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Science-based Rules of Trade – A Mantra for Some, An Anathema for Others

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The concept of science-based rules for the establishment of trade barriers was a new development that arose from the Uruguay Round. It is an attempt to de-politicise decision making in the complex areas of human, animal and plant health as well as aspects relating to the environment. In the short time it has been in operation it has become a mantra for some but an anathema to others with an interest in trade policy. It is now at the heart of a major trade dispute between the EU and the United States over trade in the products of biotechnology. The paper discusses the controversies relating to the science-based system and provides suggestions to improve its efficacy.

Keywords: independence, precautionary principle, science-based, scientific consensus, SPS, WTO

> Given an unknown but non-zero probability of God's existence and the infinity of the reward of an eternal life, the rational option would be to conduct one's earthly life *as if* God indeed exists.
>
> Consider the possible existence of another deity than God, say Odin. If Odin is jealous, he will resent our worship of God, and we will have to pay an infinite price for our mistake.
>
> Henk van den Belt[1]

The United States, Canada and a number of agricultural exporting countries continually reiterate their firm commitment to science-based rules for the imposition of barriers to the international movement of goods when health, sanitary and phyto-sanitary issues are invoked. Anti-globalisation activists, a number of environmental non-government organisations (NGOs) and other civil society groups have condemned science-based rules as a sham and conjure up visions of undemocratic, paternalistic cliques of self-proclaimed "experts" in the pay of large multinationals. The European Union accepts a role for science-based rules, up to a point, but suggests the ultimate authority should be a political one that may wish to consider other factors, including socio-economic ramifications, in their decision making. The reason positions regarding science-based rules of trade have become so polarised is the ongoing confrontation over the commercialisation of genetically modified agricultural products and the regulatory regime under which they will be allowed to trade. This confrontation is at the heart of the recent case against the EU's moratorium on the import of genetically modified crops brought by the United States, Canada, Australia and Egypt at the World Trade Organisation. The outcome of this case is likely to have major ramifications for U.S.-EU relations and for the future efficacy of the WTO. Beyond the emotive issue of biotechnology, there are a number of important issues pertaining to science-based rules of trade that warrant serious examination.

Countries have legitimate reasons related to human, animal and plant health and the environment for limiting the entry of products into their markets. These limitations are non-tariff barriers to trade and may take the form of moratoriums, regulatory hurdles such as testing or the maintenance of paper trails for purposes of tracing, and labelling (Isaac et al., 2002). As barriers to trade, they also provide economic benefits to those who produce import-competing goods and, hence, can be sought by parties

with a vested interest in seeking protection from foreign competitors – they are open to abuse by those seeking ways to provide protection. In recognition of the potential for (and suspicions and allegations of actual) abuse, it was decided during the Uruguay Round of General Agreement on Tariffs and Trade (GATT) negotiations to move sanitary- and phyto-sanitary-based ("phyto" means plants) trade regulations out of the arrangements pertaining to technical barriers to trade and into a separate Agreement on Sanitary and Phyto-sanitary Measures (SPS) that would be incorporated into the WTO. The need for a separate SPS agreement was heightened by the prospect of bringing trade in agricultural goods under general GATT disciplines for the first time (Gaisford and Kerr, 2001), meaning that a number of alternative means of extending protection to agricultural goods were to be eliminated or curtailed. The expectation was that the temptation for the illegitimate use of sanitary and phyto-sanitary measures would increase.

The clear intent of the SPS was to close off sanitary and phyto-sanitary trade measures from protectionist influences. The mechanism to accomplish this was to make science the only basis for imposing trade restrictions in the name of sanitary and phyto-sanitary concerns. There are two tests that a country wishing to impose trade barriers for sanitary and phyto-sanitary reasons must pass. First, there must be a scientific reason for the restriction. Second, the country must show that there is a risk. The second test is included to ensure that an identified scientific problem that does not pose a risk cannot be used as a reason to impose a trade barrier. The SPS specifically does not require a quantitative risk assessment – qualitative assessments are allowed. Each country is allowed to establish its own acceptable levels of risk – which was a contentious issue in the negotiations for fear that protectionist interests could be satisfied by the establishment of very low risk tolerances. The only check on this potential area of abuse is consistency – that dispute panels[2] would not allow barriers when the level of risk specified for a particular commodity was lower than those used for similar problems in other commodities. This was, for example, one of the reasons the WTO dispute panel gave for disallowing the EU's ban on importing beef produced using growth hormones (Kerr and Hobbs, 2002).

While each WTO member is allowed to develop its own case regarding scientific legitimacy, it was hoped that harmonised international standards would evolve. This was to be accomplished by the WTO recognising three long-standing science-based institutions as having the competence to develop international standards: (1) the Codex Alimentarius Commission (for food safety); (2) the International Office of Epizootics (animal health); and (3) the Secretariat of the International Plant Protection

Convention (plant health). The negotiators were particularly cognisant of the difficulties individual developing countries would have in devising SPS regulatory regimes and expected that if a country adopted the standards approved by these organisations, the standards would provide a "safe haven" from complaints of trading partners. Countries are allowed to exceed the harmonised international standards but must provide both a scientific justification for doing so and an assessment of risk mitigation.

A number of important assumptions underlie this model. The first is that a scientific consensus can be reached, either within a country making its own SPS standards or in the international standards organisations. Second, that the scientists making the determination are independent of (protectionist) political influences. Third, that sufficient information exists to formulate scientific hypotheses and for risk to be assessed. Fourth, that there is a willingness among the population to defer to the judgement of scientific experts – that the scientific establishment is trusted. These turn out to be rather large assumptions in the face of a major transformative technology like modern biotechnology and in an era when some members of civil society are suspicious of all traditional authoritative institutions.

While the scientific establishment in a country, or internationally, often finds sufficient grounds for consensus, there will never be a consensus among all scientists. Science is based on hypotheses and it is the nature of the scientific process itself that the received knowledge and its evidence should be questioned. Thus, on any given issue there are likely to be divergent views. Further, the consensus reached by the scientific establishment may prove to be wrong – there is certainly considerable historical evidence of this being the case. To enshrine a scientific basis for decision making, however, must mean that agreement among some subset of scientists will be sufficient to represent a consensus to be acted upon. If this threshold cannot be reached then prudence would suggest that trade barriers should be allowed until a consensus can be found. Problems arise, however, when trade policy makers refuse to accept the consensus, as when the EU chose to ignore the conclusions of the scientific experts it had chosen to review the evidence pertaining to growth hormones in beef production (Kerr and Hobbs, 2002).

There must be a scientific consensus on three things: (1) the scientific basis of the need for a trade restriction; (2) the risk arising from not imposing a trade restriction; and (3) when sufficient science has been done. The latter is important and often overlooked. The number of hypotheses that can be tested pertaining to a new product or technology is infinite. For example, when testing a new drug there are both large

numbers of possible human subpopulations, defined both by their genetic make up and the possible combinations of existing drugs they may be taking, upon whom the new drug can be tested. In a similar fashion, there are a very large number of plants, animals, insects and other organisms in the environment that genetically modified organisms could react with. In the beef hormone case, the EU suggested that insufficient evidence existed because tests had not been undertaken for subpopulations of women taking certain drugs (Kerr and Hobbs, 2002). Without commenting on the merits of this particular case, it is clear that more subpopulations could always be tested, and testing is not without cost. Thus, to have a workable science-based system the concept of scientific consensus must extend to defining when sufficient testing has been done.

It is also clear that relying on scientific consensus cannot ensure that mistakes are not made; it was, however, the best solution that the member states, including the EU, negotiating the Uruguay Round could agree upon.

Underlying the notion of a science-based system is the assumption that scientists are independent, specifically that those making decisions with trade policy implications are independent of political and other vested interests. In the past, genetic-based research in agriculture was largely undertaken in the public sector due to the inability of private researchers to recoup investments made in plant breeding – once the genetic material was in the hands of farmers, part of a crop could be saved for seeding the next year. The technical aspects of biotechnology (combined with the extension of intellectual property rights to biological organisms) have increased the probability that private firms could recoup their investments in genetic research, and much of this work is now undertaken in the private sector (Boyd et al., 2003). The move to privatised research in the field of genetics was convenient for governments facing large fiscal deficits in the 1980s and 1990s because it allowed them to downsize their public scientific establishments in the name of budgetary restraint (Klein and Kerr, 1995).

The economic potential expected from biotechnology has meant a considerable increase in research activity in this area. As scientists in private industry have a direct economic stake in the research they undertake, either as entrepreneurs or as employees of the firms (often large multinationals) engaged in research, regulatory compliance and commercialisation, their independence is open to question. If a science-based system is to function properly, then there must be a sufficient public regulatory scientific establishment to check the claims of private-sector scientists. Given the increase in research activity and the downsized public-sector scientific establishment,

the picture is often of an under-resourced regulatory establishment that must rely on the information provided by the private sector.

As the standards system is currently structured, governments appoint representatives to the international standards-setting organisations recognised by the WTO. These bodies are supposed to be free of political influence, but with much at stake there have been allegations that appointments have become politicised, that appointed members are not independent and that the influence of non-scientists is increasing.

Part of the reason that there is increasing political pressure on international scientific institutions is that the WTO has no mechanism that allows protection to be provided in cases when consumers or other groups such as environmentalists lobby their politicians for it. In the economic model that underlies the WTO, consumers are always losers when trade restrictions are imposed and, hence, are not expected to ask for them. In recent years consumers and environmentalists have increasingly lobbied for protection – it is easy to show that some consumers will lose with the introduction of new products, such as those derived from biotechnology, due to asymmetric information (where the presence or absence of an attribute cannot be detected by the consumer) and its accompanying market failure (Gaisford et al., 2001). While the WTO is a mechanism that explicitly recognises that governments have a legitimate right to respond to producer-driven protectionism, there is no equivalent for other interests that may lobby for protection (Perdikis et al., 2001). The scientific basis for the anti-biotechnology sentiments of some consumers, environmentalists and others in the EU may be tenuous, but there is no doubt that their desire for protection is strong – sufficiently strong that EU politicians have not felt they could be safely ignored (Perdikis, 2000). Given no direct mechanism to respond to these protectionist interests, the only apparent avenue open was to alter the SPS so that protection can be provided in the face of political pressure from non-producer sources.

Even if governments appoint scientists on the basis of their ability and do not interfere in their deliberations, there is no way to ensure that they cannot be bought by vested interests. This is, however, true of any alternative group, including politicians, that might be charged with making decisions regarding science policy.

Decision making when scientific uncertainty exists is currently the major battleground in the debate over science-based rules of trade. Uncertainty is the case when there is insufficient information to attach objective, or even subjective, probabilities to the risks associated with a product or technology (Knight, 1921). In the context of a science-based system for rules of trade, this is a situation where

scientists cannot know. In the case of a transformative technology such as biotechnology, there may be much that scientists cannot know and that, hence, lies in the realm of uncertainty. The question is how to proceed with decision making when uncertainty exists. The answer is to exercise precaution. What has become known as the *precautionary principle* is enshrined in the WTO through the SPS, in a number of multilateral environmental agreements, including the Biosafety Protocol which is meant to regulate trade in the products of agricultural biotechnology, and in domestic EU legislation pertaining to food safety and the environment.

While there is general agreement on exercising precaution in the face of uncertainty, there is no agreement on how it should be operationalised for decision making. It is probably unfortunate that the precautionary principle was included in international agreements before the details of how it should be used in formulating policy could be agreed internationally. As a result, the precautionary principle can be interpreted in self-serving ways. For example, those opposed to agricultural biotechnology choose to interpret it in what Van den Belt (2003b) calls the "strong version" of the precautionary principle. The strong version would require absolute certainty that a catastrophic event will not take place before proceeding with a new technology. As uncertainty exists, it is not possible to rule out a catastrophic event. The strong version of the precautionary principle, however, even disallows a technology when the risks are known, because a zero probability of risk cannot exist. Hence, those opposed to biotechnology (or any other new technology) see the precautionary principle as a way to prevent its development and use. Van den Belt (2003b) shows that the strong version of the precautionary principle is logically inconsistent in that while one cannot deny that a catastrophic event will take place if the new technology is allowed, it is also impossible to assert that a catastrophic event will not take place if the new technology is disallowed. Thus, invoking the strong version of the precautionary principle does not provide support for the Luddite-like denial of a technology, because an equally strong case can always be made to proceed with the technology.

If the strong version of the precautionary principle is not accepted, then the question arises of what is the basis upon which the principle can be invoked for decision making. The EU has been the major international proponent of the precautionary principle, yet it has had great difficulty defining how it should be operationalised. It is clear that it has not been caught in the strong version trap. The EU Commission's latest ruminations on the precautionary principle (European Union Commission, 2000) suggest that benefits as well as costs should weigh in any

decision. The major contentious issues in the Commission's current interpretation of the precautionary principle from the science-based rules of trade perspective are that when uncertainty exists the decision should be a political one and that socio-economic factors can inform the decision. Both of these aspects of the Commission's interpretation represent movements away from science-based decisions. Isaac (2002) calls this a social rationality approach to the Risk Analysis Framework (RAF) and contrasts it to the science rationality approach used in the United States. He suggests there is a philosophical difference in the approach to technology that has led to the different regulatory regimes. On a practical level, moving the decision criteria into the political realm may reflect a belief that it is politicians who should make the difficult tradeoffs when uncertainty exists. Proponents of this approach may believe that politicians will restrict their decision-making process to weighing the incomplete scientific evidence. Explicitly allowing for political decisions, however, opens the process to other (protectionist) influences and defeats the purpose of moving to a science-based system for establishing the rules of trade.

In a similar fashion, allowing socio-economic considerations to influence decisions would, for example, allow trade barriers to be put in place against the products of biotechnology because "some local farmers may be hurt by the introduction of these products into the market" – which is nothing more than old fashioned protectionism. If one wants the rules pertaining to the constraints on politicians' ability to grant protection to be softened, then this should be negotiated directly rather than done indirectly by altering, and negating, science-based decision making.

If one is committed to a science-based system for establishing the rules of trade, when faced with uncertainty it should still be members of the scientific community that are allowed to decide – not because they are infallible (or even because, hopefully, they are better informed regarding the existing scientific information) but rather because they are less open to other influences. Of course, this is contingent upon scientists being independent.

Finally, if decision makers are faced with an influential political constituency that refuses to defer to the judgement of the scientific community, the solution is not to open the science-based process up to decision making by other members of civil society. Note, this is not the same question raised earlier where individuals reject scientists as decision makers because they are not independent; in other words, they would defer to scientists if they believed they were independent. That problem can be rectified by acting to increase public confidence in the independence of the scientific

community. What one is talking about here is individuals who object to deferring to the scientific community when it *is* independent. This is a rejection of science-based rules of trade. If trade policy makers wish to accommodate this point of view, then negotiations need to be initiated to repeal the SPS directly. Non-scientists making decisions in a science-based decision making process is a *non sequitur*.

It is clear that science-based decision mechanisms for the establishment of trade barriers are an anathema for some because such mechanisms produce an undesirable answer. This is no different than traditional producer protectionist interests chafing under international rules that limit the ability of their country to impose, for example, import quotas. Attempts by vested interests to capture the science-based system by convincing politicians to insist on the strong version of the precautionary principle being enshrined in the SPS and multilateral environmental agreements is no different from producer protectionist interests convincing decision makers to practice "dirty" tariffication in the conversion of import quotas into tariffs. These attempts should not be justified as being part of sound science.

As for those who wish to dilute the decision-making power of the scientific community by adding either other decision makers or non-scientific considerations to the process, it is essential to realise that what they propose is not a science-based system. It is no different from the pre–Uruguay Round situation where decision makers who were not scientists could take the advice of the scientific community but ignore that advice if they chose to. Under such an approach, the SPS would become a sham and could simply be done away with.

Those who support the science-based system should not do so simply because it provides a convenient result in the current circumstances. For example, Canada is a supporter of the science-based system yet faces a major quandary over the licensing of genetically modified wheat. If the EU and other markets remain closed to genetically modified products, and the Canadian grain handling system is unable to effectively segregate non–genetically modified wheat, Canada faces a risk of significant market loss if it licences the use of genetically modified wheat (Furtan et al., 2002a; Furtan et al., 2002b). Canada may want to not licence genetically modified wheat for this socio-economic reason, yet its domestic regulatory regime for new crop varieties is "science-based". If there is no scientific reason to deny the licensing of genetically modified wheat, then it will be licensed in Canada if the commitment to a science-based system is upheld.

It is also important that those who advocate the science-based system understand the importance of the independence of scientists. Sufficient resources must be made

available from public sources, along with a hands-off method of distributing those funds, so that scientific decisions are free of other influences. If this is not the case then it will be impossible to convince trading partners that a science-based system exists that can be safely deferred to for decisions. There must be no systematic way that vested interests can have influence over the decision makers. Of course, no system will ever be perfect, just as it is impossible to prevent all judges, police and politicians from taking bribes.

It is also important that those who wish to have a science-based system recognise the WTO's institutional deficiency regarding non-producer protectionism. To deny that consumers, environmentalists and other groups in civil society may apply political pressure for protection simply forces those who feel they must respond to such pressure into other avenues such as the SPS. This puts the science-based system at risk. While finding ways to accommodate these "new sources" of demands for protection in the WTO may be difficult (Perdikis et al., 2001), it will be much better to deal with them directly than to risk the science-based system. If one examines the beef hormone case, the science-based system worked as intended, despite the EU's attempts to manipulate it. The reason, however, that the EU chose not to comply with the dispute panel's ruling was because there was no other way to respond to consumer-based pressure (Kerr and Hobbs, 2002).

The SPS system is a relatively new, Uruguay Round creation. It is probably not surprising that grey areas have come to light within the science-based system. These grey areas should be clarified by further negotiations. In particular, who and what constitutes a scientific consensus needs to be agreed – presumably by a committee of scientists appointed on a case-by-case basis. Further, the relative weighting to be given to costs and benefits when the precautionary principle is invoked must be established. These are arbitrary elements in the science-based decision-making system and an appropriate place for political "horse trading".

Viewed in the light of the analysis presented in this article, the science-based system for establishing rules of trade may be too rigorous for some of its current proponents. If it is not clearly defined and rigorous, however, a science-based system will become a sham that denigrates both the scientific profession and international trade institutions.

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Endnotes

1. I am indebted to Henk van den Belt of the Applied Philosophy Group, Wageningen University and Research Centre in the Netherlands for pointing out the logical inconsistency of the strong form of the precautionary principle favoured by many environmental non-government organisations. The first of the two quotations is a stylised version of the 17th–century French philosopher Pascal's famous wager (Haller, 2000). The second quote is a stylised version of the "many gods" argument (Manson, 2002). Van den Belt (2003a) continues from the second quote as follows: "Never mind that Odin's existence may not seem likely or plausible to us. It is sufficient that we cannot exclude the possibility that he exists with absolute certainty. So the very same logic of Pascal's wager would lead us to adopt the opposite conclusion not to worship God. Pascal's argument then cannot be valid. … If the wager argument is not valid, the strong version of the Precautionary Principle cannot be valid either."
2. Disputes under the SPS are handled under the WTO's dispute settlement mechanism.