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# Consumer information, labelling and international trade in agri-food products

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**Abstract**

The focus of the World Trade Organization is establishing limits on governments' ability to impose trade barriers in response to producers' requests for protection. In recent years, however, requests for protection from imports has increasingly come from consumers over issues ranging from animal welfare concerns, employment of child labour, the use of growth hormones, differing environmental standards and GM foods. The current international trade regime is ill-suited to deal with consumer-based protectionism. This paper develops a model that explicitly incorporates consumer concerns into an international trade model and compares the result with the standard treatment. Further, using the model incorporating consumer concerns, a labelling policy for imports is compared to an import embargo. The labelling policy is found to be superior to an embargo. Implications are drawn for future trade negotiations pertaining to sanitary and phytosanitary measures and technical barriers to trade.
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## Producer oriented trade policy

Those charged with developing trade policy have always found food and agricultural products a challenge. The agricultural sector has been subject to a sustained process of labour shedding technological change over the last 150 years. This has meant that the sector has been in a constant state of disequilibrium and farmers have sought policies, including trade policies, which will slow the exit of farmers. This lobbying has been relatively successful and countries have been allowed to retain restrictions on market access and to provide subsidies that differ in kind and degree of support from those that are generally permitted in the World Trade Organisation (WTO). In the last quarter of the 20th century, the absence strong disciplines on agricultural trade meant that barriers to market access remained high and led to a subsidy war between the US and the European Union (EU). The rising cost of competing subsidies and the detrimental effect the acrimonious debates over agricultural trade policy were having on the wider aspects of international relations led to an agreement at the Uruguay Round (1986–1994) of multilateral trade negotiations to truncate the subsidy war and to gradually bring trade in food and agricultural products into conformity with general WTO disciplines (Gaisford and Kerr, 2001). Since 1994 agricultural trade policy has focussed on how and at what rate the latter will be accomplished. Further liberalisation of market access and limitations on subsidies are the subject of the current WTO negotiations on agriculture that commenced in 2000.

The negotiations over market access and subsidies are the types of producer protection issues that the General Agreement on Tariffs and Trade (GATT) and subsequently the WTO were established to address. The entire history of the

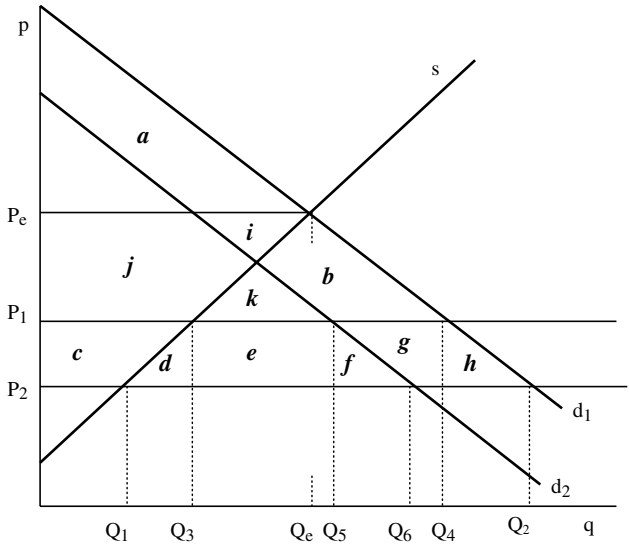


Fig. 1. Importing country.

GATT/WTO can be seen in the context of two competing needs: (1) the need, at times, for politicians to extend protection to producers facing strong foreign competition and; (2) the need for strong and transparent rules of trade by firms that wish to invest in international commercial activities. At any point in time, the existing set of trade rules represents the current *political compromise* between these two interests (Gaisford and Kerr, 2001). The economic theory that has underpinned the GATT since its inception is a stylised model incorporating many neoclassical assumptions. It can be represented by Fig. 1 that shows the market for a particular product in an importing country with domestic supply curve, s, and the domestic demand curves, $d_1$ and $d_2$. Price $P_1$ is the price at which imports can be obtained and with which domestic firms must compete.[2] Assuming market demand is $d_1$, at international price $P_1$, domestic suppliers will be willing to supply $Q_3$ while consumers will be willing to purchase $Q_4$. In the absence of trade restrictions imports will equal $Q_4$ minus $Q_3$.

If foreign suppliers benefit from a technological change unavailable to domestic producers[3] and the international price declines to $P_2$, domestic producers must compete with a lower price while domestic consumers benefit from those same low prices. Domestic suppliers face a decline in their producer surplus equal to area $c$ and thus have an incentive to ask for protection. Consumers unambiguously gain from the liberal trade regime gaining consumer surplus equal to area $c+d+e+f+g+h$, $(c+\cdots+h)$.[4] Given the assumptions of this model, consumers never have an incentive to ask for protection.[5] As a result, the WTO only recognises producers as the source of protectionism and its rules are oriented solely to limit the ability of politicians to respond to their requests. As currently constituted it is ill-suited to respond to requests for protection from consumers (or other groups in civil society) (Perdikis et al., 2001).

## Consumer protectionism

In recent years, new issues have arisen in the trade in agricultural products that call into question the whether consumers are unambiguous winners in a liberal trade regime. If consumers can be losers, they may ask for protection. The new issues centre on what are known as credence characteristics of goods. Nelson (1970) and Darby and Karni (1973) distinguish between search, experience and credence attributes. The search attributes of a good can be evaluated by consumers prior to

[2] Note this illustrates the 'small country' case where the imported quantities are too small to affect the international price. Altering this assumption for the large country case where the import supply is not infinitely elastic does not materially affect the results in what follows.

[3] Or any other change that lowers their supply cost.

[4] As the gain in consumer surplus exceeds the loss in producer surplus, welfare also increases.

[5] In a similar fashion, trade liberalisation is considered welfare enhancing. If there is a tariff in place that raises the import competing price from $P_2$ to $P_1$, removal of the tariff will unambiguously increase consumer surplus by $(c+\cdots+h)$, reduce producer surplus by $c$ while the government loses tax revenue equal to $e+f+g$.

purchase, for example, the colour of a car or the visible intra-muscular marbling in a steak. Experience attributes can only be evaluated after the good has been purchased and experienced by the consumer, such as the fuel efficiency or mechanical performance of a car, or the taste and tenderness of a steak. Finally, credence attributes are those that the consumer cannot evaluate accurately even after use due to insufficient information and/or the consumer's lack of expert knowledge. Examples include the services of a mechanic or doctor, or Bovine Spongiform Encephalopathy (BSE)[6] contamination in beef.

Concern has been rising among some consumers in a number countries regarding what can generally be classed as credence attributes of goods. These concerns include chemical residues on fruits and vegetables, drug residues in meat, growth enhancing hormones used in animal production, the animal welfare standards applied, the environmental cost of production, the use of child labour, etc. Probably the issue that has gained the highest profile is the advent of genetically modified (GM) crops in commercial agricultural production (Gaisford et al., 2001). In each of these cases, consumers cannot tell whether the attributes are contained in the goods they purchase either by inspection or after the experience of consumption – they are credence attributes.

The model that underpins the WTO has embedded in it major neoclassical assumptions that consumers have perfect, costless information about the goods they consume. These assumptions no longer hold in the case of credence attributes. As in the previous case using Fig. 1, assume that foreign suppliers are able to adopt a new cost saving technology such as biotechnology and, in addition, assume that producers in the importing country cannot use the technology either because it is not applicable to their agronomic conditions or that it has not been licensed for use.[7] Assume further that the exporting country makes no effort to segregate GM and non-GM products. The import competitive price again declines from $P_1$ to $P_2$. Some consumers, however, perceive GM products as inferior to non-GM products but cannot determine if the product they are consuming contain GM material. This means that, for those consumers, their demand curve shifts inward. Other consumers may not care and not alter their demand. The aggregate effect is that the demand curve in the importing country shifts to the left to $d_2$ reflecting the decline in demand from consumers who consider GM products inferior. The market now clears at $P_2$ and $Q_6$. There are now two opposing effects on consumers in the importing country. As price declines from $P_1$ to $P_2$, there is a positive 'price effect' gain in consumer surplus of $c + \cdots + f$. The decline in the willingness to pay, however, leads to a reduction in consumer surplus equal to $a + i + b$,[8] an adverse quality effect. If $a + i + b$ is greater than $c + \cdots + f$ then consumers lose from having an open trade regime and have an incentive to ask for protection. Further, governments may have a legitimate social welfare reason for considering the impo-

[6] Commonly called 'mad cow disease'.

[7] Note, this assumption is made for ease of illustration but similar results for consumers will be obtained if producers in the importing country adopt the new technology.

[8] Of course, producer surplus again declines by $c$.

sition of import restrictions – total welfare in the importing country declines if $a+i+b$ is greater than $d+e+f$.[9] Given the opposing effects of this *pooled* (Gaisford and Kerr, 2001) market solution, the net effect on consumers and welfare is an empirical question.

## Import embargoes versus labelling of imports

One trade policy response to consumer requests for protection is to impose an import embargo.[10] If an import embargo is imposed on GM foods, only non-GM foods remain available and the adverse quality effect does not arise – the relevant demand curve is $d_1$. Since no imports are allowed the price is Pe leading to an increase in producer surplus of $i+j$ and a decline in consumer surplus of $j+i+k+b$. Thus there is a decline in welfare equal to $k+b$. The embargo welfare is superior to unrestricted imports if $a+i$ is greater than $k+d+e+f$.

To remove the market failure, arising from the absence of information on which product has what attributes, labelling can be used as a signalling device. To accomplish this there must be labelling of imports and a mandatory identity preservation system along the supply chain. The identity preservation system is required to keep products with different attributes separate so that the signal the label is sending can be verified. The result, continuing with the GM food example, is separate markets for non-GM foods (products with original attributes) and GM-foods (products with new attributes). These are illustrated in Fig. 2. Prior to the biotechnology innovation, GM-food is not available and only the non-GM market exists. The initial demand curve is $dh_1$. Given supply curve s and import price $Ph_1$, imports equal $Qh_3$ minus $Qh_1$. If, as in the previous example, an embargo were imposed to prevent imports of a new GM product, price would be $Ph_e$ and quantity $Qh_e$. The welfare loss associated with an embargo is $n+b+c$.

The advent of labelled GM imports leads to separate markets, an imported GM market and a domestically produced non-GM market between which individual consumers must choose. The imported price is $Pl_2$.[11] The advent of the segregated GM market shifts the demand curve in the non-GM market as some consumers chose to purchase the lower cost GM alternative – the demand curve for products with original attributes shifts to $dh_2$.[12] When both markets are in equilibrium, $Qh_2$

[9] Similar results can be obtained if the importing country raises, for example, animal welfare standards while exporters do not.

[10] Note, the imposition of a tariff, the WTO's preferred border measure, only reduces the positive price benefit without removing the market failure that caused the decline in demand. Only in the extreme case where the tariff was high enough to exclude all imports from the market and thus equivalent to an embargo would a tariff not be inferior to an embargo.

[11] Note, $Pl_2$ will be higher than $P_2$ in Fig. 1 due to the costs of labelling and segregation.

[12] Note, the cause of this shift, people vacating the non-GM market to consume cheaper GM food is different to the demand shift in Fig. 1 that was caused by consumers not being able to discern whether or not they were consuming GM foods.

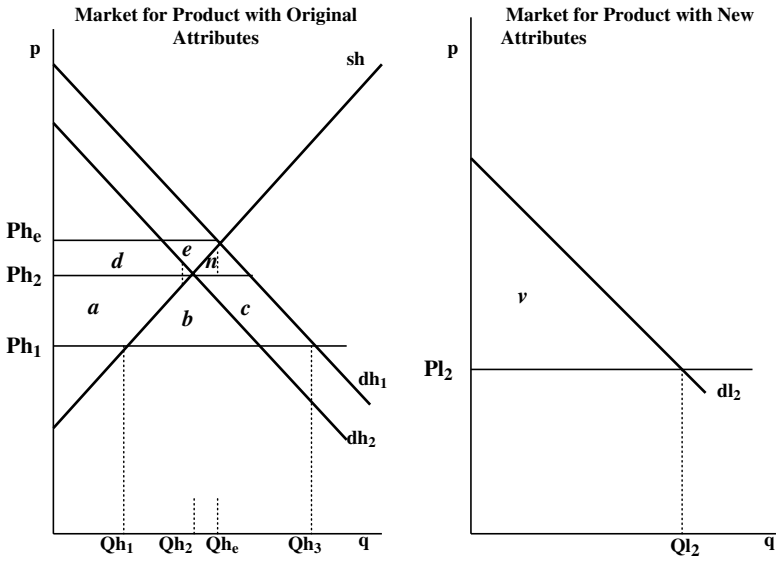


Fig. 2. Import embargo versus labelled imports.

of the product with original attributes is purchased at $Ph_2$ and $Ql_2$ of the product with new attributes at $Pl_2$.[13]

The welfare effects of the mandatory labelling policy requires an assessment of both markets. In the non-GM market, price has risen from $Ph_1$ to $Ph_2$ yielding an increase in producer surplus of $a$ and a loss in consumer surplus of $a + b + c$ for a net adverse price effect of $b + c$.[14] In the GM market there is a gain in consumer surplus of $v$ – this is a beneficial new product effect.[15] The overall welfare effect of labelling is $v$ minus $(b + c)$.

Fig. 2 can now be used to compare the labelling policy with the import embargo. The welfare loss in the market for products with original attributes with labelling is $b + c$ while it is $b + c + n$ with the embargo because price rises less in labelling case.[16] In addition, there is the new product benefit equal to $v$ in the labelling case. Thus, the labelling policy is never inferior to the embargo policy by $n + v$ for the importing country.[17] This is an extremely important result for an exporting country. The EU, for example, has been prone to handling consumer demands for protection by imposing import embargoes – permanently in the case of beef

[13] This two market case is more fully developed in Gaisford et al. (2001).

[14] Note, $dh_1$ is the correct demand curve with which to make this calculation – we raise the price in the non-GM market while holding the price of GM products at its initial infinite price – i.e., it was not available.

[15] Note, $dl_2$ applies when price has been raised to $Ph_2$ in the high quality market.

[16] Note, this will always be true unless no consumers are willing to consume the GM product.

[17] Labelling is also preferred to the embargo by exporters.

produced using growth hormones (Kerr and Hobbs, 2002) and temporarily in the case of GM-foods. It is also important because the current WTO regimes rules relating to the labelling of imports are not structured to account for the market failure arising from credence attributes. Given the current array of issues that centre on trade in products where credence attributes are important, the superiority of labelling as a policy option for importers may suggest that the WTO needs to be reformed.[18]

## Trade policy reform

The current WTO rules dealing with labelling are administered within either the Agreement on the Application of Sanitary and Phyto-sanitary Measures (SPS) or the Agreement on Technical Barriers to Trade (TBT). The SPS deals with all types of measures pertaining to food safety and animal and plant health. The TBT deals with non-health consumer protection issues such as fraud or misrepresentation.[19] The labelling rules under the SPS agreement are relatively straight-forward. The key is whether the product poses a hazard to human, animal or plant health. If the product poses a hazard for all, then labelling does not apply and the country can ban the import of the product.[20] If the product poses no hazard then no label is justified and imports cannot be required to be labelled. If the product poses a hazard for some, then imports can be required to include a hazard label (Isaac et al., 2002). This would be the case where, for example, some consumers, such as pregnant women, could be affected adversely if they consumed the product. In Fig. 2 those who would be adversely affected would not consume the labelled product and continue to buy the product with original attributes while women who were not pregnant and men would consume the product with the new characteristic that was not a hazard for them. Thus, the SPS labelling rules provide information whereby consumers can make an informed choice regarding health related credence attributes.

The difficulties in international trade pertaining to the SPS relate to establishing what constitutes a hazard rather than the rules on labelling. Under the SPS, for a country to put in place a measure to restrict market access, there must be a scientific justification. The idea underlying the SPS was that there would be international

[18] While a policy of labelling dominates the embargo, labelling need not always be better than unlabelled imports. The costs of ensuring that products are kept separate, a requirement in the labelling case, may be significant. If perceived quality differences are small, these segregation costs will exceed the benefits and labelling should not be required. If quality differences are large, labelling should be obligatory.

[19] An excellent and detailed examination of the SPS and TBT agreements can be found in Marceau and Trachtman (2002).

[20] Note, if consumers are informed of a product that is a hazard to all, presumably no one would switch to consume that product. This is equivalent to all consumers voluntarily choosing to remain solely in the market for products with the original attributes in Fig. 2 when labelled imports are allowed which is equivalent to the result if a formal ban is imposed. Thus, the SPS allowance for a ban in this case does not conflict with the result that labelling is never inferior to a ban.

harmonisation of standards in the areas of human health, animal health and plant heath. The SPS designates three long-standing international organisations – the Codex Allimentarius (food safety); the International Office of Epizootics (animal safety) and the International Plant Protection Convention (plant safety) – where recognized standards should be developed. If, according to the standards or standards-setting guidelines used by any of the three relevant organisations, a legitimate scientific justification for requiring the labelling of imports exists, then countries can implement a labelling regime without being challenged by trading partners (Isaac et al., 2002).[21]

Problems arise, however, because importers can choose to impose higher standards than those agreed by the standards organisations, but only if a risk assessment indicates that the measure will achieve the level of risk chosen by the importer. This leads to arguments regarding how much science is enough, whether the judgements of scientific experts should be deferred to and how uncertainty should be dealt with. These are, however, arguments about whether the credence attributes actually exist, who should decide if they do and what should be done when the existence of a hazard is purely speculative.[22] Importers are allowed to put in place import measures when scientific evidence is not sufficient. If they choose to invoke this justification for import restrictions, countries must actively seek the required information over a reasonable period of time. While it has been agreed, this provision remains contentious. The European Union, for example, is attempting to have the *precautionary principle* enshrined in the WTO to weaken the need for a scientific justification to impose a labelling regime by increasing the role that "other legitimate factors" can play in informing decisions in situations of uncertainty.[23] The wrangling over these issues is of vital importance, for example, to GM exporters such as the US, Canada and Argentina because it will determine the conditions under which genetically modified crops can be traded internationally. The more contentious direct concerns regarding labelling at the WTO, however, relate to the TBT agreement rather than the SPS.

If there is no hazard, then the TBT agreement regulates whether a country can institute a labelling policy for imports. No scientific justification is required. The negotiation of the TBT rules for mandatory labelling was very difficult and the result was a compromise that fails to deal effectively with credence attributes of imports that consumers may have an interest in. The compromise is that mandatory labelling is only allowed in cases when the good is changed in ways that consumers can iden-

[21] Of course, the Codex also sets standards that are not related to SPS such as for organic or hallal products or even what can be labelled as a sardine.

[22] Isaac (2002) provides a discussion of speculative risk and how it should be dealt with.

[23] Most countries accept the need for caution in cases of scientific uncertainty. The problem lies with operationalising the precautionary principle for decision making. There is no internationally accepted definition of what would constitute decision-making under the precautionary principle and the current EU definition is wide open for capture by protectionist interests. See Van den Belt (2003) for a discussion of the precautionary principle.

tify through inspection (i.e., search attributes) or consumption (i.e., experience attributes). Thus mandatory labelling is allowed when a food looks different or tastes different. If the product is simply produced or processed using a different method (PPM), then labelling is not allowed. Hence, imported pork derived from pigs produced to a low animal welfare standard would not have to be labelled because it neither looked or tasted different from pork produced to a high animal welfare standard.

Mandatory labelling is permitted by some countries[24] provided the product in question is *novel*. In order to be novel, a product must be sufficiently unique that no *like* products exist (i.e., there are no substantially equivalent substitutes). If a product is deemed to be novel, then a mandatory labelling standard that contravenes the like product concept of the WTO principle of non-discrimination is permissible because it deals with non safety related production and processing methods that alter the product (Isaac et al., 2002). Commercially licensed GM-foods in Canada, for example, have been found to substantially equivalent to their non-GM counterparts.

If there is no hazard and no discernible change in the search or experience attributes of the good, then mandatory labelling of imports is not permitted. This is because labelling would violate the WTO principle of non-discrimination against like products. Developing countries have been particularly adamant that trade barriers, including labelling, should not be allowed based on the PPM's used. To understand this resistance one has to return to the economic model that underlies the WTO. Remember, in this model consumers never have an interest in asking for trade barriers. It is only producers in importing countries that ask for protection. Developing countries tend to see import barriers based on the technology used simply as disguised protection for domestic producers in importing countries (Hobbs et al., 2002). Given that developing countries often use radically different, often labour intensive, technologies than developed countries (e.g., handlooms in textile production), they fear opening the door to trade barriers based on differences in technology. They have long experience with the ability of producers in developed countries being able to exploit loopholes in trade law to obtain protection from their agricultural, textile and manufactured products. They have every justification to be suspicious. India and other countries fought hard against any trade barriers based on new technologies. The current compromise of allowing labelling for novel products was a significant concession by developing countries.

Consumers with an interest in credence attributes of the imported product that they are faced with in the marketplace are frustrated by the current international trade regime. The protesters dressed as dolphins and turtles at anti-WTO demonstrations during the Seattle Ministerial Meeting of the organisation in 1999 and other international meetings are the most visible manifestation of this frustration. These WTO disputes pitted developing countries against US domestic laws requiring that imported tuna be caught using dolphin friendly technology and that imported shrimp be caught using turtle friendly technologies – both PPMs that did not alter

[24] For example, Canada.

the search or experience attributes of the products. One of the difficulties the EU has experienced in putting in place its import regime for GM products is that it is a credence attribute that is at issue.

Those that oppose changes in the TBT regime worry that allowing labelling on the basis of consumer concerns with PPMs is that the exception will be open to capture or manipulation by producers interested in acquiring protection from imports. It will be extremely difficult to determine if consumer concerns are sufficiently widely held to justify the imposition of a labelling regime (Perdikis et al., 2001). If there is no threshold established then the use of the trade barrier will be wide open for abuse by importing countries because, for any product, it will be possible to find some 'concerned consumers' if for no other reason that producers (and their families and friends) are also consumers. Further, the neoclassical model assumes that consumers are 'sovereign' in their decision making. This means that they are not open to manipulation. Exporters worry that producers (or other groups) in importing countries will be able to directly influence consumer opinion to create concerns over credence attributes. At the moment, trade law errs on the side of ensuring that traditional producer protectionism is kept at bay. This is consistent with orientation of the GATT and subsequently the WTO.

Labelling is often seen as a simple solution to the problem of credence attributes of goods. Labelling, however, has considerable commercial ramifications, particularly when food supply chains cross international borders. As suggested above, the credence nature of these attributes means that there is an information asymmetry problem. In the case of animal welfare and/or eco-labelling, for example, consumers and downstream food firms have no way of telling whether food is labelled accurately. This lies at the heart of the voluntary versus mandatory labelling argument – do firms have the incentive to label GM products honestly if they fear a consumer backlash against products that do not contain the desired credence attribute? It is partly for this reason that mandatory labelling of, for example, GM products has been supported by a number of countries. In some European countries, the private sector has pre-empted regulatory moves to require labelling – a number of UK supermarkets publicly stated that they would not allow genetically modified material in their own-label products or would not sell any products containing GMOs.

The requirement that credence attributes (or their absence) be identified in a product raises transaction costs for downstream food processors and retailers. The firms must ensure that food is accurately represented to the consumer. This increases the information, monitoring and enforcement costs of occasional supply chain relationships, providing an additional incentive for closer vertical coordination along the agri-food supply chain (Hobbs and Plunkett, 1999).

Ironically, the requirement that food be labelled as genetically modified may impose relatively higher costs on producers of non-GM food. This is because it does not matter that GM canola might be "contaminated" with non-GM canola. However, it matters greatly that non-GM canola not come into contact with GM canola as it passes along the supply chain from farmer to consumer. Proving that your product does not contain a GM organism will be a lot more costly than simply acknowledging its possible presence with a 'may contain' label. Firms in the non-GM supply chain will incur higher transaction costs and may be less cost competitive as a

result – of course, those higher costs could be offset by consumers being willing to pay a premium for non-GM products. If these transaction costs are sufficiently high (or the premium small), food companies may simply label all food as potentially containing GMOs. Hence, instead of providing consumers with choice, mandatory labelling may actually eliminate choice.[25]

Allowing consumers to signal their preferences by labelling PPMs only functions effectively if consumers are not misled by the label. Consumer surveys suggest a great deal of confusion over the meaning of terms such as 'genetically modified' or 'genetically engineered'. A survey conducted in Canada by the Angus Reid Group (1999) revealed that, while 84% of respondents recognised that inserting genes from one plant to another constituted 'genetic engineering', they held a much broader (and, in many cases, inaccurate) view of what was meant by the term. Around 60% of respondents considered crops sprayed with hormonal agents or chemicals to be genetically engineered, and 42% considered irradiated foods as genetically engineered. This suggests that a sizeable proportion of people associate the terms genetically modified or genetically engineered with any food technology with which they are not familiar or are not comfortable. Similar confusion can be expected regarding animal welfare and environmentally friendly designations.

Analogous to nutrition labelling, information is not necessarily knowledge (Riemenschneider and Bonnen, 1979). There is little point in providing information labelling if consumers do not know how to interpret it. This suggests an important public good role for governments in the provision of unbiased, objective information and education so as to inform consumer purchase decisions.

## Conclusion

Pressure from consumers to deal with the issue of PPMs that pertain to credence attributes of imported goods that they care about is rising. Labelling is a means by which these concerns can be dealt with. Mandatory labelling of imports can have considerable ramifications for the export of agricultural products. A failure to find a solution to the problem may also have considerable ramifications for exporters as illustrated by the case of the willingness of the EU to maintain its import embargo on US and Canadian beef produced using growth hormones despite the WTO having ruled in favour of North American exporters. Accepting retaliation, as the EU has in the beef hormone case, helps no one and simply introduces new trade distortions. Labelling is never an inferior policy to an embargo for importers[26]

[25] In Fig. 2, if the price of the high quality imported product rises sufficiently high due to the segregation costs associated with labelling, a sufficient number of consumers will have switched to the low quality product that exporters may no longer find it commercially viable to service that market.

[26] In Fig. 2, if the product is hazardous and labelled as such then no consumer would purchase it, the demand curve would not shift in the left hand panel and no market for the product with the new attributes would develop. In both the case of the embargo on imports and mandatory labelling, the market price will be $Ph_e$. If this is the case, it may be administratively less costly to have an embargo than a labelling system.

and, thus it is in exporters interest to remove barriers to their use in international trade law. It is important, however, that the international rules for labelling are constituted in a fashion that minimises the potential for capture and abuse by other interests and are minimally trade distorting for those wishing to engage in international commerce.

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