USES OF FOOD LABELLING REGULATIONS

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

This study provides an overview of labelling regulations in the context of the food industry. A basic economic framework for labelling policy is presented, followed by a review of the various functions of labelling. The role of government in labelling regulation is then examined and implementation issues are highlighted. Finally, short case studies on the use of labelling for food products are presented. Where appropriate, particular reference is made to the potential value of labelling regulations in ensuring food safety.

It was prepared by Dr. Julie A. Caswell, Department of Resource Economics, University of Massachusetts, Amherst, USA, as input to the study on Regulatory Reform and the Agro-Food Sector, which was published in *The OECD Report on Regulatory Reform, Volume I: Sectoral Studies.*

The Secretary-General has agreed to the derestriction of this report under his own responsibility as recommended by the Committee for Agriculture.

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I. Introduction[1]

Labelling policies differ from other regulatory approaches because they work more directly in conjunction with consumer demand in the marketplace. Consumer demand for higher quality foods has been increasing, especially in high income countries, based on consumers' increased knowledge about links between diet and health; awareness of quality characteristics; and access to information about new production and processing technologies. Food producers and retailers are responding to changes in consumer demand by modifying and extending the variety of foods offered for sale. They are also marketing particular attributes of food products more intensively, especially nutritional attributes. The marketing of safety attributes is beginning to develop in many countries, although at a slower rate.

This case study provides an overview of labelling regulations in the context of the food industry. A basic economic framework for labelling policy is presented, followed by a review of the various functions of labelling. The role of government in labelling regulation is then examined and implementation issues related to labelling regulations are highlighted. Finally, short case studies on the use of labelling for food products are presented. Throughout, where appropriate, particular reference is made to the potential value of labelling regulations in ensuring food safety.

II. An Economic Framework for Labelling Regulations

II.1. Food Quality Attributes (Targets) and Regulatory Regimes

Product quality depends on the bundle of characteristics (attributes) the product has, which determines how well it performs (Lancaster 1971). The major quality attribute subsets for food products are shown in Table 1. They include food safety (e.g., levels of microbial pathogens, residues), nutrition (e.g., fat content, calories), value (e.g., compositional integrity, taste), package, and process (e.g., animal welfare, use of biotechnology, environmental impact) attributes (Hooker 1997, Hooker and Caswell 1996a). For example, a particular consumer's satisfaction with a tomato sauce product depends on its level of pesticide residues, Vitamin C content, percent of tomato solids, taste, and whether biotechnology-based inputs were used to produce it. A second consumer may evaluate quality based on a somewhat different attribute set.

[1] The author wishes to thank Eliza Mojduszka, Neal Hooker, Yumei Ning, and Yuan Wang for their contributions to the body of work on which this case study is based.

Table 1. Quality Attribute Space for Food Products

Quality Attribute Subsets
1. Food Safety Attributes - Foodborne Pathogens - Heavy Metals - Pesticide Residues - Food Additives - Naturally Occurring Toxins - Veterinary Residues
2. Nutrition Attributes - Fat Content - Calories - Fibre - Sodium - Vitamins - Minerals
3. Value Attributes - Purity - Compositional Integrity - Size - Appearance - Taste - Convenience of Preparation
4. Package Attributes - Package Materials - Labelling - Other Information Provided
5. Process Attributes - Animal Welfare - Biotechnology - Environmental Impact - Pesticide Use - Worker Safety

Source: Hooker (1997), Hooker and Caswell (1996a).

Standard tools of economic analysis apply to markets for quality attributes just as they apply to markets for the food products themselves. For example, market demand for food safety depends on consumers' willingness to pay for additional safety, reflecting the value they place on the benefits they receive from improved safety (Caswell and Mojduszka). In most cases, the amount that consumers are willing to pay for each additional unit of a particular quality attribute, such as safety, will fall (Swinbank 1993). Consumers with different preferences, including different risk preferences, will rationally choose different bundles of food. These choices will maximise the consumers' utility from their food purchases as long as their perceptions of the quality attributes of foods are correct. In other words, consumers will buy those products that give them the most value, as long as they are able to accurately judge the quality attributes.

On the supply side of the market, food producers will supply food quality if it is profitable for them or if they are required to do so (Caswell and Mojduszka). Providing high quality may increase profits by increasing product differentiation, sales, and perhaps prices, or by allowing the firm to avoid costly events such as a foodborne illness outbreak with any associated tort liability. Economic models of food quality usually assume that the marginal cost of supplying additional units

of food quality is likely to increase. Thus the market for food quality is characterised by a rising supply (marginal cost) curve and a falling demand (marginal benefit) curve (Kinsey 1993, Henson and Traill 1993, Viscusi, Vernon, and Harrington 1995). In markets with no imperfections, these curves intersect at a particular market clearing price providing the optimum level of food quality.

Markets for food quality rarely work perfectly, however, most often because information is imperfect as discussed in detail below. As a result, governments are active in regulating markets for food quality in an attempt to correct imperfections or mitigate their effects. Depending on the situation and their regulatory philosophies, governments use a range of regulatory regimes as shown in Table 2. These include input standards (e.g., microbial pathogen loads on live animals entering a processing plant); process standards (e.g., Good Manufacturing Practices (GMPs) for plants); product performance standards (e.g., minimum residue levels); information requirements (e.g., nutrition labelling); conditions of sale or service requirements (e.g., temperature of refrigerated-display cabinets); and conditions of use requirements (e.g., safe handling of products by final user). The ultimate target of these regulatory regimes is to ensure certain levels of important quality attributes or to prevent consumer deception.

Table 2. Regulatory Regimes for Food Products

Regulatory Regimes
1. Input Standards
2. Process Standards
3. Product Performance Standards
4. Information Requirements
5. Conditions of Sale or Service Requirements
6. Conditions of Use Requirements

Source: Hooker (1997), Hooker and Caswell (1996a).

Combining the quality attribute (target) set of Table 1 with the regulatory regimes listed in Table 2 yields the very useful analytical matrix shown in Table 3. This matrix pinpoints where mandatory (and voluntary) quality control programs are intended to take effect. It is also useful in understanding interactions between different types of regulatory regimes that may be simultaneously in place. As shown in Table 3, food labelling requirements may be applied to any of the food attribute subsets.

Table 3. Food Quality Targets and Regulatory Regimes Matrix

	Regulatory Regimes					
Quality Targets	Input Standards	Process Standards	Product Performance Standards	Information Requirements	Conditions of Sale or Service Requirements	Conditions of Use Requirements
Food Safety Attributes				**PRIMARY**		
Nutrition Attributes						
Value Attributes				**LABELLING**		
Package Attributes						
Process Attributes				**COVERAGE**		

Source: Hooker (1997), Hooker and Caswell (1996a).

II.2. Economic Models of Quality and Quality Signalling

The economics literature includes a now fairly large body of work on markets for quality and on how quality is communicated (signalled) to consumers. These models focus on the types of goods or attributes being sold; asymmetries in the quality information available to buyers and sellers; companies' incentives to provide quality and quality information; the structure of markets; and how government regulation may seek to improve markets for product quality.

Labelling policy directly affects the information environment for food products. Where it is used and how it affects markets depends on how much and what types of information consumers already have or can readily attain about the product and its important attributes. The information environment is characterised by whether the product's important attributes are search, experience, or credence attributes (Nelson 1970, 1974, Darby and Karni 1973). (Alternatively, the good itself can be placed into one of these categories.) As summarised in Table 4, with search attributes consumers can judge a product's quality before they purchase it by either looking at or researching the product. For example, a consumer buying a tomato can assess its colour quality by simply looking at it. With experience attributes, consumers cannot determine the product's quality before buying it but can do so after they buy and use it. For example, although colour may be a good indicator of the taste of a tomato, a consumer cannot really judge the taste until after eating the tomato. With credence attributes, a consumer cannot judge the quality even after he or she inspects, buys, and uses the product. For example, a consumer cannot judge the level of pesticide residues in a tomato even after using it.

Markets for product quality operate differently and the regulatory approaches used by governments often differ depending on whether important product attributes are search, experience, or credence attributes. Because these markets operate differently, a family of economic models rather than a single model have been developed to explain them. For search attributes, the information environment for consumers is relatively rich and their demand will reasonably accurately reflect their evaluation of product attributes. Economic models therefore focus on incentives for companies to provide the range and levels of product quality desired by consumers. Early work on search goods by Spence (1975, 1976) showed that for a single product producer the incentive to provide quality is related to the consumers' willingness to pay for quality, reflecting the willingness to pay of the marginal consumer in the case of a monopolist and the willingness to pay of the average consumer in the case of a competitive producer.

Table 4. Classification of the Information Environment for Quality Attributes

Attribute Type	Information Environment
1. Search Attributes	1. Consumers can determine a product's quality before they buy it by examining or researching the product.
2. Experience Attributes	2. Consumers cannot determine a product's quality until they buy and use it.
3. Credence Attributes	3. Consumers cannot determine the product's quality even after they buy and consume it.

Markets for quality for products where search attributes are important tend to work well without government regulatory activity. Consumers have plentiful information or can easily attain it so they can make effective choices in the market and protect themselves. This type of market also provides strong direct incentives to companies to provide the quality levels demanded by consumers

or risk losing them to competitors. The tendency of the market to work well is reinforced for food products because they are purchased frequently and are relatively low priced so consumers can easily correct any mistakes they make. In addition, most search attributes are value attributes where being temporarily misled about the quality of a product does not threaten the consumer's health. For all these reasons, search attributes have been a relatively minor focus of government regulatory programs. Informational labelling programs can be used to make these markets work better but are usually of relatively low priority for government attention.

For experience attributes, the most important issues in how well markets operate are how quickly and completely consumers learn about product quality and whether they can put that information to use in making subsequent purchases. Since consumers cannot judge quality until after they buy and use the product, what incentives do companies have to provide higher quality products and what protects consumers from deception? For markets for experience attributes to work well, consumers must have means of gaining information on quality to inform their purchases. One way this occurs is if consumers enter the market sequentially and informed consumers share information with the uninformed (Bagwell and Riordan 1986). In the United States, for example, *Consumer Reports* buys and tests multiple brands of particular food products (e.g., pasta sauces) and reports performance results for experience attributes such as taste and cooking properties. The efficiency of the market can be improved and incentives to companies strengthened with information sharing. While governments can play a role in facilitating this communication, this type of activity is often a low priority and private parties have been most active in providing information.

A second way that consumers become informed about the quality of experience attributes is through repeat purchases. Consumers' frequent repeat purchases of food products, and their tendency to stay with products they find satisfactory, are powerful forces in markets for products where experience attributes are important. In economic models of this situation (called reputation models), a basic result is that equilibria in markets requires that price exceed marginal cost (Klein and Leffler 1981, Allen 1984, Shapiro 1982, 1983). In that case, firms producing low quality products would lose money as long as consumers have some degree of loyalty to firms producing higher quality products.

A final way consumers can learn about the quality of experience attributes is through quality signalling (e.g., use of brand names, labelling, advertising, warranties) by producers to consumers. As Akerlof (1970) showed in his classic "lemons" model, if that signalling is ineffective and consumers do not have other reliable ways to learn about product quality, a market may not exist or only the lowest quality product may be sold. This occurs because of an adverse selection problem—if quality cannot be signalled, higher quality products cannot get a price premium, and only lower quality products will be offered for sale. Other models, such as Grossman's (1981) "unfolding" model, focus on cases where quality signalling is totally effective, price premiums for higher quality products encourage firms to fully disclose product quality, and the market for higher quality products works well.

Labelling policies can improve information on the experience attributes of food products. Whether consumers would gain from being provided this information depends on how effective other information sources are (e.g., knowledge gained from repeat purchases); how receptive they are to the messages; and their transaction costs in using the information to become better informed. Governments are not heavily involved in requiring labelling of attributes where repeat purchases make the market satisfactorily self-correcting. For example, attributes such as taste and cooking properties can be readily assessed by consumers during use and purchase decisions can be easily adjusted.

Economic models of markets for credence attributes are virtually non-existent at the consumer level because information is so imperfect in these cases that markets for quality simply do not function well. The key factor that makes an attribute a credence attribute from the consumer's viewpoint is that it is not practicable for the consumer to assess product quality through search, experience, or by having the product tested. Companies may use quality signalling but a reputable certification agent is often required since consumers cannot verify the truth of quality claims. Government regulatory involvement is heaviest in markets for credence attributes because the information problems weaken market incentives to firms to produce high quality products and may leave consumers unprotected. This involvement may include any or a combination of the regulatory regimes shown in Table 2, including labelling policy to improve the information environment for consumers.

Many important food quality attributes have a mix of experience and credence characteristics. For example, in some respects food safety and nutritional characteristics are experience attributes. If a consumer eats a food product and contracts a foodborne illness, he or she will have gained direct experience on the quality of that product. Clear cause and effect relationships are often absent, however. Consumers may not have sufficient knowledge or too much time may have passed to link a food product to a particular illness. For nutrition, the ill effects of a poor diet occur over time making links between specific products and health status close to impossible for consumers to make. Because of consumers' difficulty in forming quality judgements about attributes such as food safety and nutrition, they are largely credence attributes where the consumer cannot assess quality even after consumption.

Economic models of quality and quality signalling suggest the biggest role for government regulatory programs in markets with important credence attributes. For example, the level of foodborne pathogens in a meat product is a credence attribute from the consumer's viewpoint. Governments usually have extensive inspection and quality assurance programs in place to assure that unsafe products do not reach consumers. Labelling policies may be used to complement or substitute for these types of direct regulation. For example, a government could require testing and labelling of foodborne pathogen levels in meat products, in effect creating a market for reduced pathogen levels as companies compete for market share. This policy could be pursued as a complement to inspection programs, with labelling applying to attribute levels above the minimum set by the regulatory system. Alternatively, labelling could be used instead of inspection and standards programs if the government thought the market for the attribute would work reasonably well as long as the information environment was improved. Labelling policies may also be effectively applied to improve the information environment for search and experience goods.

II.3. Labelling as a Limited Resource

In practice, the use of labelling policy to influence the operation of markets for food quality is limited in at least three important respects. First, space on the label itself is limited and is in high demand for use by food companies to market their products. Mandatory labelling programs use some of this precious space, which marketers resist. For example, there was significant opposition to mandatory nutrition labelling of food products in the United States when it was implemented in the mid-1990s because of the label space needed to display the required nutrition panel. To partially accommodate this concern, the final regulations made allowances for smaller panels with abbreviated information to be used on smaller-sized products. Similarly, the requirement of safe handling information panels on fresh meat products in the United States met opposition based on label space and feasibility issues. Because only a limited amount of label space may be used by labelling

regulations, governments must make decisions about what are the highest and best uses of the scarce labelling resource. This involves choice of attributes to emphasise and the form and length of messages.

Second, labelling regulations may be limited by a country's notion of companies' rights to commercial free speech. Labelling regulations may be seen as an infringement on companies' rights to market their products and use label space as they see fit. An example from the implementation of mandatory nutrition labelling in the United States is the regulation's limitation or consideration of the limitation of when specific descriptors such as "light", "healthy", "less", or "reduced" may be used on food product labels. For example, should the use of a term like healthy be limited to products that meet specific nutrition criteria? If so, what should be done about products that used the term prior to the new regulation (e.g., the Healthy Choice® product line)? Should lower fat meat products be blocked from using a term like "low fat" because they are not low fat when compared to other non-meat products? Labelling regulations alter the relative competitive positions of products and may be challenged by companies that are placed at a competitive disadvantage due to the regulation or who do not accept government oversight of their use of particular marketing claims.

Finally, labelling is a scarce resource in that consumers only devote a limited amount of time to using label information, especially at the point of purchase. Research on consumers' use of labels indicates that labels contain too much information, or information that is delivered in formats that are too complex, will not be used by consumers (Magat and Viscusi 1992). This limitation also suggests the need for careful consideration of the highest and best uses of labelling regulations.

III. The Functions of Labelling

Where labelling is used as a policy, it plays several roles. Most prominent among these is its role as a direct aid to consumers in making purchase decisions. However, labelling also plays several third party roles as discussed below.

III.1. As a Direct Aid to Consumers in Making Purchase Decisions

Labelling requirements may be attractive for governments because they are believed to be more compatible with consumer and seller incentives than other types of regulation. Economists have frequently argued that if a government has a choice between banning a risky product or activity and providing information about the risks involved, it should choose information provision (Magat and Viscusi 1992). Quality signalling through product labelling and information disclosure requirements encourages market incentives with relatively limited government involvement, which is consistent with the regulatory philosophy of many policy makers (Caswell and Mojduszka).

As a direct shopping aid, labelling regulations act to change fundamentally the information environment in markets for quality attributes. They do so by transforming former experience or credence attributes into search attributes. In the case of experience attributes, mandatory disclosures on labels make it possible for consumers to judge quality more easily before purchasing the product. In the case of credence attributes, labelling allows consumers to judge quality in cases where they could not do so before. In addition, labelling requirements may be used to improve the information environment for search attributes themselves. Thus labelling policies are intended to improve the quantity, and often the nature, of information available to consumers in their decision making. The

intent is that the improved information environment will improve the functioning of markets for quality attributes.

Examples of labelling policies that transform credence attributes into search attributes include labelling of organic growing practices and of the nutritional content of foods. Many consumers view levels of pesticide residues in foods as a safety issue and wish to purchase organically-grown or certified low-residue products. A certification and labelling program for these types of products transforms a credence attribute (the consumer has to simply believe that residue levels are lower in certain products) to a search attribute (the consumer can inspect the product to see whether it carries a label indicating how it was grown or the level of residues in it). Similarly, nutrition content labelling transforms credence attributes (e.g., fat content) into credence attributes (the consumer can inspect the label to verify fat content).

There are several possible limits to the effectiveness of labels in improving consumer information and markets for quality attributes (Caswell and Padberg 1992). There are limits on the information processing abilities (and willingness) of consumers in the shopping environment of supermarkets or other retail outlets. In the United States, for example, as Caswell and Padberg wrote: "Periodic surveys by the Point-of-Purchase Advertising Institute indicate that consumers make as many as two-thirds of final purchase decisions in-store (Food Institute Report 1987). The average consumer makes one major shopping trip per week, spending about an hour in the store (Meloy, McLaughlin, and Kramer 1988, *American Demographics* 1988). Thus the consumer evaluates the over 15,000 products offered by the typical store on complex nutrition, taste, convenience, and price criteria in a limited period of time. Research on grocery shopping behaviour indicates that decision-making quality deteriorates when the shopper is under time pressure (Park, Iyer, and Smith 1989). Other survey data suggest that consumers dislike grocery shopping (*American Demographics* 1988). These factors limit many consumers' use of labels as shopping aids (p. 62)."

Consumers' level of motivation to use labels, which depends on how important they deem the labelled information to be, is crucial to the impact of labels as direct shopping aids. Using information imposes costs upon consumers. Those who attach little value to particular quality attributes may choose to ignore information about them. Food labels may also be limited in their impact because they are only one of a range of information sources used by consumers (e.g., prior use experience, brand names, advertising, medical professionals' recommendations, public health officials' recommendations, friends' opinions).

III.2. Third Party Roles

In their 1992 article, Caswell and Padberg argued that labels play very important third party roles, in addition to their role as direct shopping aids, that should be carefully considered in designing and evaluating labelling policy. They argue that many discussions of labelling policy overemphasise the label's role as a direct shopping aid. The third party roles of labels relate to their impact on manufacturers' strategic choices and on the operation of other regulatory and information policies. They may have impacts on the food marketing system even without widespread consumer use of labels for making purchase decisions or may reinforce the consumer-level impact. The third party roles discussed by Caswell and Padberg include:

- ***A Significant Product Design Influence*:** Labelling regulation may assert a strong influence over product formulation and reformulation. For example, with detailed nutrition labelling requirements food processors may design a product to use a defined label term such as "low

sodium" or reformulate a product to give better numbers in an important label category, such as fibre. They may also avoid using particular ingredients so they will not have to be listed on the label. For example, in the United States many cookie and cracker companies have reformulated their products to exclude use of palm oil and lard (Caswell and Padberg 1992). Research by Ippolito and Mathios (1990) in the U.S. cereal industry suggests that improved information can have a strong effect on product design.[2]

– ***An Advertising Franchise*:** Companies closely co-ordinate their branding, labelling and advertising messages in order to produce a consistent product image. Depending on the country's policies, labelling requirements may establish parameters (i.e., influence the franchise) for advertising. For example, a government may require labelling disclosures when particular types of claims are made in advertisements or on labels. This approach provides consumers with easy access to information needed to evaluate the claim. Labelling policy may also clarify for manufacturers what kind of claims the government accepts as legitimate or is likely to challenge.

– ***A Public Surveillance Assurance*:** Labelling policy may serve to assure consumers that their government is paying attention to important quality attributes of products. In the language used by resource and environmental economists, "food labels have option and existence values separate from their direct use value. The option value stems from the availability of the label should the consumer decide to use it. The existence value can be interpreted as a feeling of consumer assurance that someone is watching over the presentation of food products. This surveillance signals to consumers that they can have confidence in the food supply's quality (Caswell and Padberg, p. 465)." The role of labels in generating consumer confidence in product quality may be especially important in markets for food.

– ***A Public Values Definition/Forum for Consensus*:** Caswell and Padberg argue that "regulators' choice of the required information on food labels and the format used signals to consumers, distributors, and manufacturers which of the product's attributes are key and which values make a difference (p. 465)." Labelling programs crystallise, often for a significant period of time, a set of judgements on which quality attributes are important. The prominence of this signalling role for labelling policy varies among products. A prominent recent example is the struggle in many countries over the labelling of products produced with the use of biotechnologies. In the U.S., for example, pressure has been applied to block the labelling of milk from cows treated with bovine somatotropin (bST). The argument is made that since the government has found the technology safe it is unnecessary to label its presence when used and misleading to label its absence when not used. In Europe labelling of biotechnology process attributes has been very controversial.

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[2] Some advocates of labelling requirements explicitly recognise their influence over product formulation in designing labelling policy. A case discussed by Caswell and Padberg is California's Proposition 65, which establishes a duty to warn consumers prior to exposure to certain carcinogens and reproductive toxins (Phipps, Allen, and Caswell 1989). They note (p. 463) that "analysts who question such warnings argue that they are a very cumbersome and ineffective way to inform consumers about potentially risky products or ingredients (Viscusi 1988). They view the warnings primarily as a shopping aid and find them deficient in this role. Proposition 65's proponents argue that the initiative's success will not rest on the effectiveness of point-of-purchase product warnings as shopping aids. Rather, they anticipate that manufacturers will reformulate products to eliminate ingredients requiring warnings or stop marketing products with such ingredients (Roe 1988, Roberts 1989). Thus Proposition 65 could be a success without a single label warning ever appearing."

– ***A Public Education Format*:** Labelling regulations may reinforce other forms of education at the consumer level. For example, food safety and nutrition education programs may be more effective when linked to label information. This role will be increasingly important if governments turn more frequently to labels to inform consumers about potential product risks and proper handling methods, relying on consumers to make more self-protection decisions.

IV. The Role of Government in Labelling

IV.1. Types of Labelling Policies

Policies to influence the information environment for products can take several forms. There may be no policy on claims for particular attributes leaving companies free to use claims as they see fit. More frequently, a basic policy that claims may not be deceptive is in place, with governments engaging in case-by-case enforcement against questionable claims. This type of activity regulates claims by using prominent cases as examples to set parameters for acceptable labelling practices. For example, in the United States during the early 1990s, the Food and Drug Administration successfully challenged several companies' label claims that their pasta sauces or orange juice products were "fresh" when the products were heat-processed. Governments may also publish guidelines indicating the types of claims they are likely to find acceptable.

Beyond these basic policies, governments may require mandatory disclosure of information about the nature of a product or how it should be used; place controls on voluntary claims used in product promotion or the use of product names; provide public information and education; and subsidise the provision of information. The choice of labelling policy depends in significant part on the existing incentives companies have to make claims and disclose information. Companies have market incentives to make claims and disclose information about the positive but not the negative attributes of their products. Mandatory disclosure requirements may force disclosure of negative attributes or the balanced disclosure of positive and negative attributes. For example, nutrition labelling may require a complete accounting of the nutrient content of a product or require that if a voluntary claim is made (e.g., high fibre) that information on all nutrients be provided (e.g., fat and cholesterol content).

Among the labelling policies, mandatory information disclosure requirements usually garner the most attention but very frequently they are used in conjunction with the other types of information policies. An example of this layering of policy is the Nutrition Labelling and Education Act of 1990 (LEA), which went into effect in the United States in 1994 (Castle and Mojduszka). The law mandates the presence on food packages of a standardised nutrition information panel that presents data on the macro- and micronutrients found in a food. In addition, it circumscribes a broad range of voluntary nutrient content claims (e.g., low sodium, high fibre) and health claims (e.g., claims linking increased consumption of a nutrient to lower incidence of a specific disease) that may be made outside the standardised information panel. Voluntarily-provided information is regulated in order to prevent deception and to facilitate product evaluation by consumers. For example, a voluntary "low sodium" claim means the same thing whether it appears on a can of soup or a box of crackers. In addition, the U.S. government provides public education programs on nutrition (e.g., the nutrition pyramid) and subsidises research programs on nutrition information.

Labelling regulations that mandate disclosure of information or circumscribe voluntarily-provided information perform the basic transformation of former experience or credence attributes into search attributes, or improve the information environment for search attributes themselves. As Caswell and Mojduszka note: "Mandatory disclosures, for example, make it practicable for consumers to judge quality before purchasing a product by establishing a quality scale, requiring testing of quality, and mandating a reporting format. Regulation of voluntary claims serves similar purposes. The monitoring and enforcement activities of the government then attempt to ensure that the disclosures made are truthful and credible."

The format that is mandated for information labelling is a very important element of policy design. Companies tend to focus their competitive reactions toward meeting the criteria for specific claims set out by the regulations. For example, if the regulation sets several categories, competition is often focused around the change between categories rather than throughout the entire quality range (Beals, Craswell, and Salop 1981). For example, if the requirement for making a "low fat" claim is that total fat per serving is less than or equal to 3 grams and that the calories from total fat per serving are less than or equal to 30 per cent of total calories, then companies are likely to focus on getting below these levels rather than on taking fat to the lowest practicable level for a particular food product. Thus the design of the format can influence the operation of markets as well as influencing quality signalling itself.

IV.2. Standards and Enforcement Activities Needed to Support Labelling Regulations

Labelling regulations affect the information environment in food markets and, as a result, often involve less direct involvement in the operation of food markets than other types of regulation such as process or performance standards. However, the setting of labelling standards and their enforcement do require a significant level of support functions. This support is primarily in the form of standards setting and enforcement or certification.

Labelling policy usually requires specific standards regarding the types of attributes that must or may be labelled and the form that claims take. For example, an organic labelling program requires the detailed specification of the farming, processing, and distribution practices that are consistent with the organic label. Food safety labelling requires identification of important health risks; specification of safety improvements related to those risks that are significant enough to merit labelling (i.e., that represent real improvements that consumers may wish to base their buying decisions on); and design of label claims that effectively communicate the safety attribute to consumers. Nutrition labelling requires identification of nutrients and nutrient levels that are important to health status (e.g., is fat content an important nutrition attribute?); setting standards (e.g., how much fat is too much and when should a product be allowed to claim it is "low fat"?); and specifying relationships between claims (e.g., may a product make a no cholesterol claim if it is high fat?). Labelling standards must also be updated over time to keep in step with the evolution of scientific information and understanding of effective communication methods. Once standards are set, labelling policies require certification and/or enforcement programs to ensure compliance. Certification programs may be private or public, while some public enforcement mechanism is required to assure the overall integrity of the labelling program.

IV.3. Relationship of Government Programs to Private Labelling/Certification Programs

Labelling regulations are intended to improve quality signalling and the market for quality attributes where private markets and incentives are not functioning adequately. However, labelling programs have the potential to stifle or damage the development of private markets for food quality attributes (Ippolito and Mathios 1990, 1996), particularly if they are not well designed. For example, government quality standards and labelling formats may fall behind new developments in product formulation and presentation making it more difficult for new products and processes to be introduced. They could also stifle competition among companies to make claims because they limit the range and form of these claims.

These considerations indicate that regulatory programs for labelling must be cognisant of how private markets for quality signalling, quality certification, and quality itself are operating. In some cases, private programs may work effectively to correct market imperfections, without requiring a government program or requiring minimal government involvement. For example, there may be no need for a government program if farmers can effectively set organic production standards, certify growers, and administer labelling programs. When considering labelling programs, governments should evaluate the potential for private systems to operate efficiently.

IV.4. Benefit/Cost Analysis of Labelling Programs

Good preliminary, applied benefit/cost analysis of labelling regulations has been done in conjunction with the adoption of several new labelling programs (e.g., nutritional labelling in the U.S.). Work by Caswell and Padberg (1992) and Caswell and Mojduszka also suggests a framework for analysing the benefits and costs of labelling programs. They suggest an attempt to evaluate both the direct and third party roles of labelling regulations. They also suggest that analysis of the distributional impacts of labelling programs is especially important in view of recent research showing that different demographic segments are disproportionately reached by label information (Ippolito and Mathios 1990, 1996, Putler and Frazão 1991).

A large share of the benefits for food safety and nutrition labelling regulations are associated with improved health status for consumers (reductions in mortality or morbidity). Among economists, the theoretically preferred methodology for placing a monetary value on health improvements is to measure how much consumers would be willing to pay for those improvements and the benefits associated with them. If products with different health profiles or impacts are available in the market, any price differentials between them provide a market test of how much consumers value these attributes. However, since markets for food safety and nutrition attributes often have not existed due to the information problems associated with credence attributes, it has been difficult to use market-based data to evaluate willingness to pay. Economists have alternatively used surveys or experimental markets to measure willingness to pay or used other methodologies such as valuing costs of illness, loss of productivity, and other costs of impaired health status. Caswell and Padberg (1992) note that “benefits valuation for labelling regulations is complex: diet is only one determinant of health status, food safety and nutrition attributes are but one factor in food choice, and labels are only one information source on food products' attributes. Despite these complexities, alternative labelling regimes should be evaluated according to their impact on consumers' decisions and firms' incentives to design and merchandise products with different health profiles (p. 466).”

On the cost side, it is possible that many benefit/cost studies have used too narrow a focus in valuing the costs of labelling programs because they have primarily focused on compliance costs. Work by French and Neighbors (1991) on the U.S. nutrition labelling program suggests that compliance costs, while sometimes large, can typically be absorbed in the normal label change cycle if the compliance period is sufficiently long. Few, if any, empirical estimates are available on the broader economic costs society may incur from loss of business flexibility, or potential loss of consumer product choice, associated with more extensive labelling regulation.

In benefit/cost analysis of labelling, the major questions are how do the required changes in the information environment affect the market for quality in food products and, ultimately, the targets of policy such as the health status of consumers? Measuring a separate, distinct, beneficial effect for labelling programs is often difficult because the requirements complement or coincide with on-going forces that are influencing markets for quality. Caswell and Mojduszka also note difficulties because "relationships between levels of consumer information and behaviour are complex. For example, extensive work by Viscusi and Magat (1987, 1992) examined how people alter their behaviour in response to hazard warnings and risk labelling in a variety of settings. Their findings provide specific directives for when different types of information provision instruments are effective and when they are not, as well as which kinds of instruments will have the greatest impact. The implications of this and other empirical and theoretical research on policies that provide information is that labels can change consumers' levels of understanding about quality attributes and alter their consumption behaviour. However, variation across consumers in their responses to the information can be expected."

Labelling requirements are likely to have a significant impact on markets for food quality attributes. Improvements in information, if well designed, should create incentives for manufacturers to compete for market shares from sales to attribute-conscious, label-using consumers. Product reformulation and redesign may be prompted among companies with less desirable quality profiles. Efforts are now being made in many countries to forecast the benefits and costs of label regulations before they are implemented. It is equally important to attempt high-quality, ex post evaluations of the impact of informational labelling requirements, especially if labelling solutions to information problems are relied upon more heavily in markets for food product quality.

IV.5. Labelling in the Context of International Trade

International trade issues arise from the use of labelling by countries as a regulatory regime to complement or substitute for other types of regulatory programs. The environment for national-level quality regulation has changed significantly with the signing of the most recent round of the General Agreement on Tariffs and Trade (GATT) establishing the World Trade Organization (WTO); establishment and development of trading block agreements such as the European Union (EU) and the North American Free Trade Agreement (NAFTA); and numerous other bilateral and unilateral efforts toward freer trade. These trade agreements are making efforts to limit the impact of regulatory regimes as nontariff barriers to trade by subjecting them to scrutiny and possible disputes. In addition, these agreements encourage countries to lessen barriers to trade arising from regulation by actively co-operating in setting policy and determining the equivalency of different regulatory systems.

In general, regulations that affect food quality fall under the rubrics of either technical barriers to trade (TBT) or sanitary and phytosanitary (SPS) measures. Labelling policies are generally classified as technical barriers to trade but the distinction between the two areas can become

blurred for food labelling programs, especially when they interact with SPS regulatory regimes. The impact of labelling policies on international food trade depends in part on the level of regulatory rapprochement between trading partners. These rapprochement levels can be placed along a spectrum from weak (no rapprochement or simple co-ordination) to stronger (mutual recognition) to strongest (harmonisation) (Jacobs 1994).

Using this hierarchy, several important considerations arise regarding international trade and the use of labelling policies by countries in the area of food quality. Labelling policies may create nontariff barriers to trade by making it more difficult for food to be imported into a country. They may pose continuing problems with transparency, especially when the label requirements are very detailed as to the content and format of required information, and of equal enforcement between domestic and imported products. It may not be possible for countries to mutually recognise each other's labels if they have specific concerns about what information is delivered to consumers and how it is delivered. Some co-ordination of labelling goals and policies has occurred, however. For example, over the last two years, the Codex Committee on Food Labelling (see, e.g., CC/FL 1996) has focused on considering voluntary and mandatory information provision for process attributes (organic produce and biotechnology issues), food safety and nutrition attributes (health and nutrition claims), and the trade impacts of non-SPS labelling issues (e.g., guidelines for the use of the term "Halal").

On the other hand, labelling regulations may pose a lesser threat of becoming nontariff barriers to trade than do sanitary and phytosanitary standards enforced with process or performance standards. This is the case because the labelling requirements only directly affect the package of the product. Different runs of labels and packaging materials may be easier for food exporters to accommodate than different standards that affect the product itself.

From another angle, labelling policies may be an essential complement to mutual recognition between countries of regulatory programs that try to assure the quality of food products. For example, two countries or a country group may mutually recognise each other's regulation of value attributes, as is largely the case in the European Union. While doing so, they may also institute labelling programs to specify origin or content of products in order to facilitate consumers making informed decisions between products. Thus, labelling programs may support the use of mutual recognition between countries.

These considerations suggest that labelling regulations may have different possible impacts on international trade, especially when considered relative to or in combination with other types of food quality regulation. However, on-going efforts to reduce or control barriers related to labelling requirements are important, particularly if labelling policy is used more intensively.

V. Examples of Labelling Policies in Use for Food Products

Governments use food labelling regulations to shape 1) consumers' knowledge, purchasing patterns, and use practices and 2) manufacturers' product offerings and marketing practices. Labelling can complement other forms of regulation such as process and performance standards. Countries may also be interested in the potential for labelling regulation to substitute for other types of regulation. The idea is that mandated improvements in the information available to consumers can allow private markets for quality to develop that will obviate the need for regulations such as process or performance standards.

Food labelling policies may be used by governments for any of the subsets of quality attributes: food safety, nutrition, value, package, or process attributes. Mandatory informational labelling for value attributes such as product composition and origin are common in most countries, as is specification of various package attributes such as how and where information is presented to the consumer. The three examples discussed below focus on labelling policies currently in use for safety, nutrition, and process attributes of food products. Across countries, policy is least settled and most under development in the areas of labelling food safety and process attributes, while approaches to nutrition labelling are more settled.

V.1. Food Safety

Labelling has not been a prominently used regulatory tool in the area of food safety nor has voluntary labelling of food safety attributes by companies been widespread. While terms such as pasteurised and UHT appear on many labels, consumers are often not very aware of their safety implications. An exception, discussed in some detail below, is organic labelling which at least in part relates to the food safety attribute of pesticide residue levels. Food safety attributes are largely credence attributes; the consumer cannot judge or has difficulty in accurately judging product quality even after the product has been purchased and consumed. Labelling policy has mostly focused on regulating the voluntary use of labelling by companies rather than on mandatory labelling requirements.

There is evidence that future demographic changes will result in the expansion of markets for safety-improved products (see, e.g., Roberts et al. 1997). Factors include rising standards of living; the fact that demand for food safety appears to be income elastic; and increases in vulnerable populations (e.g., for foodborne pathogens people with suppressed immune systems and the aged). New scientific and medical knowledge is likely to better identify foodborne risks, those populations that are most susceptible, and food purchasing and consuming practices that will reduce risk.

Governments have relied on more direct forms of regulation (e.g., process or performance standards) for food safety and have made only minor use of labelling policies. A major rationale for this approach is that direct regulation offers more certain and consistent minimum standards of safety for all consumers. Regulators have been concerned that substituting labelling and market demand forces for direct regulation will not create adequate incentives for firms to supply safer products. They have also been concerned that labelling policies provide uneven levels of protection across consumer groups, with the more highly educated and richer consumers being more protected than the less educated and poorer because they are better able to use label information and to afford safer products. Thus labelling is little used as a stand alone policy in the food safety area.

Governments have pursued varying policies in relation to the use of labelling policy as a complement to other types of regulation for food safety. One complementary use of labelling is to differentiate safety levels above the minimum levels set by direct regulation. As noted above, this type of labelling requires identification of important health risks; specification of safety improvements related to those risks that are significant enough to merit labelling (i.e., that represent real improvements that consumers may wish to base their buying decisions on); and design of label claims that effectively communicate the safety attribute to consumers. Policy design in this area can be challenging. For example, accurate labelling of levels of foodborne pathogens may be difficult because these levels can change after the product leaves the processing plant. This raises the question of where in the distribution chain the safety level should be measured and labelled. In some cases, governments have actively discouraged this type of labelling, believing that the labelling is likely to be inherently deceptive because of difficulties in controlling product quality or because the attribute being differentiated does not represent a true safety difference relative to the standard product.

A second complementary use of labelling in the food safety area is to educate consumers about safe use practices for the product. For example, a government may not view it as economically or technically feasible to eliminate all foodborne pathogens from a food product. However, even with foodborne pathogens being present, the food may be safe to eat if properly handled and cooked by the food service operator or consumer. In this situation, labels that inform the user about safe practices may be more effective than other types of regulation in reducing foodborne illness.

Overall, governments have taken a cautious approach to the use of labelling as a policy tool for food safety regulation. It is likely that consumer-level, private markets for food safety attributes are being stifled to some extent by governments' reluctance to allow some forms of safety labelling. There are also market and legal (e.g., tort liability) factors that have resulted in companies being reluctant to market products based on safety (Caswell and Johnson 1991). Serious policy design questions exist related to the increased use of labelling for food safety attributes. Most difficult are identifying important attributes and designing formats that accurately communicate complex safety information to consumers. Because of this complexity, and the common use of labelling as a complement to underlying food safety assurance systems, safety labelling may have a potential for creating significant nontariff barriers to international trade. As markets for safety attributes develop, a key question to watch is to what extent a range of safety levels are offered on the market. Price differentials and differing consumer preferences may support a range of safety offerings but it is also possible that only products with the highest safety level will be viable in the market.

Box 1: *Marketing of Pasteurised Shell Eggs*

The incidence of *Salmonella enteritidis* (S.E)-related foodborne infections increased more than threefold in the United States from 1975 to 1993, with epidemiological evidence linking a high proportion of the outbreaks to the consumption of Grade A shell eggs. This incidence has resulted in a variety of measures being undertaken including traceback of eggs to their flock of origin, improved production practices, encouraging use of pasteurised egg products in food service operations, and educating consumers about the danger of eating foods that contain raw eggs.

Several companies have responded to this situation by developing processes for in-shell pasteurisation of eggs and beginning test marketing. For example, in April 1996, Michael Foods (Minneapolis, MN) began test marketing of this product under the *Crystal Farms Pasteurised Egg* label. Prior to marketing, the company had conducted a telephone survey of Minnesota adults in order to define the niche market for pasteurised eggs. Roberts et al. (1997) note that "the results showed that 95 per cent of the sample had heard about *Salmonella*, 75 per cent responded that they were aware that eggs could carry *Salmonella*, and that chicken and eggs were the two foods identified as most likely to cause *Salmonella* food poisoning." Based of its research, the company set the suggested retail price for in-shell pasteurised eggs at $1.39 per dozen, compared to the average price of $0.85 per dozen for large, Grade A, unpasteurised eggs. Other competitors are also entering this niche market, some of whom will be certified by the United States Department of Agriculture.

Pasteurised shell eggs are an example of marketing of the safety attributes of a food product, with a basic regulatory framework in place that requires that label claims cannot be deceptive. Any claims made by the companies regarding the safety of the product are voluntary and subject to case-by-case review by the U.S. government. There is currently no mandatory labelling program for safety risks associated with eggs or formal program for regulating voluntary claims. If this market develops, the need may arise for a more formal system to regulate safety claims.

Sources: Morales 1996, Roberts et al. 1997.

Box 2: *Is Organic Labelling a Form of Food Safety Labelling?*

The use of organic labels is widespread to indicate that food products have been produced and processed under certain standards. Efforts are underway to standardise the use of organic labels (e.g., Codex Guidelines, U.S. Department of Agriculture rules) in order to protect consumers against deception and protect producers of organic products against misrepresentation of other agricultural products as being organic when they do not meet recognised standards.

Are organic labels an example of the safety labelling of food products? In practice, one of the major reasons consumers demand organic products is because they perceive those products to be lower in pesticide residues and, as a result, safer. (Consumers may also demand organic products because they believe their production causes less environmental damage or risk to workers.) Demand for organic products tends to surge in periods when concern about pesticide residues is highest (e.g., during the publicity about Alar use on apples in the United States).

However, there is no necessary link between organic production/processing and lower risk to consumers from pesticide residues in foods. Codex's *Draft Guidelines for the Production, Processing, Labelling, and Marketing of Organically Produced Foods* (CL 1996/23-FL) state that:

> *Organic agriculture is a holistic production management system which promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on the low use of external inputs and non-use of artificial fertilizers and pesticides... it would be expected that substantially lower levels of residues than those from effective pesticide use would be achieved from organic management systems. In all cases such levels would not exceed established maximum residue levels for agricultural products and foodstuffs (p. 2).*

While organic practices are expected to result in lower residue levels, at minimum those practices would result in products being within established maximum residue levels, which most governments seek to set at a level that yields something akin to a reasonable certainty of no harm. By accepted scientific standards there is likely to be little or no safety differential between organic and conventionally grown produce from a consumer safety viewpoint nor do products need to show a safety differential in order to carry an organic label.

Organic labelling standards are process standards that specify how a product is produced but do not specify performance attributes at the consumer level such as food safety. In this respect, they are not an example of food safety labelling. However, many consumers use organic labels as a indicator of pesticide residue safety. In that sense, the labels do operate as safety labelling and are an example of differentiation of products based on perceived (or real if the consumer views government residue standards as inadequate) safety differentials. Codex's guidelines setting efforts and the U.S. Department of Agriculture's rule making on organic labelling focus on setting process standards for the voluntary use of organic labels (van Ravenswaay 1996), leaving the consumer safety issue ambiguous.

Box 3: ***Labelling of Safe Handling Practices for Fresh Meat and Poultry Products***

Mandatory labelling to inform users about recommended safe food handling practices for fresh meat and poultry products was adopted in the United States in 1994. The U.S. Department of Agriculture had rejected such labelling in 1987, arguing for voluntary efforts to educate consumers about proper practices. However, the agency rethought its position after a foodborne illness outbreak in the western United States in early 1993 related to *E coli* O157:H7. Over 500 cases of illness and the deaths of four children were attributed to contaminated, undercooked hamburgers. The mandatory labels were implemented as a complement to a longer term, comprehensive revamping of food safety control systems that includes the adoption of a Hazard Analysis at Critical Control Points (HACCP) regulatory approach at the processing level.

The safe handling labels educate consumers and other food handlers about practices that will reduce foodborne risks associated with fresh meat and poultry products. They include text describing recommended practices:

Safe Handling Instructions

This product was prepared from inspected and passed meat and/ or poultry. Some food products may contain bacteria that could cause illness if the product is mishandled or cooked improperly. For you protection, follow these safe handling instructions.

Keep refrigerated or frozen.
Thaw in refrigerator or microwave.

Keep raw meat and poultry separate from other foods.
Wash working surfaces (including cutting boards),
utensils, and hands after touching raw meat and poultry.

Cook thoroughly.

Keep hot foods hot. Refrigerate leftovers
immediately or discard.

The text is accompanied by small pictures, respectively, of a refrigerator, an open water tap with soapy hands being washed under it, a pan over a cooking flame, and a meat thermometer. USDA's rationale for the mandatory labelling policy is that safe handling practices can effectively reduce the risk of foodborne illness and that many users are insufficiently aware of these practices.

The label may differentiate fresh meat and poultry products from other food products that do not carry specific handling instructions. How this informational labelling affects the market depends on whether consumers interpret it as an indicator of poor quality (e.g., the product poses a significant risk) or simply as a reminder to use good kitchen practices.

V.2. Nutrition

In marked contrast to food safety, labelling is widely used by governments as a regulatory tool in the nutrition area and companies are eagerly marketing the nutrition attributes of their products. Nutrition has been a focus of labelling policies in many high income countries because diet (e.g., over consumption of some nutrients such as fat and under consumption of others such as fibre) is related to several leading causes of death. Nutrition labelling is seen as an effective method of encouraging consumers and giving them the nutrient content information necessary to change their diets to be in closer alignment with those recommended by health professionals. At the same time, information policy is preferred to more direct regulation in most countries because governments do not have a mandate from citizens to regulate their diets.

While consumers can be expected to be generally knowledgeable about the nutrient value of the foods they eat, the specific nutrition values of a product are credence attributes, especially for processed and packaged foods that combine several ingredients. The market for nutrition attributes is developing rapidly in many countries as consumer knowledge of diet-health linkages has improved (Frazão and Allshouse 1996). The importance of marketing based on nutrition attributes has increased the incentives for companies to use nutrition claims as well as the temptation for some companies to mislead consumers about the nutritional content of their products. Labelling regulations, if well-designed, can facilitate development of the market for nutrition attributes, while providing consumer protection by preventing deception.

The use of labelling policies for nutrition displays the full range of possible options. The United States has the most extensive system of labelling, including mandatory nutrition information panels showing nutrient content and strict regulation of voluntary nutrient and health claims. In other countries, labelling is voluntary except where specific claims have been made for the product in which case nutrient content information must be provided. The Codex Committee on Food Labelling is currently discussing standards for nutrition and health claims. However, to date there has been relatively little co-ordination of the adoption of nutrition labelling across countries.

Box 4: ***Multi-Layered Nutrition Labelling Policy in the United States***

In 1994 the United States implemented an extensive new food labelling policy aimed at improving nutrition information available to consumers. The multi-layered policy applies to virtually all food products and includes:

Mandatory Nutrition Information Panels: Every food product is required to carry a standard **Nutrition Facts** panel showing its content of important macronutrients (e.g., calories, fat, cholesterol, carbohydrates) and micronutrients (e.g., Vitamin A, calcium). This and all nutrition information must be based on a standard serving size for the product, which is in turn based on a reference amount of the food customarily consumed (e.g., 1 cup of ready-to-eat cereal). The panel also includes information on recommended daily intakes of important nutrients to help consumers in choosing foods to make up their diets. The panel allows for easy access to nutrition information and comparison of competing products in the grocery aisle.

Regulation of Voluntary Nutrient Content Claims: Voluntary nutrient content claims on the package outside the nutrition information panel may only be made by a company if its product meets defined standards for those claims. For example, a "low fat" claim may only be made if the product contains 3 or fewer grams of fat per serving. Conditions under which relative nutrient claims (e.g., light, less/reduced) may be made are also defined. The regulation assures that a claim such as "low fat" is comparable across product categories and does, in fact, identify foods that are low fat.

Regulation of Health Claims: Voluntary health claims that link any substance in the food or the food itself to a disease or health-related condition may only be made by a company if the claim is specifically recognised by the government; is stated in an approved form; and the product does not contain levels of nutrients such as total fat or cholesterol that disqualify it from making a health claim. For example, a food could make a claim linking sodium and hypertension as long as it contained 140 or fewer mg of sodium; followed the recommended label statement; and did not contain more than 13 grams of fat per serving. The strict regulation of health claims is intended to prevent marketing based on diet/health relationships that have not been scientifically substantiated.

The nutrition labelling policy also contains several other features designed to inform consumers, facilitate comparison shopping, and prevent deception. It is aimed at further encouraging an active market for nutrition attributes to develop. Research shows that after implementation the number of nutrient content and health claims initially decreased somewhat, while they became more truthful (Ning 1997). A recent compliance study done by the Food and Drug Administration reported that 91 per cent of over 300 popular products tested had accurate nutrition labels (Bowers 1997). Over time, the success of the labelling program will be judged based on its contribution to lowering the incidence of chronic diseases associated with diet relative to its costs of implementation. Some analysts have criticised the program as being too regimented and have worried about its ability to adapt to new scientific findings on nutrition and the changing marketing strategies of food companies.

Box 5: ***Nutrition Labelling and International Trade***

While Codex is discussing guidelines for the use of health and nutrition claims, governments are pushing forward with labelling programs that often are not co-ordinated with those of their trading partners. For example, Echols (1996) identifies these major differences between Codex guidelines and nutrition labelling regulation in the European Union (EU), Canada, and the United States:

Voluntary or Mandatory: Under Codex and in Canada and the EU, nutrition labelling is voluntary with the exception that it becomes mandatory when a nutrition claim is made. In the United States labelling is mandatory.

Which Products are Covered? Codex guidelines apply to all foods, Canada's rules apply to packaged foods, the EU directive applies to food packaged for consumers and food service operations, and the U.S. rules apply to most foods offered for sale at retail.

Which Nutrients Must be Listed? The countries differ in the nutrients that must be listed, definitions of those nutrients and sublistings for them, and the order in which they are presented.

What is the Reference Unit? Canada requires that nutrients be reported based on serving size, with possible serving sizes suggested; the EU requires reporting based on weight or other specified units, while allowing per serving information; and the United States uses strictly defined serving sizes as its basis for reporting.

Where May the Nutrition Label be Placed? The Codex guidelines only require that the label be obvious; Canada allows it to appear anywhere but the bottom of the package; the EU requires that it be in a conspicuous place; and the U.S. requires it to appear on the principal display panel (the package front) or the information panel (the part of the package immediately contiguous and to the right of the principal display panel).

The countries also differ in what types of claims are permitted and when. The divergence in labelling policy evident among this group of countries has not been addressed in recent revamping of regulations; if anything, the divergence may have increased. Companies who wish to market in multiple countries are likely to continue to face barriers related to differences in nutrition labelling policy.

V.3. Process Attributes: Use of Biotechnology and Environmental Impacts

Labelling of process attributes poses complicated issues because specification of processes themselves can be complex and because the process may affect a range of the other attributes (e.g., safety, nutrition). There are a number of reasons why regulators and consumers may care about process attributes. First, there may be concerns about the impact of use of the process on the final safety or nutrition level of consumer-ready products. Second, the process may have impacts on the environment, animal welfare, worker safety, or other important attributes.

In policy and public discussions, these levels of concerns about process attributes are often mixed together, leading to significant confusion. This confusion can contribute to controversy

regarding labelling of process attributes as seen in the example of organic labelling discussed above. On the one hand, voluntary labelling with certification programs may be appropriate for process attributes that consumers care about and are willing to pay for. On the other hand, the labelling of process attributes may be taken as an indicator of final, consumer-level safety in cases where regulators believe it is not. As a result, some countries have been reluctant to allow labelling of process attributes that they have judged to be safe in production and at the consumer level. In some cases, companies that wish to market based on these process characteristics have been frustrated. The examples of biotechnology-related labelling and ecolabeling discussed below illustrate these issues.

Countries have pursued diverse policies on the labelling of biotechnology-related inputs or products (materials and/or products produced from genetically modified organisms). From the consumer viewpoint, the use the biotechnology is a process attribute, which may affect other attributes such as safety or nutrition as well as other process attributes. For example, use of biotechnology (e.g., "Roundup Ready" soybeans, bovine somatotropin (rbST) for milk production) may raise concerns about the environmental (e.g., possible increased pesticide use) or animal welfare impacts of their use. In most cases, the use of biotechnology is a credence attribute, although it may also be a search or experience attribute if it affects the appearance of the product or its use characteristics.

Many countries and the EU, as well as Codex, are currently defining their policies on labelling of biotechnology. An important element in that process is defining what information on which attributes the labelling is intended to convey to consumers. Some countries have limited labelling of biotechnology-related inputs or materials in cases where the review process of the appropriate government agency has found the technology to be safe. Their concern is to prevent consumer deception that might occur with the labelling of an attribute that in the government's view does not involve a safety differential. However, such limits may frustrate consumers who want information on biotechnology because of other concerns or because they do not accept the safety judgement of the government. Consumer-level labelling policy is especially important for biotechnology-related inputs and products because its absence or presence may strongly influence adoption of the technology by producers and processors (Caswell 1991). Clear definition of what attributes the policy wants to convey may help clarify the contentious issues surrounding labelling related to biotechnology.

Similar although distinct issues relate to the labelling of the environmental impacts of food products (e.g., ecolabeling, "green" labelling). Public and private initiatives to label these impacts are widespread in many industrialised countries. Many environmental impact attributes are credence attributes because the consumer in most cases cannot or cannot fully verify the technology used in production and distribution of the product. Depending on the labelling and certification program, a possible distinction between ecolabeling and labelling of other process attributes such as organic production is that the ecolabeling standards may focus on specific performance outcomes (e.g., environmental improvement throughout a product life cycle (Erikson and Kramer-LeBlanc 1996)) while labelling of other process attributes does not (van Ravenswaay 1996). In any case, labelling programs for environmental impact attributes face tough problems in setting standards and certifying products.

Demands for labelling of process attributes by consumers and by producers and processors who wish to sell to them are likely to grow in the future. At a most basic level, governments will be called on to prevent deceptive practices regarding these types of claims. They are also likely to be called on to more actively influence the use of these types of claims through labelling policy and to balance needs for labelling in this area against needs in the areas of food safety and nutrition.

Box 6: *Biotech Labelling: The Case of rbST*

Recombinant bovine somatotropin (rbST) became commercially available for treating dairy cows to increase milk production in early 1994 in the United States, after winning safety approval from the Food and Drug Administration (FDA). Should products from cows treated with rbST be distinguished from those from untreated cows? The labelling options included:

- Allow no labelling regarding the use or nonuse of rbST.
- Mandatory labelling of products from treated cows.
- Voluntary labelling of products from untreated cows.
- Voluntary labelling of products from untreated cows, with a note on any differences between products from treated and untreated cows

The FDA chose the fourth option, issuing Interim Guidance on the Voluntary Labelling of Milk and Milk Products From Cows That Have Not Been Treated with Recombinant Bovine Somatotropin. The guidelines state that labels may not claim milk products are "bST free" because the hormone occurs naturally in milk nor may they claim to be "rbST free" because that implies the milk is different. Products may state that they come "from cows not treated with rbST" but should also provide a proper context, for example, stating that "No significant difference has been shown between milk derived from rbST-treated and non-rbST-treated cows." The FDA's approach is a middle ground that allows voluntary labelling but also requires a disclaimer that it views as necessary to prevent consumers from being misled as to safety differences between products from treated and untreated cows. Under the policy, consumers can use labels to find products from untreated cows and companies can market based on the absence of rbST treatment, although the scope of companies' claims is limited by the disclaimer.

The FDA policy is in the form of guidelines that indicate how the agency will view the legality of labelling practices. FDA also advised the states to offer further guidance to the dairy industry in order to avoid violations of federal law. Several states have taken the opportunity to pass laws or set standards. Three states chose the first option above, precluding any label claims regarding the nonuse of rbST (Centner and Lathrop 1996), while many chose either the third or fourth option listed above. Vermont chose the second option, passing a law to require the labelling of milk and milk products from rbST-treated cows. Vermont's law has been blocked in the federal courts, however, so the policies in place across the United States primarily focus on voluntary labelling of the technology, with a disclaimer suggesting there is no significant difference in milk products from treated and untreated cows.

FDA's labelling policy for rbST may well serve as a template for U.S. policy for labelling of the use of other biotechnology inputs or materials. It is interesting to note, however, that in the United States other, less controversial biotechnologies are likely to be adopted, incorporated into products, and marketed with little attention and labelling activity. Once a biotechnology passes safety tests, the need for a specific labelling policy is dictated by whether a market exists or can be developed that differentiates between food products that do and do not use the technology.

VI. Conclusions

Food labelling regulations may be used as a tool to improve the information available to consumers in making purchase decisions and as a means of influencing markets for food quality. They may be used as complements or substitutes for other types of regulatory regimes and may be applied to the full range of food quality attributes. The discussion and examples of use of labelling policies presented above lead to several general conclusions:

- Labelling has been under-utilised as a regulatory tool for food products, including for food safety attributes.

- When reduced use is made of traditional regulatory programs (e.g., process and performance standards), improved market information is often needed in order to provide adequate consumer protection. Reduced traditional regulation, or lack of harmonisation, can result in a broader range of product quality levels, so consumers will need reliable means of comparing products based on information available prior to purchase.

- Some caution is required if labelling is to be used as a substitute for other types of safety regulation such as process and performance standards because it will yield more variable levels of protection across consumer groups. The level of protection consumers receive would depend more upon their ability to process label information and to pay for higher safety levels.

- Mandatory labelling requirements should be reserved for key attributes related to human health, while voluntary labelling of other attributes, under government guidelines where appropriate, is encouraged. In all cases, the emphasis should be on creating competitive markets for quality attributes and providing reasonable consumer protection.

- Efforts to reduce or control barriers related to labelling requirements are important, particularly if labelling policy is used more intensively as a regulatory tool.

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