA uses information from the CCIA database to identify the last location of the animal and the herd of origin (CCIA, 2002). This information is used to track cattle movements both backwards and forwards in the supply chain. Producers are not required to maintain records. In this regard the Canadian system is quite different from the 'cattle passport' system in the UK. The UK system requires producers to

register all cattle movements on or off a farm with the national identification agency. In the UK system the unique animal ID number should allow immediate identification of all farms on which the cattle have been located. The Canadian system only allows identification of the herd of origin and the final location of the cattle, with traceback beyond those two points relying on the ability of producers to provide this information.

The Australian beef industry has a voluntary quality assurance system that includes a national identification program including DNA sampling for traceback. The Australian system is an industry-government partnership in the sense that the system is led by a government agency, the Meat and Livestock Agency (MLA). A series of quality management protocols covering production, handling and processing were developed under the umbrella of "Cattle Care". A producer selling cattle signs a National Vendor Declaration form that identifies the seller and provides basic production information (e.g. whether the cattle were treated with a growth-promoting hormone; information about the feeding program, etc). This information, combined with a cattle tag, enables the traceback of cattle in the event of a problem (Lawrence, 2002).

A voluntary grading system, Meat Standards Australia (MSA), uses a series of pre and post-slaughter measures to predict the eating quality of meat. Blood samples are taken from each carcass that qualifies for the MSA program while the carcass can still be identified with a seller. If a consumer complains of a bad eating experience from MSA-graded meat, a DNA sample from the meat and can be matched with the blood sample from the carcass. In this way, meat cuts can be traced through the supply chain and to the farm of origin. The traceback in the MSA system is focused primarily on quality rather than just food safety. It allows a direct link to be made between eating quality and

production and processing methods. It can assist in identifying where improvements may be necessary or in identifying sellers who consistently misrepresent cattle on their National Vendor Declaration form (Lawrence, 2002).

The Australian systems of identification and quality assurance are voluntary. They establish the information infrastructure onto which individual supply chains can bolt on their own quality branded beef programs. There are several examples of Australian branded beef programs that use the MSA system as part of a product differentiation strategy (Lawrence, 2002).

REGULATORY TRACEABILITY & LABELING PROGRAMS

Mandatory traceability and labeling initiatives have been introduced in some countries. The European Union (EU) has a beef labeling regulation that requires all Member States to have in place compulsory beef labeling and traceability systems by 2003. There are three components to the regulation. First, each Member State will have a national cattle identification and registration system. Second, beef products will be labeled with a traceability number identifying origin, including where the animals from which the meat was derived were born, reared, slaughtered and processed. Third, the regulation introduces rules for voluntary labeling with additional information (for example, production information, animal welfare information, etc.).

The 2002 US Farm Bill introduced retail-level country of origin labeling for beef, lamb, pork, fish, fresh and frozen fruits and vegetables and peanuts. In the interim this is voluntary but a mandatory regulation will be established by September 30 2004. To receive a US country of origin designation livestock must be born, raised and slaughtered

in the United States. Mandatory country of origin labeling has major ramifications for the traceability, record keeping and information systems that will be required in order to substantiate the 'born, reared and slaughtered' claim for any meat products.

These examples have shown that there are numerous examples of private and public sector initiatives, offering various degrees of traceability and quality assurances with respect to credence attributes. A valid question, therefore, is the extent to which traceability and origin labeling should be a private or public sector responsibility? This depends on whether there is market failure, and if so, whether the benefits to consumers of mandating traceability and/or labeling outweigh the costs. To help assess these questions, it is useful to consider the functions and potential economic benefits of a traceability system.

WHAT DO WE REALLY MEAN BY 'TRACEABILITY'?

There are three main functions of a livestock traceability system. The first is to facilitate the traceback of products or animals in the event of a food safety problem. Effective traceback enables the scope of a food borne illness to be contained, thereby minimizing private and public costs, e.g. pain and suffering, lost productivity, medical costs, damage to a firm or industry's reputation, liability costs, etc. By identifying and isolating the source of contamination, a traceability system can protect firms who practice due diligence from free riders who fail to invest in good production practices or preventative measures. A traceability system allows ex post cost reduction *after* a problem has arisen. It performs a reactive function. Most livestock traceability programs, for example the Canadian cattle identification system, perform this reactive function.

The second function of a traceability system is to enhance the effectiveness of tort liability law as an incentive for firms to produce safe food. The threat of civil legal action and the resulting financial damages and damage to brand name capital provide the incentive. To the extent that industry-wide traceability systems can facilitate the establishment of legal liability, the incentive for firms to adopt measures that enhance food safety is strengthened. In this sense, traceability systems also perform an ex post information function.

The third function of a traceability system is pre-purchase quality verification to reduce information costs for consumers through labeling the presence of credence attributes. This is an *ex ante information function* requiring proactive information provision and quality verification. The EU and Canadian livestock identification and traceability systems facilitate ex post traceback in the event of a problem. They do not provide ex ante provision of information on product attributes to reduce consumer information asymmetry. However, the frequent justification for introducing mandatory traceability and labeling, such as the EU beef labeling regulation, is the provision of useful information to consumers that the market would otherwise fail to provide.

Several EU Member States have already implemented beef labeling regulation. Initial experiences suggest that this is indeed an ex post, reactive labeling system rather than an ex ante information system that would reduce consumer information asymmetry with respect to important credence attributes.

> Other Member States report that their consumers, even when well informed, have not notably changed their patterns of consumption of beef (Commission of the European Communities, 1999, p.7)

The question "What do consumers really want?" lies at the heart of this issue. In other words, is traceability information useful to consumers? If so, is the absence of traceability information an indication of market failure and therefore a justification for mandatory traceability and labeling programs to correct the market failure? Or can voluntary traceability labels be a useful product differentiation strategy for individual firms or supply chain alliances? Before we can begin to answer these questions, we need a better understanding of consumer responses to traceability and quality verification information.

ARE CONSUMERS WILLING TO PAY FOR TRACEABILITY?

A set of research experiments assessing Canadian consumers' willingness-to-pay (WTP) for traceability, food safety and on-farm production information for beef and ham products were carried out in 2002[1]. Laboratory (experimental) auction markets involving consumers in western and eastern Canada were used to collect bids on meat characteristics. Experimental auctions are a method of eliciting non-hypothetical bid data in the absence of publicly available market data on the demand for traceability and quality verification characteristics.

Following Shogren et al (1994), participants were given a beef (or ham) sandwich containing standard store-bought beef (ham) and had the opportunity to 'upgrade' their sandwich for a sandwich with additional verifiable characteristics. A sum of Cdn$20 was provided as an incentive for attending the session. Four 'auction' sandwiches were used,

[1] This research was conducted in collaboration with researchers from Utah State University who were conducting experiments in the US, the UK, Japan and Canada (Dickinson and Bailey, 2002). Additional Canadian data collection was funded by Agriculture and Agri-Food Canada.

each with different verifiable information. The meat in one sandwich had an extra assurance with respect to humane animal treatment. The second sandwich had an extra assurance regarding food safety standards or procedures that were over and above the industry norm. The third sandwich contained meat that was traceable to the farm of origin. The fourth sandwich combined all three characteristics: the meat was traceable to the farm of origin, with an extra assurance of humane animal treatment and an extra assurance of food safety standards/procedures[2].

The experiment consisted of ten rounds of bidding for each sandwich. Bids were collected for sandwich 1 (humane animal treatment), then sandwich 2 (food safety), then sandwich 3 (traceability), then sandwich 4 (all 3 characteristics). This process was repeated ten times. Participants wrote down their bids, so that individual bid information was private. At the beginning of each round of bidding for each sandwich, the second highest bid (or 'market price') from the previous round was announced. At the end of the 10th round, a random draw determined which of the simultaneous sandwich auctions would be binding. Another random draw determined which of the 10 rounds of bidding was binding. The highest bidder in that round for that sandwich exchanged their sandwich for the auction sandwich and paid the second highest bid price. Only one sandwich was auctioned off in each experiment. There was an equal chance that any of the rounds of bidding would be binding; thus participants had an incentive to bid honestly each time.

[2] It was explained to participants that there was nothing inherently 'wrong' with the sandwich they had been given. It was simply regular meat purchased in a regular store and therefore met all the requisite food safety standards. Instead there was additional verifiable information about each of the auction sandwiches. No deceit was used. The additional information was truthful.

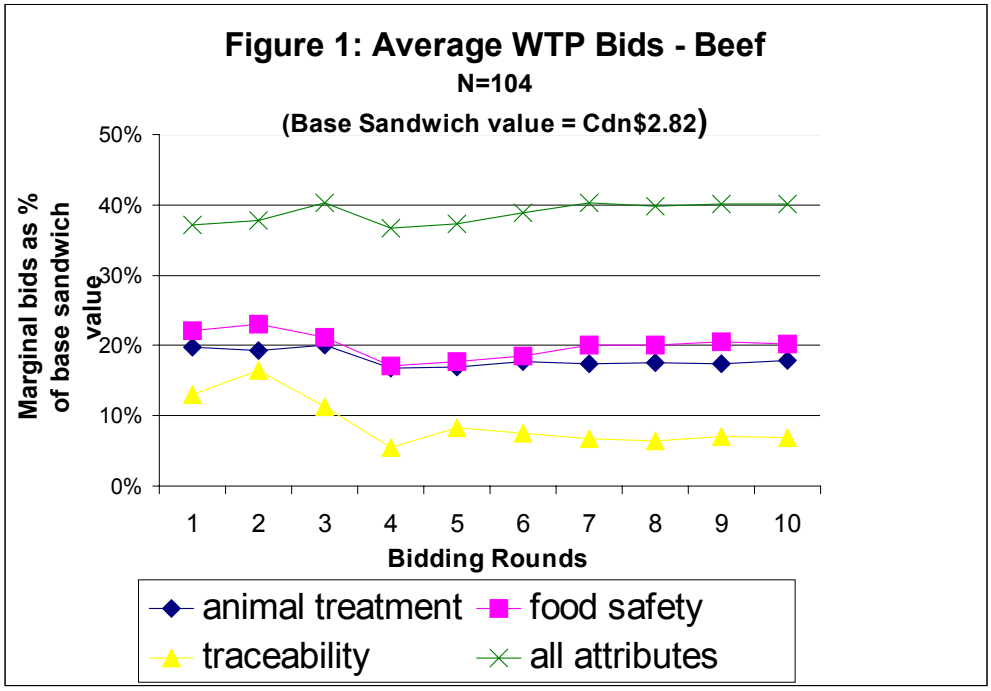
Conducting multiple rounds of bidding and announcing the 'market price' allows for bid stabilization over the ten rounds and provides a corrective mechanism to assist participants in understanding the experiment (Shogren et al., 1994; Dickenson and Bailey, 2002). The fact that participants were asked to eat their sandwich before leaving the room and the exchange of money by the highest bidder in the randomly selected round is intended to encourage honest bidding.

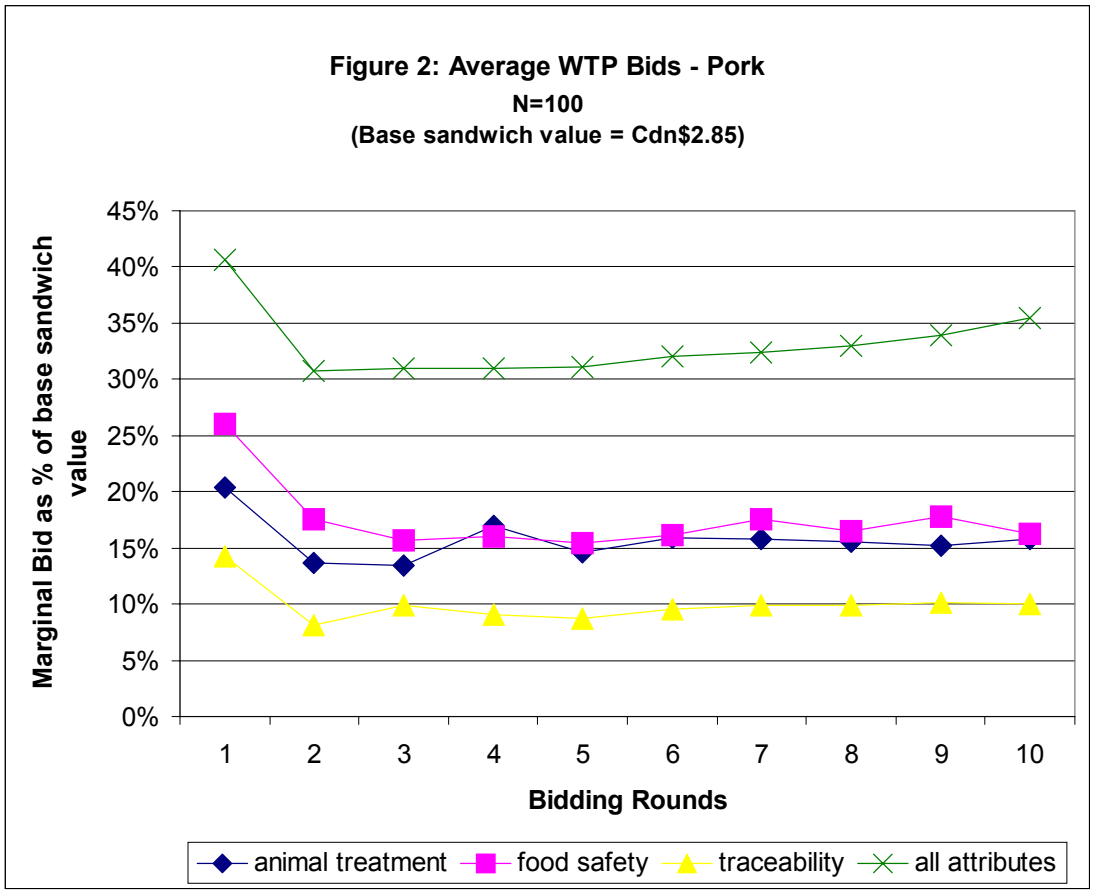
The experiments were conducted in Saskatoon, Saskatchewan and Guelph, Ontario in March and September 2002 respectively. Subjects in Saskatoon were recruited from a range of demographic groups at the University of Saskatchewan, including students, faculty, professional administrative staff and maintenance staff. Subjects in Guelph were recruited from the consumer database of a private consumer research firm. A total of 204 people participated in the study, 98 in Ontario and 106 in Saskatchewan, with 104 participating in the beef auctions and 100 in the pork auctions.

Analysis of the results is ongoing. A preliminary assessment reveals some interesting trends. Figures 1 and 2 display average bid information for the beef and pork experiments respectively over the ten rounds of bidding. Marginal bid information (i.e. the amounts on average that were bid to exchange the current sandwich for an auction sandwich) is presented as a percentage of the base sandwich value of Cdn$2.82 for the beef sandwich and Cdn$2.85 for the ham sandwich[3]. Traceability to the farm of origin, without additional quality assurances, elicited the lowest average willingness to pay. An ex ante quality verification such as an additional food safety assurance or an animal welfare assurance was of more value to the participants. Combining a traceability

[3] The base sandwich value was calculated by asking respondents how much they would typically expect to pay for the type of sandwich provided to them in the experiment, and averaging these responses.

guarantee with positive quality assurances yielded the highest bids on average, although the average bid for the 'all inclusive' sandwich was less than the sum of bids for the individual attributes, suggesting a decreasing marginal willingness to pay for the attributes. This is consistent with results from an equivalent WTP study in the US (Dickenson and Bailey, 2002).





Average WTP (averaged across all subjects for the last 5 bidding rounds in both locations) to upgrade to a traceable beef sandwich was Cdn$0.20 (7%). Average WTP to add a food safety assurance was Cdn$0.56 (20%), to add an animal welfare assurance was Cdn$0.50 (17.6%) and to add all 3 assurances was Cdn$1.12 (40%)[4]. For the ham sandwiches, average bids were Cdn$0.28 (10%) for traceability, Cdn$0.47 (17%) for food safety, Cdn$0.44 (15.6%) for animal welfare and Cdn$0.93 (33.4%) for all three assurances[5].

[4] This compares with US$0.23 (7.6%), US$0.63 (21%), US$0.50 (16.7%)and US$1.06 (35%) respectively in a similar US experiment where the base sandwich value was approximately US$3 (Dickinson and Bailey, 2002).

[5] In US experiments using ham sandwiches, Dickenson and Bailey (2002) report average bids of US$0.50, US$0.59, US$0.53 and US$1.14 (or 16.67%, 17.6%, 19.7% and 38%) for traceability, food safety, animal welfare and all three assurances respectively. The base sandwich was valued at approximately US$3.

It should be emphasized that these are average values and mask considerable variations in bids across participants. For example, there were a high number of zero bids for the 'traceability only' sandwich. Furthermore, due to the nature of a one or two day experiment, these bids are usually considered to be an upper bound on WTP (Dickinson and Bailey, 2002; Hayes et al, 1995). Finally, caution should be exercised in extrapolating these numbers into other contexts. While the data may suggest a 10% average WTP for traceability information or a 33% average WTP for the addition of the three assurances for a ham sandwich, these percentages cannot be extrapolated across an entire consumer budget. That is, the results should not be used to claim that Canadian consumers would be willing to pay 10% or 33% more for all food products with these assurances. Budget constraints typically limit WTP. Also, WTP for an additional food safety assurance may differ among products depending on consumers' risk perceptions regarding those products.

The key point to take from this preliminary analysis is that traceability, *by itself*, may not deliver much value to most consumers[6]. In essence, consumers want to know their food is safe before they consume it. Quality assurances with respect to specific credence attributes, bundled with traceability, have more appeal. While ex post reactive traceability systems perform an important economic function in limiting the costs from a food safety problem and in maintaining consumer confidence in an industry, they do little to reduce consumer information asymmetry. It is important to distinguish between the different functions of a traceability system and to recognize the extent to which the traceability systems being put in place by industry or mandated by policy can deliver on one or all of the objectives: limiting the ex post costs of a food safety problem;

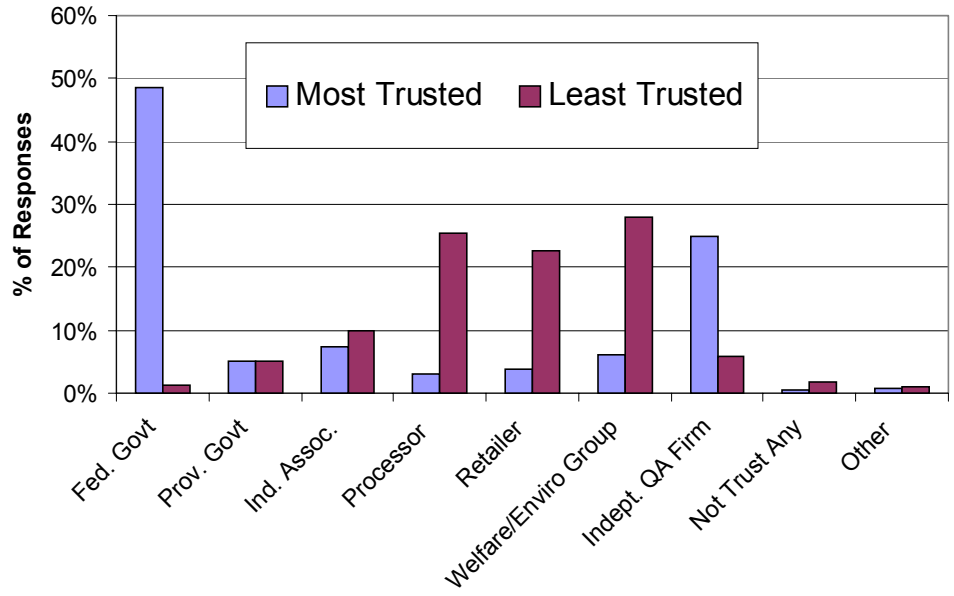
strengthening liability incentives; and ex ante provision of information to consumers. Traceability may be a necessary but not sufficient condition for ex ante verification of quality attributes.

Also of interest is the credibility of different information sources about credence attributes such as origin, food safety or on-farm production practices. The debate around traceability and labeling systems includes questions over who should be responsible for sanctioning credible information provision to consumers. Is it the role of industry associations or the role of individual firms or supply chains, or is there a market failure indicating that it could be the role of government? The Canadian consumer research also asked participants to indicate which sources they most trusted and least trusted to provide information about production practices from a list of seven potential sources. Figure 3 displays the responses to this question.

Almost 50 percent of respondents said they would most trust a Federal government agency, such as the Canadian Food Inspection Agency, to provide this information. Another quarter of respondents placed most trust in an independent quality assurance firm. Respondent comments revealed that the Federal government (CFIA) tended to be trusted because it was seen to be working in the public interest.

[6] Although clearly it is of some value to some consumers, given the non-negative average bids.

Figure 3: Credibility of Information Sources About Production Practices (N=204)



Almost one third of the participants indicated that animal welfare or environmental groups (such as Greenpeace or PETA – People for the Ethical Treatment of Animals) were the least trusted. Several people commented that they felt these sources had an agenda, and were therefore not seen as objective or trustworthy. Interestingly food processors and retailers were regarded as the least trusted source of information by 25% and 23% of respondents respectively. Comments revealed that some people felt these sources had a vested commercial interest that gave them an incentive to mislead consumers. This points to a potential credibility problem for industry sources in providing traceability and quality assurances to consumers. A potential solution to this credibility problem is the Australian model, whereby individual branding and product differentiation can be bolted onto the national identification and quality standards programs developed jointly by industry and government.

Although an entity (e.g. industry, government or interest group) may not be considered a reliable or trustworthy source of information, the information it disseminates can still influence consumer perceptions if the message is not closely associated with the source. For example, "I read it somewhere", "I heard that …", etc. Thus, the 'least trusted' sources in Figure 3 may still have an indirect impact on consumer perceptions.

TRADE IMPLICATIONS

Consumer interest in food safety and food quality have precipitated an increased focus on traceability and quality assurances, including retail labeling of product origin and/or production methods. In many cases, these are private industry responses to product differentiation opportunities. Or they may be private sector strategies to reduce risk exposure and maintain consumer confidence. Regulatory moves to mandate traceability, origin or production method labeling create problems in the international trade arena. Mandatory labeling of credence attributes has been justified on the basis of consumers' "right to know", for example, genetically modified foods, country of origin labeling.

The labeling of production and processing methods (PPM) poses particular challenges to the World Trade Organisation (WTO) system. The principle of Non-Discrimination is based on three concepts. It requires that 'like' goods be given the same treatment – the WTO rules deal with goods, not PPMs because it is goods that are traded. It requires that foreign like goods are given the same 'national treatment' as domestic goods and that all foreign like goods of member countries are granted equal market access. The challenge arises when domestic concerns request regulations on PPMs that

violate one of the three bases of non-discrimination. For example if PPMs differ across countries, a domestic regulation may favor domestic producers or violate the most-favored nation principle (Isaac and Kerr, 2002). Mandatory traceability and labeling regulations or country of origin labeling regulations may be challenged at the WTO on the basis that they violate WTO rules on allowable labels and inhibit trade.

The WTO response to the debate around trade barriers related to PPMs has been to permit 'legitimate' violations of the principle of Non-Discrimination. In a negotiated compromise, the Tokyo round of GATT negotiations resulted in PPMs being divided into product-related PPMs and non-product related PPMs. Safety-related trade barriers are dealt with under the Agreement on Sanitary and Phyto-Sanitary Measures (SPS). Product-related PPM trade barriers are dealt with under the Agreement on Technical Barriers to Trade (TBT). A trade barrier based on PPMs may be permissible under the TBT agreement if the PPM creates a novel product, such that the 'like' products designation no longer applies. However, the National Treatment and Most-Favored Nation principles still pertain. Non-product related PPMs are out of scope of the TBT agreement. There is no permissible use of TBT measures to ban trade based on non-product related PPMs, such as the use of intensive agricultural production methods rather than an organic system to produce the cotton used to make a shirt (Isaac and Kerr, 2002).

Mandatory labeling policies based on consumers' right-to-know contravene WTO rules if a non-product related attribute is being labeled and the labeling policy violates one of the three cornerstones of non-discrimination. For example, mandatory labeling of GM food based on consumers' right-to-know about a processing technique or a technology (rather than a claim that the product was novel or an objection on the basis of

safety) would contravene WTO rules (Isaac and Kerr, 2002). It could also be argued that mandatory labeling of traceability information and/or product origin on the basis of consumers' right to know would also be in contravention of WTO rules if the Non-Discrimination principle is violated.

Proponents of mandatory country of origin labeling in the US argue that it enshrines in law consumers' right to know about the origin of products. Opponents argue that a mandatory regulation panders to the domestic protectionist interests of producers. It imposes unnecessary costs on the food industry and will adversely affect (e.g. livestock) exports from other countries, particularly as US processors will be required to provide proportional country of origin content on food labels. Voluntary labeling of "US origin" would suffice to inform consumers if there is a strong demand for domestically produced food. Since the country of origin does not alter the product (beef is beef), the Non-Discrimination principle is violated by a mandatory country of origin labeling requirement since it attempts to differentiate like products through labeling.

At the heart of this issue is the fact that the WTO was not set up to handle consumer demand for protection or regulation of imports. In the simple neoclassical view of the world with perfect information, consumers always win from trade liberalization as a result of lower prices and more choice. Once we allow for information asymmetry with respect to credence attributes (on-farm production methods, country of origin, etc.) and uncertainty over food safety, it is conceivable that some consumers could demand protection from imports or tighter labeling regulations (e.g. GM food). The EU has stated its desire to renegotiate WTO rules to allow trade restrictions based on consumer preferences. The challenge lies in distinguishing between measures taken in

response to legitimate consumer concerns and trade restricting measures driven by vested producer interests in the guise of 'consumer interests'.

A first step toward making this distinction is in a better understanding of consumer attitudes to food safety and food quality issues. This includes an understanding of how consumers respond to different traceability, labeling and quality assurance initiatives. Of immediate interest is the extent to which these initiatives belong in the private sector as innovative product differentiation strategies, or the extent to which a convincing market failure argument can be made for mandating traceability and labeling on the basis of reducing consumer information asymmetry.

It appears that the EU mandatory beef labeling and traceability regulation, while perhaps performing a useful ex post cost reduction function in the event of a food safety problem, does little to reduce consumer information asymmetry ex ante. The new US requirements for the mandatory provision of country of origin information at the retail level will not provide consumers with information about other credence attributes beyond the country of origin. Mandatory labeling policies create the potential for international trade tensions when they adversely affect exports.

On the other hand, industry-driven traceability systems have emerged (often with the encouragement and support of government). In these cases, the private sector is responding to the need to reduce the potential costs of a food safety outbreak, to reduce the monitoring and enforcement costs associated with managing supply chain relationships, to maintain consumer confidence, or has recognized a product differentiation opportunity. Often the traceability system is a platform on which additional quality assurances can be provided to consumers. Traceability and ex ante

quality verification throughout the supply chain may yield sufficient economic benefits without the need to extend traceability labeling to the retail counter.

Mandatory retail labeling of traceability and product origin information is likely to impose significant economic costs on industry, and will lead to international trade tensions, without an obvious demonstration of direct consumer benefits. This does not mean that traceability is unimportant. On the contrary, it can play a central role in reducing the transaction costs of managing supply chain relationships, in reducing risk and in strengthening tort liability incentives for food safety. Thus, it is important to distinguish between the various function of a traceability/quality verification system, and to recognize the extent to which it plays a supply chain management role or a role in informing consumers. This paper provides a preliminary analysis of traceability systems and the potential value placed on traceability information versus specific quality assurances by Canadian consumers. Further research is necessary to both deepen and broaden our understanding of these issues within an international context.

REFERENCES

Bredahl, M.E., Northen, J., R., Boecker, A. and Normile, M.A. (2001). Consumer Demand Sparks the Growth of Quality Assurance Schemes in the European Food Sector. In Regmi, A. (Ed.*) Changing Structure of Global Food Consumption and Trade* Washington DC: Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture, Agriculture and Trade Report WRS-01-1. pp.90-102.

Canadian Cattle Identification Agency (CCIA) (2002). http://www.canadaid.com (accessed November 27, 2002).

Commission of the European Communities (1999). Report from the Commission to the European Parliament on the Situation Regarding the Implementation of Beef Labelling Systems in Different Member States As Laid Down in Article 19(3) of Council Regulation (EC) No. 820/97. Brussels: European Commission, http://europa.eu.int/eur-lex/en/com/pdf/1999/com1999_0486en01.pdf (accessed 24 September 2000).

Dickinson, D.L. and Bailey, D. (2002). Meat Traceability: Are U.S. Consumers Willing to Pay for It?. *Journal of Agricultural and Resource Economics* 27(2) (forthcoming).

Fearne, A. (1998). The Evolution of Partnerships in the Meat Supply Chain: Insights From the British Beef Industry. *Supply Chain Management: An International Journal*, 3(4):214-231.

Grossman, S.J. (1981). The Informational Role of Warranties and Private Disclosure About Product Quality. *Journal of Law and Economics*, 28(3):461-489.

Hayes, D.J., Shogren, J.F., Shin, S.Y. and Kliebenstein, J.B. (1995). Valuing Food Safety in Experimental Auction Markets. *American Journal of Agricultural Economics*, 77(February):40-53.

Hobbs, J.E. (1996). A Transaction Cost Analysis of Quality, Traceability and Animal Welfare Issues in UK Beef Retailing. *British Food Journal* 98 (6): 16-26.

Isaac, G. and Kerr, W.A. (2002). Genetically Modified Organisms and Trade Rules: Identifying Important Challenges for the WTO. *The World Economy*, forthcoming.

Lawrence, J.D. (2002). Quality Assurance "Down Under": Market Access and Product Differentiation. MATRIC Briefing Paper 02-MBP 1, Midwest Agribusiness Trade Research and Information Center, Iowa State University, April. http: www.matric.iastate.edu.

McCluskey, J.J. (2000). A Game Theoretic Approach to Organic Foods: An Analysis of Asymmetric Information and Policy. *Agricultural and Resource Economics Review*, 29(1):1-9.

Powell, G (2002). Leverage the Canadian Brand by Delivering a Gold Standard in Food Safety Assurance, *Food in Canada*, September. http: www.foodincanada.com

Shogren, J.F., Shin, S.Y., Hayes, D.J. and Kliebenstein, J.B. (1994). Resolving Differences in Willingness to Pay and Willingness to Accept. *American Journal of Agricultural Economics*, 84(March):255-270.