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Interaction of Public and Private Standards in the Food Chain

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Boxes

INTERACTION OF PUBLIC AND PRIVATE STANDARDS IN THE FOOD CHAIN

Summary and conclusions

This paper discusses a number of issues arising from the contiguous development of public and private quality standards, predominately in developed countries. The paper is an exploratory examination of the ways in which public and private food quality standards interact with each other in modern food systems. This review is not intended to be a comprehensive analysis of the subject matter which is a relatively new area of research. The focus of the report is on food quality standards which are defined here as including the full array of food product and process attributes required by consumers and society as well as food safety. Food safety is clearly an integral part of food quality at least to the extent that food safety is a basic prerequisite for any quality attribute. However, food safety has very different requirements than other food quality attributes. Food safety is essentially a "public good" because safe food is a basic requirement of any food system to ensure trust in the food supply. It is traditionally seen as a sovereign responsibility of the government to provide regulations, usually compulsory food safety standards as a basis for guaranteeing that food on offer is safe when delivered to consumers. Due to the presence of externalities, informational asymmetries and public goods characteristics, markets alone will generally not provide the socially desirable amount of food safety. Hence it is assumed here that the competence for food safety standards remains a public sector responsibility and outside the ambit of the discussion in the paper concerning the interaction of public and private food quality standards.

The report is based on a review of the literature, from which it becomes evident that research on the relations and inter-linkages between public and private standards in national food quality systems and international trade is still very much in its infancy. However, it is clearly apparent that systems of food quality control are evolving with increasingly complex interaction between public and private modes of food quality regulation. Government oversight of food quality has increased substantially in many countries over the last decade including the introduction of more stringent *ex ante* direct regulations and *ex post* indirect controls. In addition, private protocols and mechanisms have developed rapidly and now play an increasingly important role in the supply of higher quality food. The result is an increasingly complex network of both public and private standards to assure the increasing quality of products on offer in agricultural and food markets.

At the same time, public food standards are being subject to closer scrutiny in the WTO and elsewhere in terms of their scientific justification and economic efficiency, which, in turn, is influencing the course of the progression. Historically, the public sector was involved with setting standards for product grades, weights and measures used in arms length transactions for mass markets composed of largely homogenous agricultural commodities. Grades and standards in these markets have many of the characteristics of public goods and will remain predominately in the public domain. Public food quality regulations are, in general, becoming more performance and process based, placing greater responsibility on private food companies to implement effective food quality controls. In turn, private food quality standards have emerged to mitigate regulatory and reputational risks faced by private food businesses, and are increasingly being employed to facilitate competitive positioning in higher value food markets, through product differentiation based on an increasing array of food quality attributes.

As advances in science, increases in wealth and evolving societal concerns with respect to the environment, sustainability and animal welfare put greater focus on a wider range of food quality attributes, both private firms and public institutions find themselves responding increasingly to consumer and societal demands for higher food quality. However, private and social interests are often distinct and an efficient food quality control system operated from a private business perspective may not yield socially efficient outcomes. Firms have incentives to provide high quality food in order to gain competitive advantage, but in cases where information available to consumers on which to judge food quality is imperfect, market and legal incentives may be insufficient to give consumers the level of quality and protection that society as a whole would like. In such cases of information asymmetries and externalities, governments continue to play an important role in correcting market failures by enacting minimum food quality regulations. In the case of experience and credence goods, consumers rely to a large extent on public standards and quality signalling to ensure the quality of food products provided in the market. This reflects both the difficulty they face to evaluate food product quality in such instances or to take recourse against suppliers if the product turns out not to meet their expectations. However, this does not necessarily imply that mandatory regulations or quality standards are required in all circumstances. Governments may instead introduce voluntary standards and seek compliance with such quality standards. For a voluntary standards approach to be successful, the government must be prepared to follow up by imposing mandatory standards if adequate food quality compliance is not achieved with voluntary standards. But where practices by producers can have serious effects on the well-being of consumers, governments often decide to take preventive action to rule out such possibilities. In these incidences, the government will choose mandatory standards.

In circumstances where adequate information is available to consumers or can be found by them on the quality attributes of a food product, the role of mandatory standards is more questionable. For search attributes of food quality, the market will normally provide efficient incentives for producers to provide food quality even in the absence of mandatory standards or a well-functioning product liability system. Despite the economic arguments in favour of voluntary controls, it is noteworthy that traditional mandatory regulatory systems still tend to predominate in many national and regional food regulatory systems, compared to incentive based voluntary instruments of control.

Producer and consumer interests may also differ in the domain of international trade. While domestic agricultural and food producers have an interest to set standards so as to provide them with a competitive advantage over imports, this is not necessarily in the interest of consumers. This argument may be less valid in the case of globally operating food retailers and food service firms. With the creation of the WTO and Sanitary and Photo Sanitary (SPS) and Technical Barriers to Trade (TBT) Agreements establishing clear rules on the applications of standards by member countries to minimise any negative trade effects, governments now face increased scrutiny to ensure that standards are not introduced for the purpose of trade protection. The initial results in terms of disputes brought to the WTO would suggest that the WTO processes, particularly in relation to SPS matters, are having some degree of success in reducing trade protection resulting from the imposition of public standards.

Private voluntary standards can also affect trade. In a world where private standards predominate in global supply chains controlled by multinational food companies, a key issue for a food exporter or supplier is to gain access to the global value chain. With a diminishing number of leading retailers and global food businesses due to industry consolidation and concentration trends, there is greater scope for exclusion from entire markets if private standards laying down conditions of entry are not met. By the same token, for those exporters who do gain access to these global value chains, the benefits in terms of trade relations can be substantial. Standards can thus have a catalytic effect in opening up trade opportunities for such exporters. However, the evolution of private standards does not imply that public regulatory standards will disappear. Exporters will still need to demonstrate compliance with public standards to gain entry to national markets. What it does suggest, however, is that there will likely be

economic gains from closer co-ordination of public and private standards and related control systems. An example is provided by dairy industries in EU member states which have reached common agreement to harmonised standards on quality of dairy products across member states and then EU wide standards are set by the European Commission. Another example at the regional level of the benefits of such coordination is provided by the Rapid Alert System in the EU that was established in cooperation with private industry food retailers and distributors to rapidly remove products from retailer shelves if quality problems are detected.

With the increasing globalisation of food supply chains, both systems are being influenced by trade agreements in the WTO and by the work of international food quality standardisation organisations. While this is leading to increased transparency of public regulatory processes, one concern is that a similar level of transparency may not apply to private standards and their associated control and enforcement processes.

The mix between public and private food quality standards continues to evolve. There appears to be some movement towards a separation of standards and food regulation in developed countries, with the former the domain of private firms and the later that of public agencies. Direct regulation is placing more emphasis on company level responsibility. Private standards and market forces related to market segmentation and higher returns to a firm's reputation tend to reinforce this development. The shift of responsibilities towards the private sector has created a more complex policy space involving public and private sector incentives and controls. In this situation, public regulatory agencies need to be more aware of their actions in the context of evolving private modes of food quality management as the way in which public standards are developed can act to augment market-based incentives to invest in enhanced food quality and supply chain controls.

From this brief review of the literature it would appear that while private food quality standards are often higher, more flexible and agile in responding to a wide range of continually evolving consumer preferences for food quality than public quality standards enforced by single nations on their domestic food supply or as a result of international negotiations (Codex); overall, public and private food quality standards tend to be complementary. In many cases private standards build on the existing public standard infrastructure to provide an element of competition through quality differentiation. Public standards are still necessary to correct market failures associated with information asymmetries or consumption externalities and where standards have clearly public good characteristics. Public standards will, therefore, continue to play a dominant role in establishing basic grades and standards for mass markets composed of largely homogenous agricultural products to create economies of scale and for ensuring minimum standards of a safe food supply as well as to prevent fraud or quality deception of consumers. They also have a global role in assuring that basic standards are consistent across countries and with those that are required to be met (SPS, TBT) in cross border trade. Private standards may play a substitute role in situations where there is an absence of effective public standards to provide a measure of food quality for consumers. Alternatively, private standards have emerged despite the existence of strong public food quality standards as a means to differentiate products, reflecting the growing role of quality as the mode of competition in agricultural and food markets, as well as to facilitate effective coordination of expansive buyer supply chains. In certain circumstances, private standards can also act to facilitate compliance with public standards to allow for better targeting of scarce compliance resources. In markets for differentiated products and to meet requirements of niche markets (including for product liability), food companies may choose to exceed public standards with higher private standards. In this way, private and public standards can be mutually reinforcing, contributing to total system efficacy and resulting in higher quality food being available in national and global markets.

A. Introduction

Contemporary agri-food systems are increasingly pervaded by an array of inter-related public and private standards. These are becoming a mandatory part of doing business in supply chains for processed food products, beyond basic bulk commodities [Henson and Reardon, 2005]. Governments have traditionally played the major role in establishing minimum food quality standards and regulations for their populations. This recognises a degree of government responsibility for food quality issues to ensure, amongst other things, the availability of safe food[1] for the population at large and to protect consumers from deceptive and fraudulent practices

Standards continue to evolve in response to changes in technology, scientific developments regarding the risks associated with food and directly in response to consumer and societal demands. They have proliferated and diversified their coverage over time as societal activities have become more complex. At the same time, structural and institutional evolutions based on private control systems and enforcement procedures are taking place in the agri-food sector of many developed countries in conjunction with trends in consumer demand that have increased the role of private voluntary standards in food chains. The wider use of private standards is refocusing agricultural and food supply chains from price-based to quality-based centres of competition [Henson and Reardon, 2005]. Quality food standards are now increasingly seen as private goods that differentiate food products and are increasingly in the domain of private firms. Public standards and regulatory controls have also evolved over time in most countries around the world, and have become ever more stringent and complex as consumers demand specific attributes or disclosure of information about certain attributes of food [Josling *et al.,* 2004].

Increasingly, supply chains for food products are extending beyond national borders, facilitated in part by new processed food products and a policy environment more supportive of international food trade. Minimum quality standards while protecting the consumer often do not allow food retail businesses, food service companies and processing firms in a contemporary food system to differentiate their products based on quality attributes to protect and gain market share when competing in national and regional markets[2]. As a consequence, private standards have emerged to fill this gap and to respond to regulatory developments. In general, these are based on coordinated systems for meeting consumer demand for quality attributes based on product differentiation and market segmentation [Fulponi, 2006]. As private food companies and retail businesses expand across the world and develop local and global supply chains, they set standards for the quality of foods they will purchase from suppliers and sell to consumers. These standards may be higher and more demanding than the minimum standards enforced by governments in their national markets. However, private standards as a fairly recent phenomenon are not yet universally applied with public standards still the dominant form of control in the food systems of some countries.

Given these developments, many questions arise as to the relationship between public and private standards in the modern food system. With the growing importance of private voluntary standards that are often set at higher levels, more frequently adjusted and applied to more varied areas than government

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1 Food safety is clearly an integral part of food quality at least to the extent that food safety is a basic prerequisite for any quality attribute. However, food safety has very different requirements than other food quality attributes. Food safety is essentially a "public good" because safe food is a basic requirement of any food system to ensure trust in the food supply. It is traditionally seen as a sovereign responsibility of the government to provide regulations, usually compulsory food safety standards as a basis for guaranteeing that food on offer is safe when delivered to consumers. Due to the presence of externalities, informational asymmetries and public goods characteristics, markets alone will generally not provide the socially desirable amount of food safety. Hence it is assumed here that the competence for food safety standards remains a public sector responsibility and outside the ambit of the discussion in the paper concerning the interaction of public and private food quality standards.

2 Public grades and standards have, in many cases, been inherited from an era of bulk agricultural commodity markets and relatively homogenous goods.

standards, the question that arises is what is the role of government standards and food regulations? Can decisions on standards by individual private firms be relied on to yield outcomes that coincide with broader public policy goals? A related question is whether existing standard setting arrangements are conducive to aligning public and private outcomes? Are public standards still required and for what purposes? Would private quality standards be lower in the absence of minimum public food quality standards?

This report aims to throw light on such questions at the interface between public and private food standards in modern food chains through a selective review of the extensive literature that is available. The focus is on the role played by public and private standards in contemporary food systems, their evolving relations and how they interact with each other (*i.e.* complement, substitute, conflict or convergent) in establishing incentives for food suppliers to provide high quality food in national and international food markets.

The paper is structured as follows. Section 2 reviews the economic concepts of relevance to standards as a lead in to the types and definitions of food standards in Section 3. Section 4 discusses the rationale for government food regulations or public standards. The factors explaining the emergence and growing prominence of private voluntary standards are discussed in Section 5. Section 6 extends the discussion of standards to take in the international trade dimension. A final section attempts to draw the threads of the discussion together on the different roles and interactions between public and private standards in national and global food systems.

B. The economics of food quality standards

The economic literature on standards as initially conceived identified the provision of information and compatibility, or the network externalities approach, as being the driving force for standardisation [Katz and Shapiro, 1985]. Economic gains accrue due to positive network effects which arise when the value of a good to a user increases the more other users adopt the same good or compatible ones [Becker, 1999]. Classic examples of positive network externalities are telephones and fax machines, whose value to an individual user increases with the number of users connected to the service. Much of the focus of the economic literature in the area of food standards has been on the role of public food quality standards both as policy instruments for regulating food markets and as potential non-tariff measures, although more attention is now being given to the growing role of private food quality standards in the food supply chain [Henson, 2006].

In this section the economics of standards is discussed in the context of food quality. Food quality standards have been selected for several reasons. Firstly, with rising incomes and higher standards of living, consumers generally have become more demanding and fragmented in their food choices. Private food standards have emerged in part to respond to this need, with a shift to quality competition based on product differentiation in terms of quality of food products and away from price-based competition among firms. Secondly, agri-food products are characterised by considerable variability and heterogeneity that create uncertainty for consumers on the different attributes that make up food product quality. As food quality depends crucially on objective characteristics of products as well as individual subjective preferences, quality *per se* is difficult to define.[3] Two different analytical conceptions are used in the literature on food quality.[4] The consumer behaviour literature favours the consumer perceived quality or

[3] The International Organisation of Standardisation (ISO) has developed a definition of food quality that has been widely used. Quality is defined as the "totality of features and characteristics of a product that bear on its ability to satisfy stated or implied needs" However, this definition is so general it is not useful for analytical purposes

[4] The two analytical approaches are potentially contradictory as is evident in the case of the beef hormones issue between the US and EU. While the European Union is in favour of the perceived quality approach, the US takes the view that no scientific evidence is available to confirm (EU) consumer perceptions that hormone treated beef is of inferior quality and hence no justification for an EU ban on such imports which is in violation of the WTO rules.

attribute approach, while the food science literature emphasises the measurable quality approach based on objective product quality [Bowbrick, 1992]. In the case of the former approach, product quality, in following Lancaster [1966], is seen as a bundle of attributes or characteristics or properties that determine a products performance. Major categories of food product quality attributes include food nutrition, organo-leptic characteristics (colour/appearance, taste, texture, odour and other sensory characteristics, etc.) and process attributes covering such things as organic production, dolphin-safe, animal welfare conditions, GMO-free, environment preservation and worker conditions [Brunsø *et al.*, 2002].

Consumers are assumed to use cues and signals to detect attributes they wish to consume [Becker, 1999]. A distinction is usually made between intrinsic and extrinsic cues. The former refers to the physical properties of the food product and extrinsic cues refer basically to everything else [Grunert, 2005]. Intrinsic cues such as colour, appearance, size and smell, are used to predict attributes such as eating quality and taste. Among the range of extrinsic cues, three have received special attention in the literature as possible quality indicators or signals to consumers. These include product brands, indicators related to a product's origin and quality labels. In the normal course of events, consumers choose foods within the context of a total diet in order to obtain greater expected utility from their food. Consumers with different risk preferences choose different bundles of foods. If their expectations of the quality attributes of foods (such as risks or health hazards associated with certain food products) are not satisfied, consumers suffer a loss of utility. On the supply side, food producers will supply food quality if it is profitable for them to do so, or if they are required to do so. The higher profitability may arise from increased product differentiation and sales to niche markets or from avoidance of losses with costly procedures and associated financial liability in the event that quality is not maintained. The market outcome for quality is thus determined in the usual way by the supply of characteristics and the demand for attributes and the information that consumers have on these attributes [Caswell and Mojduszka, 1996].

In general, the market for food quality can be characterised by a rising supply (marginal cost) curve and a declining demand (marginal benefit) curve [Henson and Traill, 1993; Caswell and Mojduszka, 1996]. Under perfect market conditions, these schedules intersect at a particular market clearing price providing the optimum level of food quality. This scenario assumes that all market participants are fully informed about the nature of the product on offer, buyers and sellers are essentially price-takers and that market prices reflect all the costs and benefits to society. In such a situation, market prices will transmit all necessary information, externalities will not arise and government regulation is not required [Caswell and Mojduszka, 1996]. In these circumstances, a variety of products of different qualities will be offered for sale in the market at different prices. However, the market for food quality is often far from perfect. The more important imperfections arise from asymmetry in information with sellers usually being better informed about quality than buyers. In addition, since it is often difficult if not impossible for buyers to tell the difference between good and bad (credence) quality products prior to purchase, this situation provides incentives for sellers to promise high quality products but to sell low quality products in their place, leading to adverse selection as pointed out by Akerlof [1970]. Consumers may also have misconceptions about the risks associated with consuming certain foods (externalities) and information about food quality may have public good characteristics. In this situation, food quality may be under or over-supplied [Caswell and Mojduszka, 1996].

Box 1. Minimum Quality Standards

In an overall market context, the economic role of information provides the basic element for understanding the importance of standards in the food system. Standards can, in general, improve consumer's information about product quality. As a result, confidence rises and there is an overall increase in demand. Minimum standards may be used in situations of imperfect information. In the literature, the theoretical discussion considers 'minimum quality standards' (MQS) as a minimum that can be applied to any attribute, but the economic reasoning remains the same.

With imperfect information, regulatory agencies may set minimum quality standards (MQS). Most often MQS are used to increase the qualities of goods produced and consumed, though there remains debate on their final effects. When governments set MQS this is usually done for consumption externality reasons where free market qualities may be considered insufficient. When governments implement minimum quality standards for some products or process characteristic, this reduces the quality difference between firms (as nothing less than the minimum quality is allowed to be sold) and increases price competition. In this situation, competing firms may decide to increase their quality standard of a given attribute in order to relax price competition. But differences in quality between firms are never fully restored to levels that existed prior to government standard setting, so prices fall or increase less and welfare rises [Ronnen, 1991; Gal-Or, 1997)].[1] Authors such as Leland, [1979], Shapiro, [1983], argue that regulatory MQS are not sufficient to raise the consumption quality of consumers, since many already consume above the minimum standard and other consumers might be driven out of the market as prices rise.

In the food sector there has been widespread use of minimum quality standards on products and processes related to consumption attributes, such as organic or free range.[2] In order to build and maintain reputation as high quality sellers, or to keep customer loyalty and to earn premiums, sellers may decide to set quality levels above MQS. Some suggest that this behaviour is a response to consumer demands for higher quality by those willing to pay for it [Lutz *et al,* 2000; Ecchia and Lambertini, 1997; Boom, 1995; Crampes and Hollander 1995]. This may also explain why specific high quality product lines in food retailing are set up, such as Tesco's Nature's choice, Carrefour's Fillière de Qualité or Loblaw's President's choice. An increase in private standards above MQS raises the question of the economic or strategic motivation of firms. Is it a new way to compete, a way to insure against possible quality failures, a strategy to pre-empt government regulations or simply to influence the regulatory outcomes?

One strategy is to pre-empt public regulations. Individual firms or a group of firms may decide to exceed existing standards if, in doing so, they can influence future regulations. The timing of government and firm decisions is again important [Lutz *et al*, 2000]. If firms decide to adopt a standard above current and expected minimum levels before government takes action, then regulators may be influenced to set lower MSQ than they would have done otherwise. Under this formulation, food companies may have undertaken substantial investments in machinery and equipment or other supply logistics to ensure their specific private standard is achieved and adopted. Governments may be unwilling to increase costs to firms with adverse consequences for prices or employment levels, if they set different minimum standards. Such a pre-emptive strategy may, however, reduce social welfare compared to a situation where the government would have moved first. [Lutz *et al,* 2000]. This situation can arise where MQS hitherto did not exist. In the food sector this could possibly be the case for process attributes such as animal friendly and environmentally friendly production processes. In certain cases, firms may over-comply or exceed required standards in order to further enhance their reputation for offering high quality products in niche markets. Since over compliance may increase reputation and market returns, public knowledge of a firm's behavior provide incentives to over-comply [Lutz *et al*, 2002; Boom, 1995].

1. These results are obtained in imperfectly competitive markets where sellers can set prices rather than act in the price taker situation discussed in Leland and Shapiro. Ronnen finds that competition in qualities relaxes price competition: To alleviate the effects of the more intense price competition on their revenues, sellers of high quality products raise their quality in response to the sellers of low quality products that have been forced to raise their quality to the mandated minimum quality level. Consequently, if variable costs do not rise 'too quickly' with quality, prices corrected for quality fall [Ronnen, 1991 p. 503].

2. When minimum standards are set exogenously, they may not be optimal. The optimal standard is found by balancing the benefits accruing to consumers of high quality and losses to those who would purchase a good at a quality below the minimum. Regulatory agencies set minimum standards for goods where inferior qualities might have negative impacts on society

Economists have frequently classified goods into three categories that signal the degree of information available to consumers when buying them. The first category is *search* goods. For *search* goods or attributes, consumers are able to ascertain visually a product's attributes before they purchase and consume it by inspecting or researching the product. There is no quality uncertainty given careful pre-purchase inspection and assuming that the cost of search is negligible. This is a full information situation. In the case

of *experience* goods or attributes, consumers are only able to determine a product's quality after they purchase and consume it. Allowing for repeated purchases, the experience attribute can be used to eliminate any quality uncertainty that may exist in the minds of consumers.[Nelson, 1970] *Credence* attributes denote those quality features of a product which are important to the consumer but which are unable to be determined even after consumption [Darby and Karni, 1973; Andersen and Philipsen, 1998]. In practice, a single food product could embody attributes that fit all three types of goods. For example, in selecting a tomato in a fruit and vegetable stall, one could "search" for a tomato that looks ripe, smells good and is free of any external disease or insect infestation. Once the tomato is eaten, the consumer "experiences" the quality judging it by a variety of subjective factors, such as flavour, firmness and texture. However, the consumer is unable to detect any credence attributes of the tomato. These may relate to the method of production such as organic or whether it contains toxic elements or residues that may have a long term cumulative effect on the health of the consumer. The consumer essentially "trusts" that these credence attributes are either present or absent, as the case maybe, in the tomato that was consumed. Credence attributes have the potential to be particularly problematic as the consumer has no way of identifying their existence through either pre-purchase search (other than at a prohibitive cost) or from post consumption experience.

Markets for search attributes usually function with simple transactions such as barter exchange or open street markets. As full information is available to consumers, these markets can effectively deliver search goods with little or no direct government intervention. On the other hand, markets for experience or credence goods do not function without some external trust element. For *experience* attributes, information is the most important issue; it determines what consumers can learn about product quality. In these markets, producers tend to possess superior information to consumers on the quality of the products on offer. In these circumstances, there is a danger of firms taking advantage of their knowledge concerning product characteristics and selling low quality products at a price meant for higher quality ones that cost more to produce. The risk they face in doing so, however, is a consumer backlash and loss of revenue as consumers shop elsewhere in the future for their repeat purchases. Markets for experience goods, therefore, have the capacity to self-correct as demand will be responsive over time to changes in product quality, particularly with repeated transactions. Markets for experience goods with infrequent purchases often require some additional structures to effect the transaction (*e.g.* brands, warranties and certifications). In the long run, the consumer will have near perfect information about product quality.

The problem is more difficult in the case of *credence* goods, which cover many aspects of food quality. For these goods, information about product quality attributes cannot be discerned by the consumer, before purchase and even after repeated consumption of the food item. Models based on informed consumers and seller reputation in markets for *experience* attributes do not function well for credence attributes such as nutritional quality and production methods. Asymmetry in information is also a feature of markets for credence food products with users having less information about the inherent quality attributes of the product than sellers. Although transactions may be possible in unregulated markets for credence goods, the absence of complete consumer knowledge severely limits the potential for an economically efficient outcome. Many food products have elements of both experience and credence attributes. As a result, agricultural and food products can be viewed as a complex array of quality attributes that are packaged together in different combinations and quantities, many of which are not directly observable at the time of purchase or even following consumption [Henson, 2006]. In order to function correctly, these markets require some public regulatory structure or private quality signal to address the consumer information uncertainty.

Credence type attributes of food quality such as "organic" or "fair trade" are not usually considered to be public goods. They are characteristics that some consumers are willing to pay more for, if they can be assured of the presence of the desired attribute through "quality signalling" that addresses the uncertainty faced by them in making their choice. The solution to market failure resulting from information asymmetry

is essentially the provision of more information to overcome the adverse selection problem. Quality labels, brands, warranties and certifications are designed to provide information to consumers to help reduce information uncertainty. According to Caswell [1998], labelling can transform credence attributes to search attributes that allow the consumer to judge the quality of the food product before purchase. However, information will only be effective in reducing information asymmetry and to allow consumers to make optimal choices in line with their preferences if it is processed and used by the target audience. Too much information or that which is not specifically targeted to consumers needs runs the risk of information overload and consumer indifference. [Verbeke, 2005]. The efficacy of a quality signal is essentially linked to two conditions: the pertinence of the information provided and its credibility to the recipient consumer [Valceschini, 1998]. For credence type goods, government standards are not the only approach, or necessarily the best, to address quality information issues. Such an assessment, however, usually needs to be made on a case by case basis. Consumers can rely on producers' voluntary claims or warranties, backed up, in some cases, by government laws to prevent deceptive claims. Alternatively, a public standard could apply that mandates disclosure of product or production process characteristics to consumers. Consumers could also place their trust in a certification provided by an independent third party to provide reliable information on the desired food quality attribute [Ippolito, 2003]. In this case, either a conformity certification of an independent third party is used, or else a public standard enforced by government testing or inspections to ensure conformity to the standard is applied. While certificates and labels provide a means to correct a domestic market failure, these remedies can also have trans-border effects and this issue is taken up later in the paper.

C. Standards: types and definitions

Standards are common in all forms of human activity and are designed to both simplify transactions and provide an element of certainty in exchange.[5] Standards fulfil a number of diverse functions. In the technical realm, standards lower risk, increase credibility and trust, and facilitate predictability for buyers and sellers. Standards are necessary, therefore, for the smooth functioning of exchange between anonymous economic agents, as parties to a transaction must be assured of the nature and quality of the product involved. By reducing search and transaction costs and lowering risk, standards help to facilitate exchange and trade. The efficacy of exchange is enhanced by two main functions of a standard – as a guarantee of a minimum quality and by defining the characteristics or specifications of the product or its production process and associated criteria of performance. Although standardisation is necessary to facilitate market operations and implies some degree of homogeneity, it does not follow that variety per se is undesirable. Standards reflect the needs of the groups that express them and as long as groups differ, their optimal standards will reflect these differences [Casella, 2001].

Following Jones and Hill (1994) Reardon and Farina (2001), grades and standards cover a collection of technical specifications, definitions, terms and principles of classification and labelling.[6] They include rules of weights and measures established by regulation or authority (standards) and a system of classification based on quantifiable attributes (grades). Food "product" standards and grades – as opposed to "process" standards – specify the characteristics of the final product. These characteristics of the product can include shape, size, weight, safety, authenticity, energy, nutritional content and organo-leptic quality attributes (colour/appearance, taste, texture, etc.). Commodity standards and grades exist to facilitate the operation of agricultural and food marketing systems. However, in an increasingly globalised agricultural

5 Standards can be defined as a specification or set of specifications that relate to some characteristics of a product or its manufacture (Sykes, 1990).

6 According to Jones and Hill [1994] grades and standards (G&S) are defined parameters that segregate similar products into categories and describe them with consistent terminology that can be commonly understood by market participants. Standards are rules of measurement established by regulation and authority and grades are a system of classification based on quantifiable attributes.

and food economy, the role of grades and standards are shifting from the traditional or historical role of reducing transaction costs in mass commodity markets towards a role as strategic tools for product differentiation and market segmentation[Clayton *et al*., 2003]. Product standards, by nature, play a role in markets of vertically differentiated products, *i.e.* products that appear in different varieties and which can be ordered according to a certain objective scale (*e.g.* milk with higher or lower butter fat content). The concept of a minimum standard is used in the context of vertically differentiated goods, by implying that only products that reach a certain level of quality or higher are considered to meet the standard.

As opposed to "product" standards, food "process" standards specify the characteristics of the production process used to produce the food product, such as organic or biological production, free range, use of animal welfare and environmentally friendly production processes, worker/labour conditions, fair trade etc. Process standards specify production techniques that the preparation of a food must follow from raw product, to processing through to the intermediate and final product for packing and distribution. Process standards are introduced for different reasons: because they affect the goods they produce (*e.g.* hygiene standards); because they affect the efficiency of the production process (*e.g*. network externalities) or because they affect the environment (*e.g.* pollution standards) [WTO, 2005]. "Performance" standards are the characteristics a product is expected to have when it reaches a certain point in the agri-food chain, *e.g.* the maximum amount of pesticide residue permitted on apples when purchased by processors from growers [Reardon and Farina, 2001].

Following Valceschini and Saulais (2005), there are four principal criteria by which to compare and contrast standards that together make up a system of standardisation. These criteria are illustrated in Table 2 of Box 2. They include the origin of the standard (*i.e.* who creates the standard), the function or content of the standard, how the standard is implemented and the method of control or enforcement to ensure conformity. Food quality standards can be classified into private and public standards although the line separating them is not always well defined. In many instances, standards adopted by governments and based on public law have their origins in private industry. These government policies and regulations in conjunction with input, process and performance standards for food products significantly influence how private markets for food quality function and develop [Caswell and Mojduszka, 1996]. From the perspectives of economic theory, the distinction between public and private standards in a functional context depends more on whose interests are being taken into account when the standard is set and enforced. For a public standard, based on a public law and set by the government, it is assumed that the interests of all actors in the economy - both producers and consumers and society at large (externalities) - are taken into consideration. Private standards, on the other hand, are assumed to take account of the profits and interests of firms, producers or private bodies. They can be expected to reflect the interests of consumers, but only to the extent that such interests correspond to those of the firm and are reflected in the price. Standards can also be set by non-government organisations (NGOs), which form another category of private standards. NGOs tend to be non-profit oriented and do not necessarily pursue the same objectives as governments in standard setting [WTO, 2005]. Table 1 provides a classification of the different types of public food quality standards according to four basic dimensions of goals, attribute focus, breadth of coverage and scope.

Table 1. Classification of food standards

Dimension	Classification
Goals	*Quality:* Regulations that provide differentiation of goods based on content and process attributes not directly related to health and food safety
Attributes	*Content attributes:* Regulations that target material aspects of the food product
	Process attributes: Regulations that target the processes by which a food product is produced, handled, or distributed
Breadth	*Vertical*: Regulations specific to a single product or closely related products in one or more stages of the marketing chain
	Horizontal: Regulations applied across products that not necessarily closely related
Scope	*Uniform:* Regulations that apply equally to products of domestic and foreign origin
	Specific: Regulations that apply only to imported products, often only of certain origins

Source: Based on Josling, T., Roberts, D., and Orden, D., (2004) Food Regulation and Trade. Towards a Safe and Open Global System, Institute of International Economics, Washington DC, p18.

Private standards are by definition voluntary, but public standards can be either voluntary or mandatory. Voluntary consensus standards arise from a formal coordination process involving participants in a market and this may occur with or without the participation of government [Henson and Reardon, 2005]. Voluntary public standards are often combined with certain government labels such as the EU's labels of protected designation of origin (PDO), of protected geographical indication (PGI) and of traditional specialty guaranteed (TSG). These are usually non-product related standards, although product related production standards also exist (*e.g.* standards on organic production). Voluntary standards whether public or private, and with compliance communicated by labels, provide a mechanism to overcome the information asymmetry problem. Countries can choose from several different types of labelling schemes that allocate the information provision task to private and public sectors in different ways. These different approaches based on voluntary and mandatory regulations are illustrated in Table 2. Following [Josling *et al*., 2004] the first regime provides an example of a labelling procedure for geographical indications for food products. Here the industry develops and adopts the standards that make the product eligible for designation from a specific region. In the second regime the government plays a large role in the control of voluntary claims of such thing as product identity that reduce consumer uncertainty and possibilities of quality deception. The third and fourth regimes are based on labelling procedures that require mandatory disclosure of information; in one case for labelling a country of origin product and the other for labelling a content attribute such as the nutritional composition of a product.

In the case of mandatory (minimum) quality standards, as only food products meeting these standards are allowed to be sold in a market, they have the effect of reducing the range of products available for consumption, with potential price implications. A broad definition of standards includes mandatory technical regulations as well as voluntary agreements on the quality characteristics of goods and services.[7] Mandatory standards are standards set by public agencies and for which compliance is obligatory. While private or proprietary standards are voluntary standards, in many instances they have become *de facto* obligatory because of wide acceptance by market participants due to dominant share in the market or practice, or when compliance with them is a requirement for suppliers to access the proprietary value chain of some large food retailers and food service firms.

Table 2. Private and public roles in food quality labelling

Role	Regime1	Regime 2	Regime 3	Regime 4
Legal status:	Voluntary	Voluntary	Mandatory	Mandatory
Standard set by:	Private sector	Government	Government	Government
Attribute:	Process	Content	Process	Content
Implementation:	Adoption of production practice	Product reformulation	Segregation and identity preservation	Product reformulation
Conformity assessment				
Accreditation:	Private sector			
Certification:	Private sector			
Testing:		Private sector		Private sector
Documentation:			Private	
Inspection/audit:		Government	Government	Government
Legal enforcement:	Private and Government	Government	Government	Government
Examples:	Geographical indications	Standards of identity	Country of origin labels	Nutritional content labels

Source: Based on Josling, T., Roberts, D., and Orden, D., (2004) Food Regulation and Trade op cit, page 131.

[7] The Technical Barriers to Trade (TBT) Agreement in the WTO, on the other hand, makes a clear distinction between mandatory technical regulations and voluntary standards. The expression "defacto mandatory standard" is used in the sense that the private standard of a food buying firm becomes virtually obligatory for food supplying firms who wish to be able to supply or sell food products to the downstream buying firm. This is different from the use of the term in the economics of innovation. In this literature, the term "defacto standards" concerns technical standards (formal or informal) that have achieved a dominant position in practice, either by enforcement or market dominance This contrasts with "*de jure* standards" required by law and established by regulation or perhaps by means of a voluntary standard endorsed by a standards organization such as ISO in response to a widely perceived need.

Box 2. A paradigm of standards

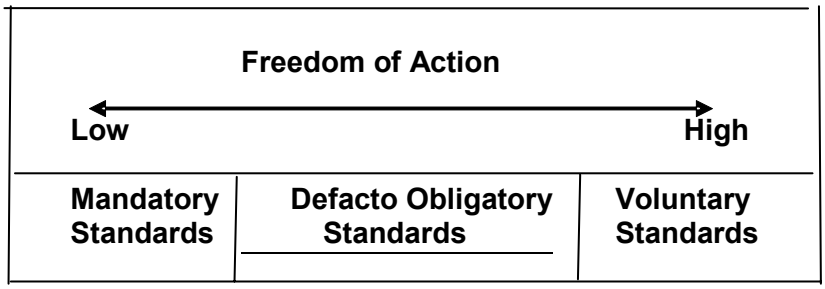
Box 2 Table1 illustrates the different types of standards. Following Henson [2004], standards can be considered as a continuum characterized according to the degree to which users have freedom of choice and action regarding compliance (Box 2 Figure 1). At one end of the continuum are mandatory public regulations establishing standards and grades for minimum food quality and at the other end voluntary standards where users can decide to comply with or not and take the associated economic consequences that each decision implies. Voluntary standards can become *de facto* mandatory or obligatory on market participants since suppliers are obliged to comply with them if they wish to enter or remain within a particular market. Thus, voluntary proprietary standards of buyers in the food chain can exclude potential food suppliers from entering into a market if they are unable to meet the buyer's established standards.

Box 2 Table 1. Comparison of standards

Type of standard	Origin of standard	Function of standard	Compliance with standard	Enforcement of standard
Public Regulation	Implemented by the State	Protection of consumer, prevention of fraud	Mandatory	Official certification and inspection
Semi-public/private Norms	Outcome of consensus of public and private representatives of sector	General procedure such as HACCP	Voluntary	Conformity certified by first, second or a third party
Private standards	Created by an enterprise for internal use or a group of producers and recognized by state	A standard developed to reflect existing public regulations or a designated product and related process of production.	Voluntary	Conformity guaranteed by internal controls or certified by an independent organization or public agency
Proprietary private standards	Created by a retailer, food service operator or manufacturer to coordinate and control their suppliers	Covers relations between buyer and private suppliers	Voluntary but generally covered by contractual relations	Conformity ensured by audit by second party or certification by an independent organisation

Source: Valceschini, E., and Saulis, L. (2005), Articulation entre réglementation, normalisation et référentiels prives dans les industries agroalimentaires. Rapport final. Rapport d'une étude financée par le Ministère de l'Agriculture et de la Pèche –Direction des Politiques Économique et Internationale (référence MAP 05 D1 05 01) I.

Box 2 Figure 1. Forms of standards



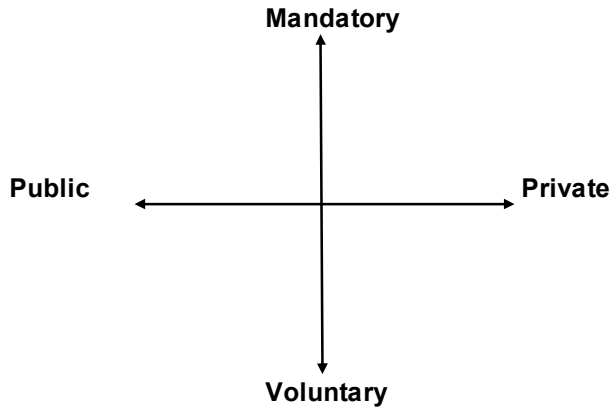
Source: S. Henson and J. Caswell [1999].

By applying this distinction between mandatory and voluntary standards, it is possible to define a two-dimensional classification of standards (Box 2 Figure 2) that has been widely applied in the literature [Henson, 2005]. This classification can be used to compare standardization for products and processes within and across countries. For example, in the case of countries at low levels of development, most standards fall into the mandatory public quadrant of Box 2 Figure 2. While public standards may exist on the rule books in least developed countries they may not have much effect in practice, if not enforced by state authorities due to a lack of resources. As the economy develops and becomes more integrated into the global market place, there is typically increased incidence of voluntary public standards, particularly for the export sector, and then private standards increase. In the case of developed countries, many private proprietary standards have become de facto obligatory for market participants as dominant firms impose their requirements on suppliers through the processes of market competition based on quality differentiation.

In most markets voluntary and mandatory standards exist and operate side by side with considerable interrelationship and dependencies between them. In the past, most standards introduced by public regulatory institutions were mandatory and those applied by private entities were voluntary. However, increasingly public agencies have developed voluntary standards (*e.g.* label rouge in France), whereas it is recognized that the food standards of large private food retailers and food service companies with market power can become *de facto* obligatory. Voluntary standards can also evolve as a mechanism to facilitate compliance with mandatory standards or to demonstrate such compliance. For example, compliance with voluntary standards *(i.e*. application of HACCP systems) can be used to demonstrate 'due diligence' with respect to legal product liability standards. Mandatory standards can also reference private standards as part of their requirements. This can reinforce the voluntary use of such standards and increase their acceptance. It also helps to ensure that standards institutions seek to consult with industries in the standard setting process; when the use of voluntary standards becomes widespread, they may become incorporated in mandatory public standards. In this way, voluntary and mandatory standards can be seen as complementary and equal components of systems of standardization.

A further distinction can be made between national standards and standards developed by countries on a collective or multilateral basis. In some circumstances adoption of international standards can be a cost effective way to upgrade domestic standards in order to meet international market requirements. The efficacy of this approach to standard setting is dependent on the extent to which international standards reflect domestic needs and circumstances. Where they do not take adequate account of local conditions, costs of compliance can be greater than what is required for domestically based standards.

Box 2 Figure 2. A paradigm for standards



Source: Henson, S. (2004).

Most types of standards and particularly mandatory regulations will have the effect of increasing production and other compliance costs for at least some firms in the food chain. Product standards may have lower cost implications than process standards, as the former allow firms more flexibility to choose the least costly production methods that meet the standards [Unnevehr and Jensen, 1996; Segerson, 1998]. The implementation of standards will normally also lead to increased costs for consumers in the form of higher prices of food products and potentially less variety of choice. While the evolution of (private) standards reflects in part changes in consumer demands and preferences, the consumption of food, on the other hand, is increasingly being structured by the development of standards. This reflects the proliferation and diversification of public and private standards over time. This evolution is being driven by increasing regulatory requirements with scientific and technological developments and increasing knowledge as well as by rising consumer demand and changing preferences for food diversity and higher quality products. The general "ratcheting-up" of quality standards is also contributing to a closer integration between public and private standards. The question that arises is whether this is leading to a coherent system of food standards as a whole. Furthermore, in view of the growing importance of private voluntary standards in the food sector that is predicated, in many instances, on higher food quality, what is the legitimate role for public food quality standards in a dynamic food sector?

D. The rational for government food standards

Due to differences in information requirements, the classification of goods as to the information available to consumers that was discussed in the previous section pose different issues for public standards and regulations. In the case of *search* type goods, as producers face a risk of loss of business and revenue from selling inferior goods they have an incentive to provide the range of quality that consumers are willing to pay for. For such food products, consumers have near perfect information about product quality before buying the food item. In these cases, consumers are generally capable of protecting themselves or, at worst will suffer only temporary damage to their purse, and not their health, if a product does not live up to perceived quality expectations. Markets for *search* goods and attributes would normally, therefore, be only a minor focus of government regulatory activities.

However, in markets for *experience* goods, which cover many other aspects of food quality, producers possess superior information to consumers on the quality of the products on sale. As consumers can only identify the quality attributes of *experience* goods after consumption, public regulation - for instance through a requirement for quality information labelling or through the provision of product liability legislation - is likely to be more useful than for *search* good markets. Labelling regulations help to

alleviate market imperfections based on information deficiencies and have the effect of transforming *experience* attributes into search attributes in goods. As these markets have the potential to self-correct in the sense that complete information for quality selection is eventually available, perhaps through repeated purchases of the same food item, no informational asymmetries or other reasons for market failure exist in the longer run. In this situation, mandatory regulatory intervention on the part of public agencies has been shown in the literature to lead to a decrease in social welfare [Bocksteal, 1984].

As informational deficiencies faced by consumers with respect to food quality are even more profound in the case of *credence* type attributes, policy makers often choose to intervene by imposing a mandatory standard or label requirement to signal quality in this case. Regulatory oversight of producers' quality claims is viewed as a responsibility of the public sector and particularly in the case of the many food products that carry no brands where reputational mechanisms (*i.e.* associating a particular food firm with a product) are missing to protect the integrity of market transactions. These regulations can solve the information problem, remedy the market failure and increase market efficiency. Direct government regulation can take place through enforcement of standards for production processes used to produce food or by specifying a level of quality for the final product. Standards thus provide a mechanism through which public authorities can regulate the food system in order to ensure social food quality objectives are addressed at the level desired. Mandatory standards in this situation act like a minimum standard in removing from the market those products not meeting the desired quality standard [WTO, 2005]. In this way, government standards facilitate the availability of improved information on food quality and have the potential to be open and balanced in assessing the various trade-offs involved. These standards can create greater accountability for the food industry by discouraging irresponsible activities and rewarding beneficial efforts. Furthermore, public regulators can more easily establish a single standard with certainty, such as for example an "organic" standard, than private actors and can prosecute any violators under the law [McCluskey, 2006]. However in establishing standards, governments can also be subject to interest group pressures and if standards are mandatory they have more potential to act as an exclusionary device. Special interests that would be adversely affected by a change can have an incentive to block movement and government standard setting procedures in some countries may facilitate such efforts of regulatory capture. While it is always difficult to generalise, public standards can display a tendency to be less flexible than private protocols in reacting to changing circumstances and do not usually provide incentives for innovation. Once in place, government standards can be difficult to change as science and technology evolve or as consumer preferences change. In addition, government standards shift the development costs to the general taxpayer rather than the potential beneficiary of the standard, possibly leading to more lengthy and costly processes. An example of this is the "organic" standard in the US that took some eight years to develop [Ippolito, 2003]. However, this problem of standard 'lock-in" on a possibly less than optimal path, is also apparent with some industry standards that have been effectively imposed by one or two companies. Examples can be found in areas where compatibility standards are critical, and first mover advantages exist in achieving market share which may take precedence over product quality (*e.g.* current DVD standard).

Public standards often take the form of mandatory minimum quality standards (MQS) as discussed in Box 1, and have the effect of increasing the provision of some desirable attribute of the food product. Traditionally these standards have been enforced through official inspection of production facilities and or end products, and at considerable public cost [Henson, 2006]. Government food quality standards, backed up by the force of law, can have a major influence on the operation of food markets and have been an important factor in shaping their development. In most cases, public standards have been beneficial in improving food quality. For example, minimum fat and milk solids requirements increase the nutritional content of fluid milk. Product quality regulations such as grading standards for fresh fruit also produce some desirable consumption characteristics as well as public good aspects. For instance, regulation that prohibits or limits pesticide residues on fruit and vegetables will likely reduce the amount of pesticides used by farmers and thus contribute to improved environmental quality [Sunding, 2003]. However, there

are also a few examples where such regulations have not automatically led to quality improvements. One example cited in the literature is USDA's early beef grading system. These grading standards tended to compensate producers for producing larger cattle (*i.e.* quantity of meat produced) and not for meat quality improvements as they inadequately defined beef eating quality characteristics. As a result, beef consumption in the United States declined with lower quality meat. Private protocols in the form of private brands and quality labels then emerged to address this quality deficiency, with the role of USDA shifting to that of an independent auditor of whether these private standards have been met [Ferrier and Lamb, 2007].

The *prima facie* rationale for public regulatory standards in the food sector has been to both reduce the risks to human health from consumption of inferior or below standard quality foods and to protect consumers from fraud or deceptive practices of sellers in relation to measurement and voluntary quality claims [Henson and Traill, 1993; Antle, 1995]. The desire to protect consumers and to promote particular values (*i.e.* local foods) and food preparation processes has led to increasing government involvement in the control of non health aspects of food quality attributes (*e.g.* country of origin, organic, protected designation of origin or PDOs, protected geographical indication or PGIs, GMOs etc) [Garcia Martinez, *et al.*, 2007]. Grades and standards have a long history in grain markets and were initially promulgated to facilitate arms length transactions for largely homogenous goods[8]. They were also used to prevent misuse or fraud in relation to weights and measures such as the prevalence of stones and other foreign matter being included in flour to increase its weight in transactions between flour millers and buyers [Kindlberger, 1983; Hill, 1990]. In the context of mass markets for largely homogenous commodities, public standards have public good characteristics, allow economies of scale in transactions, lower search costs of market participants and will likely continue to predominate over private standards [World Bank, 2005]. However, the role of grades and standards is also changing with globalisation of agro-food systems, and a shift from commodity oriented mass markets towards markets of highly differentiated products. This is leading to a shift in focus of grades and standards from product outcomes (measurable product attributes) towards product processes (*i.e.* how the product is produced, processed, distributed etc) [Clayton *et al.*, 2003]

Regulators may also assist in correcting market failure due to quality uncertainty through the promulgation of definitional standards that help to prevent consumer deception and fraud [Becker, 1999]. This can be useful in relation to process quality and specific characteristics of the production process, such as the definition for organic production. This was apparently the case in the United States when USDA set a national organic standard which defined what constitutes an organic product. Prior to the promulgation of the national standard, some organic foods were certified under state and private certification programmes, but consumers were often confused as to what the term actually meant which opened the door to fraud and quality misrepresentation. In some European countries, voluntary public standards are frequently combined with government labels such as the EU's labels of PDOs, of PGIs and of traditional speciality guaranteed (TSG) which have been established for the benefit of private agricultural producers. These are examples of public and private cooperation in quality assurance. The private producers and their representative body set the details of the production process covered by the standard. Granting of the public label requires that inspection, control and certification be made by an independent third party, usually accredited by the public regulator to assure the presence of the relevant credence attributes based on traditional production processes and a designated origin [Young and Hobbs, 2002].

For some aspects of product quality, related to human health, it is unclear, however, how acceptable informational labelling is to policy makers, food companies and consumers [Caswell and Mojduszka, 1996]. Governments usually prefer to avoid any risk (other than perhaps that of moral hazard) by promulgating a mandatory standard in such situations. In recent years, public food standards have tended to

[8] The terms "standard" and "grade" have overlapping uses. The basic distinction is that a grade is a designation that places a product in a qualitative category, whereas a standard is a measurable threshold that a commodity has to meet in order to qualify as a specified food product (identity standard) or grade of product (grade standard) [Gardner 2003]

become stricter and more complex, with a greater emphasis on science and a systems approach. At the same time, many governments have initiated efforts to apply food quality regulations in ways that are less burdensome on food companies. This has led to some shift towards performance based measures that afford suppliers greater flexibility to achieve the desired level of food quality in the most cost effective manner [Flynn *et al*., 2003]. In addition, requirements are progressively being put in place for process controls based on the principles of Hazard Analysis and Critical Control Points (HACCP) for the manufacture of food in recognition that end product testing is an expensive and inefficient form of food quality control. The form in which food quality regulation is applied has implications for the level and form of enforcement used by public authorities to assure food quality. Performance based regulation, when paired with HACCP process standards and product traceability, relies mainly on enforcement through inspection of firm audits of production records. This replaces the need for regular product inspection and firm plant visits under traditional procedures, reducing the costs of enforcement and shifting the role of government to one of oversight of the food quality system and its performance.

In the context of the shift that is occurring in public policy in a number of countries from regulating the product to regulating the process or emphasising performance criteria for achieving food quality (*e.g.* requirements for HACCP), one issue that arises is whether compliance should be achieved with voluntary or mandatory standards. The usual assumption in favour of voluntary arrangements is that they have a cost advantage for firms in terms of lower compliance and transaction costs when compared with mandatory standards. However, a common trend across developed countries is the increasing relevance of government regulation based on mandatory HACCP procedures for certain foods and processed products. This development raises the question of whether mandatory government intervention necessarily implies higher compliance and transaction costs. If they do not, the threat of mandatory regulation may not be sufficient to motivate firms to adopt voluntary measures to improve food quality and mandatory approaches may be welfare improving [Venturini, 2002]. This may explain the increasing use of mandatory HACCP-based systems in many advanced countries.

As part of the change in the public role, there has been a trend in some countries towards shifting more responsibility for ensuring food quality to the private sector based on private standard protocols and certification of system compliance by independent third parties. An example is provided by the procedures for quality controls developed in France for importers of fruit and vegetables. Since 1998, importers of fruit and vegetables in France have been responsible for undertaking quality controls themselves based on a system of auto-control to ensure that minimum residue levels of pesticides and other chemicals present in fruit and vegetables satisfy the French standard. The auto-control agreement based on HACCP procedures is negotiated between the various sellers and their representative body and approved by the public authorities. The representative body of the fruit and vegetable sellers is assigned the responsibility to ensure that participating sellers undertake the designated quality controls and respect their commitment. The agreement is enforced by the threat of exclusion. The role of the public authorities has been changed from carrying out product inspections to checking that fruit and vegetable sellers undertake their auto-controls correctly. For this second level control, the authorities rely on reports submitted by sellers on the auto-controls carried out. For the public authorities delegation of quality controls to the sellers themselves has a number of objectives. These include extending the number and effective coverage of quality controls over the market, reducing the cost of public product inspections and releasing these resources for use in other sectors where risks may be higher (*e.g.* meat products) and making public controls more results orientated. For the sellers, it allows them to reduce the scope and frequency of public controls and to share the cost of auto-control with any required scientific analysis undertaken at a single laboratory at a preferential rate which gives them access to economies of scale in implementing the controls. Finally it also reduces the extent of their legal responsibility in the event of a quality anomaly being detected, if the public authorities consider the sellers have mobilised sufficient resources for the auto-controls procedures. If the auto-controls are correctly implemented sellers are not held responsible under criminal law for any

quality anomaly. In the event that a quality violation is detected, the seller is required to notify their representative body who then informs the public authorities of the anomaly [Codron, *et al.* 2005].

The foregoing provides an example of increased co-ordination and co-operation that is taking place between public and private actors in some countries in relation to food standards. The evolution of EU food quality legislation provides another example. With the passage of EU food hygiene regulations from 1 January 2006, responsibility for the production of safe food lies with food business operators. All food businesses are required to have controls that demonstrate they are managing food quality within their businesses. This represents a shift from a largely prescriptive control approach towards an enforced self-regulatory approach with the regulator imposing a requirement on food businesses to determine and implement their own internal rules and procedures to fulfil the regulators policy objectives. The regulator is then responsible for approving these internalised rules and for monitoring compliance. While national legislation is not required to give effect to the EU legislation beyond providing for their enforcement in national jurisdictions, in many cases there are areas that allow member states to adopt additional provisions as appropriate in their national law [Garcia Martinez *et al.* 2007]. Some shift in focus of regulation is also occurring in the US, from a predominately prescriptive process and product standards to more flexible performance-based standards that allow food businesses greater choice in the mode of implementation. However, for Canada, the predominant approach is still based mainly on detailed process and product standards with enforcement through plant level inspection. Although there has occurred a change in focus of food quality regulations in the meat and poultry processing sector with a shift of responsibility towards food businesses and mandatory application of HACCP procedures. Processing firms have been granted some flexibility by the authorities to implement food quality control systems that reflect their own particular circumstances [Garcia Martinez *et al.,* 2007]. The inspection authorities then audit the control procedures and records of performance. A question remains, however, whether the move from a prescriptive to a self-regulatory approach that is evident in a number of countries is fully acceptable to all stakeholders, particularly consumers.

There may be other co-regulation opportunities whereby government agencies can rely more on private mechanisms of food quality control, including implementation of systems such as the ISO 22000 series. For example, compliance with such system standards may enable enforcement authorities to distinguish between high and low risk food products and establishments and focus their inspection efforts accordingly. This, however, requires the confidence of enforcement authorities in the efficacy of private standards to assess and maintain compliance with legal public food quality standards. Co-ordination of public and private food quality management can potentially result in improvements in the level of food quality at lower cost and more effective allocation of regulatory resources. However, the scope for co-regulation may depend on the nature of established regulatory and institutional arrangements that differ between countries. Recent developments in the EU regulatory environment appear to be providing a wider range of opportunities for closer collaboration between regulatory agencies and the private sector through the operation of food supply chains, but to date co-regulation remains limited in practice. The formulation of coordinated food quality policies that pursue both private and social benefits remains a significant challenge to such procedures [Garcia Martinez, 2007]. Other examples of such public-private coordination of a more longstanding nature are the quality labels based on protected geographical indications (PGI), protected designation of origin (PDO) and traditional speciality guaranteed (TSG) that have been established for the benefit of agricultural producers in France and other parts of Europe and which are now enshrined in European Union law. As has been noted, these standards are developed by private producers and a representative body, with public authorities ensuring enforcement through certification that the standards are met.

In some cases, the transition to increased private sector responsibility is being reinforced by *ex-post* product liability legislation to provide effective incentives to food producers to sell products of acceptable quality in the first instance. In addition to fulfilling more rigorous product and process standards, firms are

also legally accountable under product liability laws, for damage or harm resulting from a food product sold by them. This legal recourse reflects a rise in prominence of both tort liability standards [Buzby *et al*, 2001] and a duty of care of food sellers with respect to their food quality obligations based on the concept of "due diligence" [Henson and Northen, 1998; OECD, 2004; Henson, 2006]. The introduction of a "due diligence" defence under legislation enacted in the UK gave the first major impetus to the development of higher private standards for this reason [Hobbs and Kerr, 1992].

Under this defence, food sellers are required to demonstrate that they have been proactive in ensuring that the food they handle and any food obtained from upstream suppliers, conforms to legal food standards. Food retailers initially responded to this requirement by enhancing their food quality controls, and those for their suppliers, which were enforced by a second party audit. This was extended further with the introduction of a Rapid Alert System backed up by product traceability within the EU through which products in contravention of food quality requirements are made available through a public database [Henson, 2006]. The introduction of product liability legislation has encouraged firms to set up standards that exceed those required for meeting public standards and passing the government approval process [Antle, 1995]. The risk of legal liability of a food supplier can thus work to assure compliance with the public food quality regulation. This has been accompanied by a shift of the public role to one of auditing or performance oversight based on a system of controls applied by private firms and monitoring their performance based on the results achieved [Jaffee and Henson, 2004].

Fundamental differences in national legal systems and institutions for protecting consumers from poor quality food products provide some justification for diverging conceptions on the role of government in setting and securing compliance with public food standards. Differences in the legal treatment between *ex ante* regulation vis-á-vis *ex post* litigation, go some way to explaining differences in governmental food standards between countries [Buzby and Frenzen, 1999]. As this approach is not yet widely applied by many countries, *ex ante* regulatory measures through the enforcement of mandatory standards remains the dominant approach of public policy to ensure the supply of food that meets established quality requirements.

E. The rise of private standards and protocols

Much of the focus of the literature on standards has been on the role of public food quality standards both as policy instruments and as potential barriers to trade [Henson and Hooker, 2001]. While public standards have been a feature of national food systems for many years, private standards are a relatively recent element of the food quality landscape and their scope and coverage differs widely across countries and food products. Private standards have proliferated in a number of industrial countries in recent years, operating alongside public regulatory systems and are playing an increasing role in the governance of agricultural and food supply chains. To some extent, private food quality standards have emerged in response to increasingly stringent regulatory requirements and reputational risks, including product liability exposure, faced by leading firms operating supply chains, most notably major food retailers and food service firms. However they have also been employed to facilitate competitive strategies of product differentiation on the basis of an increasingly wide array of food quality characteristics or attributes designed to respond to new consumer demands and concerns [Henson, 2006]. Private standards are now well established in a number of developed countries and are gradually extending their global reach to middle income and some low-income countries [Henson and Reardon, 2005]. The latter reflects in part the consolidation that has taken place in the food sector resulting in increasing ownership concentration with a declining number of large multinational food retail chains, food service operators and food manufacturers. These firms have the bargaining power to impose their proprietary standards on different suppliers in sourcing their products from wide geographical areas and through competitive strategies centred on their own or private brands when operating across national borders. As a consequence, national food quality control systems in many developed countries increasingly reflect a mix of public and private standards.

Despite this growth, private standards are still by no means universal in their coverage with public standards continuing to dominate in some countries and for particular food product attributes and categories.

Private food standards continue to evolve in response to a general ratcheting-up of regulatory requirements about food quality and in response to changing consumer preferences and demand for higher quality and more varied food in general. Private food standards have enabled firms to meet these challenges as well as to differentiate their products and to refocus agricultural and food markets from price-based to quality-based competition. The role of private standards is supported on the demand side by affluent consumers in developed countries with sophisticated and varied tastes and on the supply side by production, processing and distribution technologies that allow product differentiation and market extension and segmentation. As noted, this shift has led to some changes in the role played by grades and standards. In addition to reducing transaction costs of commodity market participants, they are now also serving as strategic tools of private firms for market penetration, system coordination, quality and safety assurance, brand recognition and product niche definition [Henson and Reardon, 2005] (see Box 2). By enabling firms to capture the benefits of any food quality attributes they supply, private standards provide the incentives for these firms to make the required investments to achieve enhanced food quality and the means to motivate their suppliers through price premia and other preferential supply terms in governing expansive supply chains [Henson, 2006].

Consumers for their part are increasingly focused on a broader range of product attributes when assessing the quality of food and agricultural products and this has strengthened the role of private agri-food quality standards. For instance, at higher levels of income, consumers demand relatively higher levels of enhanced attributes associated with food quality, nutrition, health promotion and traceability [Kinsey, 2004]. Food businesses operating in a dynamic agro-food system that is generally characterised by low margins and inelastic demand, have responded to these consumer demands with private standards as an integral part of their competitive strategies as they seek to communicate their approach to food quality and diversity to consumers [Fulponi, 2006]. Private standards are used to inform consumers about different quality attributes and have the effect of increasing consumer loyalty while lowering the price elasticity for the food product concerned to reward food suppliers through higher prices for undertaking investment in quality management systems [Kinsey, 2004].

In addition to product differentiation and market segmentation, private standards provide firms with the means to better co-ordinate or govern production, input supplies and distribution activities that generate efficiency gains and cost savings [Holleran, 1999]. This can lead to lower transaction costs, better management of supplies across wide geographical areas that may cut across national borders and to standardisation of product requirements over a range of suppliers [Henson and Reardon, 2005]. Standards also permit the production, identification and maintenance of product and process attributes along the entire supply chain over time to achieve a consistent supply of food quality attributes supported by own brands and certification [Bergès-Sennou *et al.*, 2004]. This is particularly critical for credence attributes that relate to the way food products are produced and handled [Henson and Traill, 1993].

Although private standards are necessarily voluntary in nature, they may be applied by the majority of suppliers, reflecting the economic advantage of standardisation or market requirements. In terms of the latter, proprietary private standards may become virtually obligatory or “de facto” mandatory in some agricultural and food markets as supplying firms have little option but to comply in order to enter or remain within a market effectively controlled by a few large buyers with oligopsonistic power [Henson and Northen, 1998]. The end result can be the same as if a public regulation had been imposed. For example, “dolphin-safe” tuna fish is a purely voluntary designation, but tins of tuna without the dolphin-safe label have now disappeared from retail store shelves in the United States. This private standard has been widely applied in practice and has now become the de facto industry standard. Proprietary private standards are

especially prominent among large food retailers, food manufacturers and food service operators, reflecting their considerable market power and competitive strategies based around private brands that tie the firm's reputation and performance to the quality of the products it supplies [Henson, 2006]. Drives to enhance minimum quality standards, differentiate products and at the same time to manage transaction costs and the risks of large supply chains, has provided considerable impetus for the evolution of private food quality standards, most notably in Europe. These factors suggest that private food quality standards tend to be more pro-active and agile and thus likely subject to more rapid change than public modes of food regulation as firms seek to respond quickly to changing consumer preferences. Overall, private voluntary standards predicated on achieving higher quality food products, and which offer increased flexibility and responsiveness to cater to changing consumer demands for variety over a range of quality dimensions, are rapidly becoming a major driver in agri-food markets and a global phenomenon[Henson and Reardon, 2005].

However, it needs to be acknowledged that private standards as a fairly recent addition to national food systems have not emerged in isolation. The development of private protocols and brands has been facilitated by the fact that they have, in many instances, been built on the foundation provided by the existing public standards infrastructure. The public minimum quality standards provided the initial basis for launching a quality differentiation of the private product at a more reasonable cost, while at the same time reducing opportunities for fraud and abuse. Thus, the evolution and specific forms taken by private standards reflect, at least in part, prevailing national public standards. In other cases, private standards simply adopted aspects of public standards such as minimum food safety and hygiene requirements and these became a common and non-competitive element of private standards. Private standards have also evolved in response to changes in the level and nature of pubic regulatory requirements. As public regulations and standards have changed, become increasingly stringent and applied more widely, this has encouraged higher private food standards as well to allow a food company to continue to differentiate its products from the more generic unbranded foods that meet the higher public minimum quality standard (MQS). As a result, any change in the public MQS requirement leads to a modification of private strategies of quality differentiation [Codron *et al.*, 2005]. In other cases, inadequate public food standards have been a motivating factor. Firms will also have an incentive to implement private standards when public food quality standards are missing or judged inadequate (or otherwise unenforced). In this situation, private standards can act as a substitute for missing or ineffective public regulations [Reardon *et al.* 2001; Henson and Reardon, 2005]. This has reportedly been the situation in some least developed countries where private standards developed by some multinational food retailers for their home markets have been also applied in less developed countries to the advantage of local consumers [Reardon and Berdegeue, 2002]. Private standards may even develop when public regulations already provide a high level of food quality. This may occur because private standards can be implemented as a means to limit a firms' exposure to *ex post* product liability, to mitigate risk of reputational damage, if the firm has been found to sell food that does not meet the public minimum quality standards, or to pre-empt additional regulatory measures [Lutz *et al.*, 2000].

In reflection of these various developments and pressures, private standards, which are increasingly buyer-driven in nature and global in reach, are seen as important drivers of change in agri-food systems of developed and increasingly developing countries [Henson and Hooker, 2001]. The promulgation of private food quality standards has been supported by the development of quality meta-systems such as Hazard Analysis and Critical Control Point (HACCP) procedures, Good Manufacturing Practice (GMP), Good Agricultural Practice (GAP) and so forth [Caswell *et al.,* 1998]. Some observers have viewed such meta-systems as "codes of conduct" for participation in the agri-food system and achieving a particular food quality attribute [Henson and Reardon, 2005]. Increasingly such systems are seen as governing the operation of the entire supply chain from farm production and processing to distribution and final retail sale of the food product [Dolan and Humphrey, 2001; Fulponi, 2006]. Some of these quality meta-systems are embedded in voluntary public standards at the national or international level (*e.g.* ISO 22000), while

others are proprietary private standards developed by standards bodies (e.g. SQF 2000) or by individual food companies (*e.g.* Tesco's *Nature's Choice*) [Henson, 2006]. Some of the meta-systems that started out as voluntary codes of good practice have now been incorporated into public regulations, representing a further blurring of the line of demarcation between public and private standards. An example is the inclusion of HACCP as part of the regulatory requirements for meat and meat products in the United States, Canada and the EU. Thus, while private standards may develop as a means to comply with public regulatory requirements, there are also instances of government regulations adopting the mechanisms employed by private standards and referencing private standards in their rules. This trend reflects the significant institutional changes being made in the public sphere in relation to the general oversight of food supply chains and food quality, in particular, in a number of countries.

Public and private food standards are also matched by public and private modes of enforcement of such standards. As private firms are not always able to fully capture the returns from incorporating costly controls of product hazards or production methods, they may lack the incentive to implement methods to assure products that meet the higher quality standard of differentiated products and to provide the degree of control to contain quality problems that may pose health hazards in the food product [Jensen and Hayes, 2006]. Faced with this situation, private quality assurance systems have developed on the basis of private certification (both self, second and independent third party), improved transparency[9] and traceability. Self regulation covers the establishment of internal control systems for product quality, while certification involves the monitoring and certification of measurable product and process quality standards by a private second party or independent third party organisation. Such certification may also be voluntary or stipulated by those with whom the firm does business [WTO, 2005] and vary by products. From the literature, public certification for food quality is high in the case of meat products in the US, UK, Canada, Australia, New Zealand and Japan. However, private certification was strongest in European Countries and weakest in the US and Japan [Jensen and Hayes, 2006]. Regardless of the nature of the standard, third party auditors of standards are usually approved on an individual basis by the official accreditation agency in the country in which they operate. This represents another example where private standard regimes are reliant on public systems of oversight to ensure their credibility [Henson, 2006].

The success of private voluntary standards in the food sector has lead to changes in standard setting processes, including the emergence of coalitions or consortia of firms for setting private standards. One result of adopting higher private standards for product differentiation and competitive positioning in markets or to guard against product tort liability has been an increase in transaction costs for individual firms that established their own standards. As a result, pressures emerged from such firms for the developments of collective and harmonised private standards through industry organisations and groups of firms [*e.g.* British Retail Consortium (BRC), International Food Standards (IFS)], with the collective standards certified by a third party audit (*e.g.* European Food Safety Inspection Service) and by private firms as a substitute for business–to-business standards [Henson and Northen, 1998]. This had the advantage of reducing the costs of governing the supply chain for individual firms and widening the group of potential suppliers from which they could procure. As a result, standards of global business to business (B2B) arrangements were extended in the form of procurement standards designed to improve overall value chain performance and their governance [Casella 1997, 2001; Nadvi and Waltring, 2003; Fulponi, 2006]. Co-ordinated or harmonised standards can thus secure competitive advantage for member firms and allow them to pursue common objectives in a non-competitive manner [Dolan and Humphrey, 1999; Casella, 2001]. While food supplying and distributor companies are interested in a rationalisation of private proprietary standards as proliferation is expensive for them in terms of additional transaction costs, they also fear a single standard, managed by some downstream retailer or food service company, over

[9] Transparency refers to the provision of information on procedures and practices used to produce a product throughout the marketing chain.

which they have no control. They are thus faced with the challenge of balancing the cost advantages of a single standard against the loss of freedom of action.

The focus of harmonisation efforts amongst leading firms to act collectively has also extended from national/regional institutions (such as BRC and Euro-Retailer Produce Working Group (EUREP)) towards international private standard organisations such as the Global Food Safety Initiative (GFSI). These private quality standards continue to evolve overtime from business to business, collective standards and Business To Consumer (B2C) standards. In many cases, B2B standards that are used to support and protect wider efforts of product differentiation are not directly communicated to consumers. However, other B2C standards have been developed by major retailers (such as the Filière Agriculture Raisonnée by Auchan, the Filière Qualité by Carrefour and the Finest brand by Tesco Stores PLC) and also by producer organisations that are linked to brands or symbols where quality is communicated directly to consumers. They are also evolving from national to regional and international standards and from first to second and third party methods of certification and conformity testing.

As a result, agri-food systems of many countries are now pervaded by an array of interrelated public and private standards. This proliferation of standards is leading to increasingly complex relationships between them. Notwithstanding, a trend appears to be underway of a shift from mandatory standards as the predominant form of control or governance over food quality that are positioned in the public sector to an increasing role of the private sector and more voluntary forms of control. This is reflected in the growing number and role of standards originating from private firms and groups including proprietary standards as de facto mandatory ones in food markets [Henson, 2006]. It would appear that private standards are assuming increasing responsibility for many aspects of food quality as the role of government shifts further to oversight of the entire food quality system and monitoring firms' quality performance through audits of control systems and similar procedures [Henson and Hooker, 2001; Henson, 2006]. This is leading in some instances to increased coordination and cooperation between public and private actors in standards procedures, as the example of the French system of quality standards applied to importers of fruit and vegetables has suggested [Codron *et al.* 2005]. A case may exist for exploring further co-regulatory approaches or public/private partnerships [Garcia Martinez *et al.,* 2005] to achieve food quality objectives in a more efficient way.

F Standards and trade

A further dimension to the interaction between public and private standards arises when the interests of other countries have to be taken into account through international exchange. Governments have a primary role in establishing trade policy and granting access to their national markets. Because standards reflect, amongst other things, levels of industrialisation and economic development, as well as national cultures and values, they are likely to differ between countries. The resulting heterogeneity in public standards and regulations is likely to affect international trade. Standards play a role in international competitiveness and their potential to act as non-tariff barriers is now widely recognised. Also, with the development of multinational food businesses with global procurement practices, private standards now extend across national borders and can also affect trade. The following sections examine a number of issues that arise for international food trade as a result of heterogeneous national standards and global private standards. Among the questions addressed are: do heterogeneous national standards and regulations impair trade and how can these impacts be minimised? Are there additional constraints on public standards setting practices arising from the WTO system and how do they relate to private standards of global firms? How do international standards organisations such as the *Codex Alimentarius* and the International Organisation for Standardisation (ISO) fit into the public-private standards architecture?

F.i Public standards and trade

The complexity of the interaction of public and private quality standards is considerably increased in the context of international trade. In addition, the distinction between product and process standards has become important in the context of the multilateral trading system, particularly process standards that involve unincorporated processes and production methods (PPMs)[10] [WTO, 2005]. The main risk of national public standards from a trade perspective is that they are backed by the power of the state and that in the course of developing standards, governments can favour domestic producers over imports by stipulating idiosyncratic production and processing methods [WTO, 2005]. These may act as non-tariff trade barriers and restrict trade. The welfare effects of standards can also change when the international trade dimension is considered. As noted in the context of national standard setting, mandatory standards when implemented in markets for credence goods can increase efficiency and national welfare by removing information asymmetries between buyers and sellers of food products. National welfare in the standard imposing country will increase in such circumstances if a standard is well designed. However, global efficiency and welfare may not necessarily be improved as a consequence of the trade effects of the national standard [WTO, 2005].

National standards that aim at increasing efficiency can, therefore, have complex effects when the trade dimension is taken into account [Henson, 2004]. In the first case, firms facing food quality standards in their own markets that differ from those in foreign markets may be placed at a competitive disadvantage in selling into foreign markets relative to national firms. This may also apply to quasi-public production standards at the farm level. For example, many of the farm-level quality assurance schemes are designed and implemented by national producer organisations and it is to their advantage to use the system to differentiate national production in a positive way from competing imports [Holleran *et al.,* 1999]. By the same token, standards can also work against the interests of exporters in standard setting countries. If a country introducing a standard is an exporting country, trade is unlikely to increase. To the extent that production costs are larger for higher quality foods, domestic exporters, unless they are able to differentiate their products and secure a return for higher quality, will then become less competitive in world markets where their foreign competitors are not required to meet the same quality standards [WTO, 2005].

International trade agreements are another influence changing the contours of public and private control systems [Henson and Caswell, 1999]. It is in the area of government mandated product and process standards where the greatest concern exists about possible adverse effects on trade [WTO, 2005]. As tariffs and other traditional tools for managing imports and controlling market access are reduced under progressive trade agreements, there remains the temptation to use sanitary and phyto-sanitary as well as technical quality food regulations as non-tariff barriers to fill the void to protect domestic producers. As a result, national food regulatory control systems are coming under increasing scrutiny as potential non-tariff barriers to trade, and governments are collectively pursuing efforts towards multilateral coordination of regulatory activities [Henson, 2004]. In the international sphere, attempts have been made to overcome the potential negative trade effects of food quality standards. The World Trade Organization (WTO) through the Agreements on Sanitary and Phyto-Sanitary (SPS) measures and on Technical Barriers to Trade (TBT) has played an important role in this respect. These agreements represent the most comprehensive attempt to address the impact of food standards on trade and have lead to the implementation of certain types of national standards becoming more transparent. As a result of these agreements, countries now have a formal responsibility and some incentives to attend to the trade impacts of their regulatory programmes [Caswell and Henson, 1999]. WTO members that develop new standards or technical regulations that are

[10] Although processes are typically not traded, the goods they produce may be traded and therefore processes are important for trade. The relevance of unincorporated PPMs for trade policy is less straightforward as they do not directly affect anything that is traded. However, consumers or governments in an importing country may care about the way an imported good is produced because, for example, they care about the environmental impact of the production process (*e.g.* the case of US shrimps). Labour standards share many characteristics with process standards.

not based on international standards are required to notify the measures prior to implementation under the terms of the SPS and TBT Agreements. The growth in these notifications also provides evidence of the increased number and incidence of public standards.

International rules for the regulation of agricultural product and food attributes are primarily dealt with in the SPS and TBT Agreements that were concluded in 1994. The SPS Agreement has established specific disciplines for the regulation of food safety attributes; the GATT/WTO and the TBT Agreement has revised rules for the regulation of other food quality attributes. The TBT Agreement covers technical regulations, standards, including packaging, marking and labelling and conformity assessment procedures. In the agro-food sector, the TBT Agreement applies to all rules other than those relating to animal, plant and human life and health which are the focus of the SPS Agreement. Food quality issues such as nutrition labelling are covered by the TBT Agreement. Another trade accord, the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) includes provisions protecting the use of geographical indications that are used to differentiate agricultural and food products in the market place. After 1994, the World Trade Organization became the court of last resort when member countries dispute trade barriers related to SPS and TBT matters[11] [Kinsey, 2004].

The SPS agreement defines guiding principles that aim to minimise the trade distorting effects of food standards that apply to health and outlines procedures for the resolution of disagreements between countries over these standards. There are two approaches through which national food standards can be justified within the Agreement. Firstly, through the adoption of international standards which are automatically assumed to be consistent with the provisions of the Agreement(s); and secondly, through an assessment of the risks to human (as well as plant and animal) health addressed by the food regulation. In addition, the agreement establishes a number of criteria which national regulations must satisfy, either where no international standard exists, or where a state wishes to deviate from or go beyond an international standard. Risk assessment is a key element of the disciplines laid down by the SPS Agreement to assess different standards. The SPS agreement has important implications for food regulation at the national level. Essentially it constrains the activities of regulatory agencies, requiring them to adopt only food quality controls that can be scientifically justified and which have the least impact on trade[12]. The WTO agreements impose wide-ranging procedural requirements such as *notification* and *consultation* obligations and *transparency* obligations. The latter goes beyond allowing sufficient time for other governments to comment on regulations and for consultation to take place, and require the establishment of enquiry points to answer questions and receive comments from persons in other states. The TBT also lays down criteria for conformity assessment procedures (as does the SPS Agreement on control and inspection procedures) to ensure that the requirements of the standard are fulfilled. However, it is evident from disputes lodged with the WTO that governments face domestic pressures for regulations that do not satisfy all these requirements [Kinsey, 2004].

An initial assessment of disputes examined by the WTO Appellate body under these different agreements suggests that the SPS Agreement has been more successful in resolving differences over animal and plant regulations than in resolving disputes over food safety related measures, particularly in

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11 The TBT Agreement has a wider coverage than the SPS Agreement in the domain of food quality standards. The SPS Agreement covers all measure whose purpose is to protect human and animal health from food borne risks, to protect human health from animal and plant carried diseases; to protect animals and plants from pests or disease or to prevent or limit damage to a country from the entry, establishment or spread of pests. The TBT Agreement covers all technical regulations, voluntary standards and conformity assessment procedures to ensure that these are met. In general, it is the type of measure that determines coverage of the TBT Agreement, but the purpose of the measure which is relevant in determining whether it is subject to the SPS Agreement [WTO, p 145].

12 . In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phyto-sanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phyto-sanitary measures applied by other Members.

relation to the risk management principles [IATRC, 2001]. The impact of the TBT Agreement on the regulation of other quality attributes of agricultural products is more difficult to ascertain in the absence of a similar body of dispute panel reports that have been decided on the basis of the agreement. The use of panels to settle disputes under the TBT Agreement appears to remain the exception rather than the rule. The IATRC study noted that despite some uncertainties about the rules to be applied for these other food attributes, there is nonetheless substantial evidence of increased interest on the part of countries in quality standards and labelling to achieve a wide array of objectives. Furthermore, it notes that most of the regulatory effort in this sphere of activity is being directed at consumer concerns on the basis of increasing acceptance of the principle of their right to know and to improve transparency. As labelling is expected to be more widely used for a greater range of purposes in coming years, the TBT Agreement is considered to likely play a larger role in setting the rules for international trade in food products [IATRC, 2001]. These developments, together with increasing international surveillance of national measures, would suggest that direct regulatory standards can be expected to become increasingly global in terms of the criteria that are applied and the mechanisms used to ensure that standards are met [Henson and Caswell, 1999].

In an attempt to reduce the trade distorting effects of diverse national food quality standards, governments are also seeking to co-operate in their regulatory efforts. This has been termed "regulatory rapprochement" [Caswell and Hooker, 1996; Hooker and Caswell, 1999]. It is possible to identify three levels of regulatory rapprochement that vary with the level of co-operation, namely co-ordination, equivalence or mutual recognition, and harmonisation. Co-ordination refers to attempts to minimise differences in food quality regulations between countries, for example, through adoption of voluntary international codes of practice. The equivalence or mutual recognition principle involves the acceptance of different forms of food quality standards amongst countries as being equivalent. Finally, harmonisation of standards involves the standardisation of food quality regulations between countries, for example through the adoption of international standards. A common international standard has the potential to facilitate trade across borders by making products more substitutable, increasing consumer confidence in product characteristics, ensuring compatibility between products and so forth [Henson and Caswell, 1999]. To the extent that different national standards have segmented domestic from foreign markets, harmonisation is expected to lead to increased trade and competition, lower prices and enhanced quality [WTO, 2005].

The different principles of regulatory rapprochement, however, are not always exactly coinciding. In some cases harmonisation, rather than equivalence, is the guiding principle. In others the reverse may be true. Hooker and Caswell [1995] in their earlier review suggest that the type of product or attribute should be an important factor in determining the guiding principle used under the WTO and that one should expect harmonisation for food safety standards and mutual recognition for food quality standards. The case in favour of harmonisation of standards, however, is relatively weak when it comes to standards addressing information asymmetries. To the extent that countries differ it may be preferable to have different policies rather than one single policy [WTO, 2005]. While some progress has been made under these WTO agreements in addressing the trade effects of food quality attributes, countries have resisted substantial recognition of equivalence between national regulatory regimes as a basis for ensuring national treatment, and harmonisation of standards has not been overly effective to date in defining uniform standards multilaterally [IATRC, 2001; Henson, 2004].

F.ii Private standards and trade

Voluntary private standards in addition to public regulations are also increasingly recognised as having a potential trade impact. As private quality standards often go well beyond basic regulatory requirements, they can impose significant costs of compliance on food suppliers and exporters. Such costs can arise from fixed investments in adjusting production and processing facilities, personnel and management costs to implement the standard and associated control systems and the costs of conformity assessment. These costs are likely to be greater for exporters in countries where public and private

standards are less well developed [Jaffee and Henson, 2004]. As voluntary standards can differ across countries they can raise an effective barrier to trade or participation in exchange to those firms, groups or farmers which are unable to meet the supply standard [Fulponi, 2006]. Another concern with the growth of private standards in a trade context is their impact on the transparency of regulatory processes. Although the WTO commits member states to notify all new public food quality standards and to provide opportunities for trade partners to raise their concerns and engage in dialogue, this does not apply to private standards [Henson, 2004]. However, in the promulgation of collective private standards, many stakeholders along the supply chain are normally involved, including from different countries. This might suggest that such standards are also open to influence by a wide range of stakeholders including trading partners [Jaffee and Henson, 2005]. Nevertheless, the growth in private collective standards by global food businesses does raise the issue of the implications for the WTO and SPS and TBT Agreements and whether these standards fall within the ambit of the rights and obligation specified in these agreements [Jaffee and Henson, 2005]. For example, the SPS Committee of the WTO focuses its work on standards developed by members which represent participating governments, whereas private standards are essentially developed by commercial entities and this limits the Committee's ability to address many of these requirements.[13]

Much of the debate on the impact of more stringent private standards on trade has focussed on developing countries and the risks they face in exclusion from buyer-driven supply chains in gaining access to developed countries' markets [Jaffee and Henson, 2004; World Bank, 2005; Fulponi, 2006]. These standards are perceived as barriers either because the developing countries lack the technical and administrative capacities and resources for compliance or because the standards can be applied in a discriminatory or protectionist way. To date, analysis of the trade impacts of food quality standards has focussed largely on public measures and predominately regulatory approaches. While empirical research has demonstrated that public food quality standards can act as significant barriers to trade in agricultural and food products, this would suggest that private standards might have similar effects, although there is no comparable body of empirical literature. To the contrary, the trend towards collective private standards and their harmonisation across global markets, suggests that these might act to facilitate trade. In weighing up the competing trade reduction and creation effects of private standards, however, it needs to be acknowledged that in many agricultural and food product markets, such as bulk grains and fruits and vegetables and so on, public standards remain the dominant form of governance. In these cases, B2B and collective private standards are unlikely to be a major impediment to this trade [Jaffee and Henson, 2004]. Furthermore, as noted previously, there are many countries in the world where private standards are less evolved, such as Japan, and public standards remain the dominant influence on trade.

An alternative perspective to the traditional *standards as barriers* argument is that of *standards as catalysts* to increase trade. Emerging standards offer the possibility that certain developing countries could use these opportunities to improve their competitive advantage. From this viewpoint, the emerging standards represent a potential bridge between increasingly demanding consumer requirements and the participation of developing country suppliers in buyer-driven supply chains. Investing in new procedures to comply with higher food standards of such buyers may provide a powerful incentive for the modernisation of developing countries' export supply chains and enable them to reposition themselves in competitive global markets. Compliance with standards in one supply chain may provide access to multiple chains, in particular, where collective standards are in place. Hence the process of standards compliance could conceivably provide the basis for more sustainable and profitable trade over the longer term. The foregoing discussion suggests a more complex reality in which close attention is needed to the specifics of particular markets, products and countries to understand how the changing international standards environment is providing both challenges and opportunities for developing countries.

[13] The TBT Agreement, on the other hand, establishes the possibility of the *preparation, adoption and application of technical regulations* by Non-Governmental bodies.

Barriers to trade arising from private standards can also be removed through harmonisation or mutual recognition. International harmonisation of voluntary standards can take place through inter-governmental treaties but is more likely through standard sharing coalitions of firms and industry consortia. These are usually designed to avoid or minimise wasteful duplication of compliance costs that result from multiple national standards and to exploit economies of scale at a more disaggregated level of economic activity [Casella, 2001]. Pressures to harmonise and rationalise voluntary food standards across countries and systems of conformity assessment, can be expected to become more important as food companies continue to expand across the world and develop global supply chains [Casella, 2001]. At the same time, it is important to recognise that public standards still matter in the context of business to business arrangements and global food chains. In addition to satisfying private voluntary standards, exporters to a country need to comply with public regulatory requirements before gaining access to that country's market.

F.iii Standards and the multilateral trading system

One intention of the Uruguay Round Agreement was to bring national food policies regulations into closer harmonisation by adopting and strengthening the language of the *Codex Alimentarius*. Although the *Codex Alimentarius* Commission sets the benchmark international standards for food quality and safety that form the guidelines used by the WTO in assessing trade restrictions, individual countries continue to regulate the quality of the food available to their consumers. In such circumstances, Codex is seen as a first step to harmonisation of world food standards [Kinsey, 2004]. In addition to the Codex, the United Nations Economic Commission for Europe (UNECE) standards are internationally recognised benchmarks, are more oriented towards quality issues and are commonly used as the basis for many national grades and standards. OECD standards for seeds, forestry reproduction material and fruit and vegetables are also an important component of this intergovernmental standards network**.**

A number of difficulties have been identified in the literature for the Codex Commission in discharging this function. For example, the goals established in the SPS Agreement of basing food regulations on scientific evidence (as opposed to social need), while allowing countries to set standards higher than those called for by international regulations in recognition of cultural, dietary and other national differences, might suggest that they could be subverted by national interests [Gaull and Goldberg, 1993]. A second potential problem that has been identified in the literature is that scientific expertise and resources vary greatly among Codex member nations. This tends to give an advantage to developed countries over developing nations in setting standards. Codex deliberations in reaching a consensus on a multinational food standard amongst its membership can at times be a long and drawn out affair [Kinsey, 2004].[14] Despite these experiences, Codex has helped raise food quality standards around the world making it essential to human health and food trade.

The standards development process organised by national, supra-national/regional and international standards institutions has evolved over time. The national standardisation infrastructure in most industrialised countries is now integrated into the network of international standardisation activities. However not all low income or transition economies have followed this trend as their national institutions are not part of the international network [WTO, 2005]. Of the 49 international standardising bodies identified by a recent WTO study [2005], the International Organisation of Standardization (ISO), is the most important non-government body with respect to food quality issues. Standards set by the ISO are voluntary, but some are referred to in technical regulations particularly in regard to health and safety as part of national regulatory frameworks and, thus, have become *de facto* mandatory in application. ISO standards such as ISO 9000 on quality management systems tend to have more focus on the specific

[14] Kinsey, in her analysis of Codex procedures for setting standards, cites the example of the protracted deliberations and processes undertaken by the Commission since 1974 to elaborate a standard on 'parmesan" cheese. In other cases such as for "yoghurt", Codex standards have been set with relative ease.

concerns of industry with greater participation of the private sector. ISO standards continue to evolve, with ISO 22000 establishing for the first time a global standard for food quality management systems that encompasses the entire supply chain from production through to distribution that is well beyond the scope of most private standards. How this new standard will impact on the future evolution of private standards is yet to be seen. Certification of ISO standards is also increasingly becoming a requirement of many national systems of public process standards. These must also comply with international norms and the testing and certification procedures in such cases need to be recognised internationally.

Many developing countries are increasingly being integrated into the international standardisation system. However, a considerable number of low income countries are still not actively participating in this process, although they continue to be affected by it [WTO, 2005]. The implementation of food standards and regulations involve costs and potentially important costs for developing countries when commitments are bound in negotiated trade agreements. Some of these costs arise from the normal requirements for testing and certification (conformity assessment) procedures necessary to determine if a food product meets standardised requirements justified by scientific risk. However, cost duplication can also arise for developing countries in determining conformity to varying national technical regulations for gaining market access for example to the different Member State markets in the European Union.

Standards institutions in poorer countries are generally located in the public sector with limited participation of the private sector.[15] While food quality standards may exist on the rule book and be well documented in such countries, a particular problem arises with respect to the enforcement of existing standards due to limited public, financial and technical resources for these activities. Where there is insufficient capacity to implement and enforce even basic food standards, private voluntary standards and associated management and verification processes of food businesses can provide a useful parallel mechanism to raise standards to provide protection for consumers [Henson, 2004]. While this leads to an improvement in food quality and a degree of uniformity across countries in which particular multinational firms operate, there is a risk that such standards may not fully reflect the cultures and preferences of the developing countries concerned [WTO, 2005]. In cases where private standards developed by globally operating firms fail to take adequate account of local conditions and cultures, the costs of compliance can be greater than for standards produced locally [Henson, 2004; WTO, 2005]. While there remains the risk of market exclusion with high private standards when applied to developing country exporters, with perhaps significant trade reduction and diversion effects, the impacts on agricultural and food product trade are likely to be complex [Henson, 2004]. As noted, rising private standards can also serve to accentuate underlying supply chain strengths and weaknesses and thus impact differently on the competitive position of individual developing countries [WTO, 2005]. For those exporters who do gain access to buyer-driven supply chains, the benefits in terms of long term trade relations through participating in systems of preferred suppliers can also be very large.

G. Some conclusions and areas for future research

The foregoing would suggest that the relations between public and private sectors in the establishment and development of food quality standards are becoming increasingly complex as the numbers of both types of standards proliferate and become generally more stringent and varied in their applications in both national and international food markets. Private standards are, however a fairly recent phenomenon and are still far from universally applied across the world, with public standards remaining the dominant influence on some national food markets.

[15] Although this situation is changing with the rapid rise in the use of private standards in the supermarket sector and as the food industry sector modernises [Henson and Reardon p244]

The interaction of private and public standards in the food system is an area of research that has only recently begun to receive some attention. The existing research would suggest that by and large, private standards are considered to be complementary to, rather than a substitute for, public norms in governing food quality in most national food systems where they are both present. The public standards or norms establish the minimum quality requirements for food products and the results to be achieved, while private standards elaborate the tools and control processes followed by private firms in meeting and often exceeding these standards and regulatory obligations in competing in quality differentiated markets [Henson, 2006]. Private standards can also act as a substitute for missing or ineffective public regulations [Reardon *et al.* 2001; Henson and Reardon, 2005]. This has reportedly been the situation in some least developed countries in the past where private standards developed by some multinational food retailers for their home markets have been applied also in less developed countries to the advantage of local consumers [Reardon and Berdegeue, 2002].

In most cases, private firms in seeking to differentiate their products, achieve market segmentation and to signal such changes to consumers to distinguish them from the more generic food items that meet the public standards, have built their private standards on the existing public standards infrastructure. That is, they follow a strategy of private differentiation from a public minimum quality standard [Codron *et al.,* 2005]. The level of standards formulated and enforced by governments influence the level of the private standards. As public standards become more stringent this can lead to a higher level of private standards to maintain a degree of product differentiation and competitive positioning in food markets.

The distinction between public and private standards has become less clear cut as the complexity of standards has increased over time. In general, private standards have been developed as a means to comply with public regulatory requirements. However, there are also instances of government regulations adopting the mechanisms employed by private voluntary standards, such as HACCP provisions, and referencing private standards in their rules. Private standards may even develop when public regulations already provide a high level of food quality in order to pre-empt additional regulatory measures [Lutz *et al.*, 2000]. In his way, private standards may play a role in shaping the content and level of the public regulation.

The complexity of the interaction of incentives provided by public and private quality standards is considerably increased in the context of international trade. While there has been only limited empirical analysis of the trade impacts of food quality standards, this has shown that they can play a contrasting role in both reducing and enhancing trade in agricultural and food products. However, it is also evident that private standards are becoming a primary determinant of market access in some industrial countries and that these fall outside the governance structures established by the WTO and the role of the SPS and TBT Agreements [Henson, 2006].

In judging the standards system as a whole, there remain many situations where inefficiencies can still arise for market participants in responding to a mix of standards that can reduce overall system coherence and efficacy [Valceschini and Saulais, 2005]. These mainly arise in the case of private proprietary standards of individual food retailers, and food service companies where standards are not based on any sectoral consensus process. Each firm implements its own private voluntary standards, which while similar are not necessarily identical and can establish different requirements for supplying firms usually on the basis of contractual arrangements. This diversity can imply higher transaction costs and inefficiencies for food supplying firms that need to conform to different buyer driven standards in food supply chains. This type of problem can also arise for private buying firms operating proprietary standards across national borders and subject to various national or international food quality and safety regulations that may have different stipulations (*e.g.* HACCP requirements excluded in France for non-transformed agricultural products but required for them under the Codex Alimentarius). Collective private protocols and international food system standards (such as ISO 22000] are possible solutions to improve the overall coherence of the system of food standards, but are not always available or systematically adopted.

The foregoing synthesis of the available literature on public and private food standards would suggest that research on how these standards interact in regulating national and international food markets is a relatively new area of work but one that is receiving increasing attention. It is apparent that differences exist between OECD member countries in how the systems of food standards are evolving, and the respective roles played by private and public agencies in this process. Future research could focus on comparing the situation in the main countries for food quality management and the different roles played by public and private sectors in key aspects of the process such as, for example, for product quality certification and conformity testing requirements. The objective would be to identify similarities and differences in approach and to highlight the reasons for and the main factors involved.

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