economies and many developing countries. With the exception of the Government Procurement Agreement (see Chapter 11), there is no reference to countertrade in the WTO. Countertrade is a business practice and as such is not of direct concern to the WTO. What matters is if countertrade regulations adopted by governments imply discrimination or a lack of transparency. But in such cases the relevant provisions of the GATT apply.

5.7. Technical Regulations and Product Standards

Product standards, technical regulations and certification systems are essential to the functioning of modern economies. Product standards are usually voluntary, generally being defined by industry or nongovernmental standardization bodies such as the American National Standards Institute, the British Standards Institution, the Deutsches Institut für Normung and the Association Francaise de Normalisation. Standards have been defined as documents 'established by consensus and approved by a recognized body, that provide, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context' (ISO/IEC Guide 2, 1991). Technical regulations in contrast are legally binding, and are usually imposed to safeguard public or animal health, or the environment. In most industrialized economies the number of standards greatly exceeds the number of technical regulations. Certification systems comprise the procedures to establish that products or production processes conform to the relevant standard or regulation.

The use of product standards is under the direct control of firms and industries. Most standards are market-driven, and firms desiring to export to or sell in a market have strong incentives to satisfy prevailing standards, be it to ensure compatibility or interconnection, or to signal that products meet minimum quality norms. In the case of technical product regulations there is no choice. Firms must comply and confront legal sanctions if they do not. In the case of both standards and technical regulations, the underlying norms are often determined through a cooperative international process that occurs under the auspices of specialized international bodies that allow for inputs by affected industries. A major player in this field is the International Organization for Standardization (ISO), which is located in Geneva, Switzerland. Whether or not to make norms developed by ISO technical committees mandatory is up to governments.

Technical product regulations are generally intended to deal with specific market failures. Possible rationales for technical regulations and standards (TRS) include

information asymmetries, uncertainty, market power and externalities in production or consumption. Many standards have the characteristic of a public good in that use by one agent does not reduce other agents' consumption possibilities (Kindleberger, 1983). Frequently, the greater the use made of such standards, the greater the potential gains to users in terms of reduced transaction costs—there are so-called network externalities. Examples include standards of measurement and conventions such as driving on one side of the road.

In the public goods situation there is a clear-cut case for harmonization, as a common standard is in the interest of all users. Achieving agreement on a specific standard can be difficult, as different groups may have different preferences. Because of free rider problems, government intervention may be required to achieve a common standard. Most standards tend to be impure public goods, in that they benefit a specific, identifiable group (usually an industry and its customers). Although government intervention is not necessary, there remains a need for interested parties to cooperate, and to the extent that there are costs to developing a standard, there may be an incentive to free ride.

Although standards may help achieve technical efficiency, they may also allow incumbent firms in an industry to increase their market power. Standards are one of the possible instruments through which a firm or a group of firms can raise their rivals' costs. Assuming there are costs to meet the standard, its existence may reduce the contestability of a market because potential entrants find it less attractive to compete or to enter. The greater are the barriers to entry, the greater will be the profit-enhancing effect of the standard, all other things equal. Thus, standardization may well be employed strategically by firms or groups of firms that aim to create rents (excess profits).

There are numerous examples of such 'standards-setting' competitions: famous cases include the battle between the Betamax and the VHS standard for video cassettes in the 1980s (which was won by the latter), and more recently, between competing consortia of firms supporting the Blue Ray or the HD standards for high definition TV content, won by Blue Ray (owned by Sony—not, incidentally, the loser of the 1980s fight, from which it had drawn the appropriate lessons by ensuring that major content providers supported its technology). Another example is the Global System for Mobile communications (GSM) standard for mobile telephony. Insofar as the standards are voluntary there is no need to lobby governments in order to obtain the rents because the standards are set by industry groups. What matters is winning the competition if there is one; and, ideally, not having to compete. Government agencies responsible for determining technical regulations can expect to be lobbied by potentially affected parties and may be captured by them.

Because TRS can raise unit costs of production they may inhibit international trade. In general, if TRS differ across countries this will segment markets, even if identical norms are applied in each country to domestic and foreign goods (i.e. the

national treatment rule is satisfied). Prices for similar goods of uniform quality will then not be equal across countries, as the different standards inhibit arbitrage. Research stimulated by the EU Single Market programme in the mid-1980s illustrated how significant such TRS-induced market segmentation can be. A typical example was building tiles where voluntary industry standards differed by EU country. Spain was found to be the lowest cost producer of such tiles, average prices being between 40 and over 100 per cent lower than prices charged by producers in other countries such as Germany, France and the Netherlands (Groupe-Mac, 1988). Such price differences were maintained as the result of a combination of differing standards and government procurement regulations. In France, nonstandard tiles could not be used in public works (about 40 per cent of the market), and private firms were hesitant to use nonstandard tiles because insurance companies tended to require that buildings meet industry standards. In Italy, pasta purity laws required that pasta be made of durum wheat, a high-quality type of wheat produced in the south of the country. This increased the cost of pasta in comparison to other EU countries, where pasta tended to consist of a mix of wheat qualities. Thus, a lack of uniform or mutually recognized TRS may have a significant impact on trade.

There is a vigorous debate in the literature whether a 'standards-as-barriers' view of the world is the more accurate one, or whether it is more accurate to take a 'standards-as-catalyst' perspective (Jaffee and Henson, 2004; Anders and Caswell, 2007). Standards and technical regulations can either facilitate or block trade. They can impose additional variable or fixed costs on exporters to the extent that it is necessary to alter production processes to adapt products for export. Moreover, certification requirements to demonstrate compliance can raise trade costs. On the other hand, standards can also reduce trade costs for enterprises. Adoption of common norms or international standards can help firms realize economies of scale and eliminate the need for redundant testing and certification.

The net impact of product standards on trade will depend on the relative magnitude of these effects. The empirical evidence is limited in this area, primarily due to the cost and complexities associated with collecting reliable data and constructing indicators on standards in different sectors across countries. Disdier et al. (2007), using WTO TBT and SPS notifications, find that standards have negative trade impacts, in particular for exports from developing countries to OECD countries. Otsuki, Wilson and Sewadeh (2001), Peterson and Orden (2007) and Wilson and Otsuki (2004) are examples that come to the same conclusion. Wilson and Otsuki (2004) use firm level data on standards and find that in Sub-Saharan Africa, firms invest on average 7.6 per cent of sales in order to comply with foreign standards. Their data also show that experiences differ greatly from one firm or country to another: the range of investment costs reported by firms runs from close to zero to over 100 per cent of annual sales. For firms in countries such as Kenya and Uganda average investment compliance costs

as a share of sales can approach 10 per cent, whereas the average in other regions rarely exceeds 4 per cent. Case studies focusing on the costs and benefits of health and safety standards come to similar conclusions: the costs are often nontrivial. Maskus, Otsuki and Wilson (2005) find that a 1 per cent increase in investment to meet compliance costs raises variable (per unit) production costs by between 0.06 and 0.13 per cent—a small amount, but statistically significant. But the lump-sum fixed costs of compliance are nontrivial: averaging US$425,000 per firm in their sample, or about 4.7 per cent of value added.

Those taking a standards-as-catalyst view stress that the overall gains from making the associated investments can be significant (Jaffee and Henson, 2004). Moenius (2004) concludes that country-specific standards tend to promote trade in manufactures, whereas they have a negative impact on trade in homogeneous products such as commodities and agricultural products. This finding is consistent with the interpretation that higher information costs in manufactures can be mitigated with harmonized standards. Anders and Caswell (2007) study the effect of a 1997 introduction of a mandatory Hazard Analysis Critical Control Point (HACCP) standard for seafood by the United States. They concluded that this had a negative overall effect on exporters to the US, with developed country exporters as a group gaining and developing country exporters losing. However, when they focused the analysis at the country level, per capita income level of the exporter was not statistically significant: what mattered was scale. The leading seafood exporters gained market share after the HACCP was mandated; whereas most of the smaller exporters faced losses or stagnant sales. This phenomenon is also stressed by Maskus, Wilson and Otsuki (2001) and Jaffee and Henson (2004): tighter standards result in a shake out of the industry. More efficient suppliers benefit, less efficient ones may be forced out of the market altogether.

Maertens and Swinnen (2009) note that an assessment of the effects of (tighter) standards needs to go beyond a focus on firm-level impacts. In the case of Senegal they show that tougher EU standards were accompanied by an *increase* in exports, and that this led to rising rural incomes and poverty reduction. The standards had an impact on market structure, inducing a shift from smallholder contract farming to integrated estate production. This in turn changed the channels through which poor households benefitted from expanding trade opportunities: through labour markets (wage income) instead of product markets (profits and prices of output sold).

Finally, there are also spillovers associated with specific standards or decisions to tighten standards. Debaere (2005) has shown how a shift in EU policy to zero tolerance of antibiotics had a major adverse effect on Thai exports of shrimp to the EU, much of which was diverted to the US market, which resulted in the launch of a series of US antidumping actions—not just against Thailand but also other exporters such as Vietnam. Peterson and Orden (2005) also conclude that raising US standards on poultry had trade deflection effects.

Thus, TRS can either facilitate or block trade. They can impose additional variable or fixed costs on exporters due to a need to alter production processes to adapt products, and certification requirements to demonstrate compliance can raise trade costs. On the other hand, TRS can also reduce trade costs for firms when produced to international norms for multiple markets. The net impact of product standards on trade will depend on the relative magnitude of these effects. The characteristic of TRS that they are in principle welfare-enhancing distinguishes them from many of the other policies that are subject to WTO rules. However, the above discussion also reveals that TRS may be captured by a subset of firms in an industry and be used as an instrument to create market power. Even if they do not, they will impose costs on firms in trading partners. This tension between the welfare-increasing potential of TRS and their possible trade-impeding effects is, of course, one that arises with any domestic regulatory policy. Because standards have been dealt with under the GATT for many years already, WTO disciplines in this area are of interest not only in their own right, but also for what they suggest about the feasibility of dealing with regulation-related trade tensions more generally.

WTO rules

The WTO does not require that members have product standards. Nor does the WTO develop or write standards. The GATT 1994 Agreement on Technical Barriers to Trade (TBT) aims to ensure that mandatory technical regulations, voluntary standards, and testing and certification of products do not constitute unnecessary barriers to trade. There is a close relationship between the TBT agreement, the national treatment requirement and Article XX GATT (which allows for measures to restrict trade if necessary to protect public health or safety—see Chapter 9). The link with national treatment (Article III GATT) is that 'like' products produced in foreign countries may be subjected to a variety of conformity assessment requirements that can be construed to be discriminatory but may be necessary to ensure compliance with prevailing regulations. The link with Article XX is that both parts of the GATT deal with measures taken by governments to safeguard public health and safety, among other things. Indeed, the preamble of the TBT agreement repeats language found in Article XX:

> Recognizing that no country should be prevented from taking measures necessary... for the protection of human... life or health... subject to the requirement that they are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade...

The TBT agreement is complemented by a stand alone agreement dealing with sanitary and phytosanitary measures (discussed in the next section).

The TBT agreement embodies disciplines on the adoption of TRS in member countries, and on conformity assessment, testing and certification procedures. It also has a variety of transparency provisions. Two tests are imposed in determining whether a specific regulation raises a legitimate trade concern: does it have a discriminatory trade impact, and whether this is necessary to achieve the objective of the government. The basic rules are that central government bodies do not discriminate (as defined by the MFN and national treatment rules) and do not adopt TRS that are more trade-restrictive than necessary to meet legitimate objectives—which may include national security, the prevention of deceptive practices, the protection of human health or safety, animal or plant life and health, and the environment. Necessity in this context means that WTO members are free to pursue any objective they deem appropriate but at the same time must select an instrument that minimizes possible negative effects on international trade. Necessity does not oblige WTO members to use what economists would call 'first best' (i.e. the most efficient) policies. Instead the focus is on trade effects. In most circumstances, however, a norm that minimizes trade effects is likely to more efficient than one that does not, unless the source of the externality is at the border.

The 'least trade restrictiveness' criterion is a reflection of a basic objective of the agreement: to facilitate trade. A unique feature of the agreement is that it encourages the use of harmonization as a way of reducing TRS-related trade costs (Article 2.4). Relevant international standards developed by bodies such as the ISO—if they exist—must be used as the basis for technical regulations, except if this would be inappropriate because of climatic, geographical or technological factors. In a rather controversial decision, the AB in *EC—Sardines* held that if a country does not use international norms when these exist, it is up to the complaining party to show that the international standard would be ineffective or inappropriate to achieve the objective of the government imposing an idiosyncratic norm. This reversal of the burden of proof greatly increases the scope for governments to diverge from international standards.

In *EC—Asbestos* the AB defined a technical regulation as any measure that applies to an identifiable products or group of products, specifies technical characteristics for these products (e.g. relating to composition and characteristics such as flammability, texture, density, toxicity, etc.) *and* is mandatory. Technical regulations based on product requirements should be worded in terms of performance rather than design or descriptive characteristics. A Code of Good Practice applies regarding the preparation, adoption and application of voluntary standards.

An implication of the definition of a technical regulation is that production and processing methods (PPMs) are only covered by the TBT agreement if they have a direct bearing on the physical characteristics of the product(s). Increasingly certification systems that deal with management processes and systems such as ISO 9000 and ISO 1400 are being used by firms to signal quality and a commitment to social responsibility and as a requirement of purchasers to engage in a trade

relationship with exporters. Such standards are not covered by the TBT agreement. The same applies to labels and certification marks insofar as these are limited to the way a product was produced as opposed to its content or physical characteristics.

Conformity assessment procedures are also subject to nondiscrimination. Here again, relevant guides or recommendations issued by international standardizing bodies are to be used if they exist, except if inappropriate for national security reasons or deemed inadequate to safeguard health and safety. In principle, WTO members are to join and use international systems for conformity assessment. The results of conformity assessment procedures undertaken in exporting countries must be accepted if consultations determine these are equivalent to domestic ones. Accreditation on the basis of relevant guides or recommendations issued by international standardizing bodies is to be taken into account as an indication of adequate technical competence of the foreign entity. Members are encouraged to negotiate mutual recognition agreements (MRAs) for conformity assessment procedures, and to apply the nondiscrimination principle when permitting participation of foreign certification bodies in their conformity assessment procedures.

A third component of the disciplines is transparency-related, and builds upon the principle of publication of trade regulations contained in Article X GATT. Each member must notify the WTO when it plans to adopt a TRS that does not conform to an international standard, allow reasonable time for other members to comment, as well as a reasonable period of time for exporters to adapt to new requirements. Moreover, Members must establish a national enquiry point where traders may obtain documents and answers regarding:

(1) technical regulations adopted or proposed by bodies that have legal power to enforce them;
(2) standards adopted or proposed by central or local government bodies, or by regional standardizing bodies; and
(3) conformity assessment procedures, existing or proposed, applied by enforcing bodies.

Best efforts are to be made to ensure that enquiry points are also able to respond to inquiries regarding standards adopted or proposed by nongovernmental standardizing bodies such as industry associations, as well as conformity assessment procedures operated by such bodies. The WTO Secretariat is to establish an information system under which national standards bodies or enquiry points transmit to the ISO Information Centre in Geneva the notifications required under the Code of Good Practice for the preparation, adoption and application of standards.

The agreement is subject to review every three years. The fourth review was completed in November 2006. In general, members are of the view that it has worked smoothly. The committee dealing with the agreement has held regular meetings, and successfully managed issues raised by WTO members. The TBT Agreement

was not subject to negotiation in the Doha Round. However, implementation concerns became an element of the broader set of concerns of developing countries in the post-Uruguay Round period. Issues that were raised included the use of eco-labels and certification systems, the growth in environmental, health and safety standards, and capacity constraints that affected their participation in standards-setting bodies. Without adequate infrastructure to deal with these standards and regulations, business firms in developing countries could see their exports restricted, not because of an unwillingness to comply, but due to an inability to identify relevant requirements, implement the necessary institutional and procedural changes, or prove compliance in a credible fashion.

TBT disputes

There have been relatively few disputes under the agreement. The TBT agreement was first invoked in a 1996 case brought by Venezuela and Brazil against US standards for reformulated and conventional gasoline. However, the panel found against the US on the basis of Articles I and III GATT, and did not rule on the basis of the allegations regarding the TBT agreement. The two major disputes in this area were *EC—Asbestos* (WT/DS135/R) and *EC—Sardines* (WT/DS/231). As mentioned in Chapter 3, the asbestos dispute involved an argument by Canada that a French ban on the manufacture, importation and sale of asbestos violated the TBT agreement because it was not necessary, and was not based on international standards. The EU argued that the asbestos ban was not a technical regulation in the sense of the TBT agreement. In considering these arguments, the panel determined that a measure constitutes a 'technical regulation' if it affects one or more given products, specifies the technical characteristics of the product(s) that allow them to be marketed in the territory of the member imposing the measure, and is mandatory. The panel concluded that the general prohibition on marketing asbestos and asbestos-containing products did not satisfy this definition.

The AB rejected the panel's approach of separating the measure into a ban and the exceptions, and reversed the panel's interpretation. It concluded that the ban as an 'integrated whole' was a technical regulation in the sense of the TBT Agreement (Annex 1.1), as it applied to an identifiable product or group of products, the document introducing the ban laid down one or more product characteristics, and the compliance with these product characteristics was mandatory (WTO, 2008). However, the AB declared itself unable to complete the legal analysis of Canada's TBT claims as it lacked an 'adequate basis' upon which to examine them.

The *EC—Sardines* case has already been discussed in Chapter 3. The relevance of this case is that it was the first time that a panel has found a WTO member to be in violation of its obligations under the TBT Agreement. The AB agreed with the panel that the EC regulation on the common marketing of sardines was a 'technical

regulation' within the meaning of Annex 1.1 TBT as it fulfilled the three criteria laid down in the *EC—Asbestos* report.

Reducing transactions costs: harmonization and mutual recognition

Standards are increasingly important in the world economy. A sectoral analysis of the total number of published technical standards as of 2004 concluded that standards are most prevalent in the telecommunications, audio and video engineering, construction materials and building, and electrical engineering industries. For each of these sectors, the total number of standards published exceeded 30,000. Low-technology industries, such as clothing, mining, paper and glass and ceramic industries reported a considerably smaller number of standards—below 6,000 (WTO, 2005). Data collected in UNCTAD's Trade Analysis and Information System (TRAINS) include the number of tariff lines affected by government-mandated technical regulations. The share of imports covered by such regulations varied from 46.2 per cent for Brazil (in 2001) and 31.9 per cent for the United States (in 1999) to surprisingly low estimates of 2.9 per cent for Japan and less than 1 per cent for the EU. This illustrates a general problem concerning NTMs: available data are very incomplete. In the case of the EU for example, TRAINS does not include any standards that are put in place by the EU member states. If these are included, the share of tariff lines rises above the US level (Kee, Nicita and Olarreaga, 2008).

Another set of estimates based on 2001 data suggest that close to 88 per cent of the value of world trade is in products that are potentially affected by environmentally related NTMs, including TBT measures (Fontagné, von Kirchbach and Mimouni, 2005). Over 60 per cent of US exports were subject to health, safety and related standards in their destination markets in the late 1990s. Government-issued certificates were required for 45 per cent of exports to the EU, private, third-party certification was accepted for 15 per cent, and manufacturers self-certification sufficed for the rest (Wilson, 1998).Within the EU, some 75 per cent of the value of intra-EU trade in goods was subject to mandatory TRS in the 1990s. Certification in regulated sectors may involve frequent and redundant sampling of products and testing for conformity to standards. Some products may be subjected to 100 per cent testing—this can effectively block imports if applied only to foreign firms. Unter (1998) estimates that redundant testing and conformity assessment procedures faced by Hewlett Packard increased sixfold between 1990 and 1997.

The GATT rules are helpful for traders in ensuring nondiscrimination and enhancing transparency of TRS, but clearly more is required if transaction costs are to be reduced significantly. There are two major policy options: harmonization and mutual recognition. Harmonization may involve unilateral adoption by one country of another's set of rules, or negotiation of a common set of disciplines—the

international standardization that is encouraged by the TBT agreement. Examples abound of unilateral harmonization to the standard of another country. These are often driven by market size disparities: in 1992 Canada adopted US auto emission standards to ensure that its auto makers could realize economies of scale by avoiding separate production lines for the home and US markets. Switzerland adopted the EU TRS regime to ensure that Swiss goods could enter and circulate in the EU on the same basis as EU-produced goods (Messerlin, 1998). Many developing countries use TRS regimes initially developed in Europe or the US, often by maintaining systems inherited from a colonial past or military occupation. Others have deliberately adopted foreign norms. South Korea imported many German and US product standards in the 1950s as part of a strategy to upgrade the quality of industrial production and foster exports. Unilateral recognition of foreign regulatory regimes can be a complement to adopting the standards of a trading partner or international norms. Thus, foreign certification for certain imports may be accepted as proof of safety. For example, the Underwriters Laboratories (UL) mark is accepted in many countries.

Harmonization of standards—adoption of international norms where these exist, or convergence towards the norms applying in major markets such as the EU or US—is one avenue through which to potentially reduce the trade costs associated with product standards. Such benefits could be enhanced insofar as the transatlantic initiative results in greater common EU–US standards, by creating a larger market where the same standards apply or partner norms are accepted as equivalent. If, as a result, fixed costs of compliance can be spread over more sales, third countries will benefit from convergence. Baldwin (2000) notes that cooperation on standards will have fewer adverse effects—if any—on third parties than would arise from the preferential removal of tariffs. Insiders may benefit from lower costs as a result of mutual recognition or the adoption of common standards, but this is also likely to benefit outsiders.

Chen and Mattoo (2008) investigate whether EU harmonization of technical regulations help or hinder third countries, focusing on Harmonization Directives issued by the European Commission that lay down common, mandatory regulations that apply in all EU member states for specific sectors. Chen and Mattoo find that these directives increase trade between EU countries but not necessarily with the rest of the world. Harmonization of standards may actually reduce the exports of excluded countries, especially in markets that have raised the stringency of standards. Among excluded countries, developing countries may be the worst sufferers as their firms are likely to be less well equipped to comply with stricter standards.

Czubala, Shepherd and Wilson (2007) focus on voluntary standards promulgated by the European Committee for Standardization, using a database on EU standards for textiles and clothing to examine the impact of EU standards on African exports of textiles and clothing. Their analysis shows that (nonharmonized)

EU standards tend to hold back African exports. Their findings are consistent with the idea that capacity constraints in Africa can make it difficult for firms to adapt products to meet multiple standards. By contrast, in instances where the EU has adopted the standards developed by the ISO, there is a much weaker negative impact on African exports to the EU.

Shepherd (2007) analyses the impacts of harmonization on the range of products exported by a country's trading partners. Market-specific fixed costs of exporting are used to model product standards. Numerical simulations show that international harmonization can promote penetration of new markets in third countries (i.e. those that do not harmonize), provided that compliance costs do not increase too much as a result of harmonization. Using the same database as Czubala et al. (2007), Shepherd finds that more product standards tend to reduce partner country export variety, whereas international harmonization acts weakly in the opposite direction. A 10 per cent increase in the number of EU standards is associated with a 6 per cent decline in the range of product varieties (tariff lines) exported by the EU's trading partners. A similar increase in the proportion of EU standards that are internationally harmonized produces a small but significant effect (0.2 per cent) in the opposite direction. The data suggest that the strength of this harmonization effect may be up to 50 per cent greater for low-income countries, which is consistent with the existence of constraints to product or process adaptation in developing countries.

Harmonization to facilitate trade has been pursued most intensively by the EU. The European experience suggests that this is unlikely to be a productive strategy as agreement is very difficult to obtain under a consensus rule. A better approach is mutual recognition, under which countries agree to recognize (accept as equivalent) each other's standards and conformity assessment procedures. Mutual recognition agreements are a cooperative mechanism through which the transaction costs associated with conformity assessment systems to establish compliance with standards can be reduced (Box 5.6). Mutual recognition agreements may require some degree of harmonization of either standards or test procedures, especially in areas where mandatory standards or regulations apply, to ensure that the underlying norms satisfy basic minimum standards. As a result, MRAs are not a panacea (Pelkmans, 2007).

Mutual recognition proved a powerful tool for increasing competition in European market. What about effects on excluded countries? Chen and Mattoo (2008) find that MRAs of conformity assessment promote the trade of *both* covered and excluded countries. As both Baldwin (2000) and Chen and Mattoo (2008) note, the impact on third parties of MRAs depends on whether 'restrictive rules of origin' apply, i.e. whether the goods must be produced in the territory of a party to a MRA, and whether a harmonized norm is accepted as being identical in an importing country. Some MRAs impose restrictive origin rules, e.g. agreements between the EU and Australia and New Zealand (Hoekman and Winters, 2007). This implies

Box 5.6. EU–US mutual recognition agreements for conformity assessment

US and EU trade talks on mutual recognition of conformity assessment began in 1992 and aimed at achieving agreement that product test results, inspections and certifications performed by independent entities would be accepted in both markets. In particular, the EU sought assurance that US testing laboratories and product certification bodies were competent to test for compliance with the essential requirements specified in EU directives. The EU also wanted European firms to be able to test and certify to corresponding US regulatory requirements. The US sought to eliminate the perceived discriminatory effects of the EU's new approach to technical regulations, which mandated product certification by approved European bodies — imposing duplicate testing costs on exporters. The EU's increasingly community-wide approach to standardization gave US firms an incentive to negotiate MRAs, as these would lower the costs of accessing the EU market as a whole.

Significant differences in European and US testing and certification systems made agreement difficult. The European system relies less on self-declaration of conformity by enterprises than the US system, and more on mandatory third-party testing and certification. Under the EU's global approach to conformity assessment, only recognized testing, certification and marking institutions are able to issue certification marks. As of the end of 1997, member states had only certified 600 such bodies to the Commission (out of a total of over 10,000, ranging from large multinationals such as Société Générale de Surveillance (SGS), Inchcape or Bureau Veritas to small in-house testing facilities). Virtually all were European (Messerlin, 1998). Another obstacle concerned the extent to which certification and inspection agencies of one country are willing and legally permitted to devolve authority for testing and inspection to the other country's regulators. It was eventually agreed that the EU would accept that the US Food and Drug Administration (FDA) was an independent agency that could not be overruled.

The EU–US MRA, which entered into force in 1998, covered in 2008 such sectors as telecommunications terminal equipment, electromagnetic compatibility, electrical safety, recreational craft, medical devices and pharmaceutical Good Manufacturing Practices. As the legal and mandatory product requirements of the importing party must always be fulfilled, the MRA did not call for a harmonization of product or conformity assessment requirements between the EU and US. Each country maintained its own legislation and regulatory requirements and remained free to set its health, safety and environmental protection levels as it deemed necessary, as long as they complied with international obligations. The MRA must thus evolve with changes in EU and US regulations and is therefore modified from time to time. The agreement addresses acceptance of test data, laboratory accreditation and final product certification.

As of 2000, certifications performed anywhere by a facility recognized under the MRA in the US or Europe are accepted, and manufacturers now have a wider choice of testing laboratories. The agreement also introduced a joint curriculum for training of European and American inspectors. The treaty was expected to eliminate duplicative product testing on an estimated $60 billion worth of traded goods (Semerjian and Beary, 2001). The MRA on telecommunications and information technology products alone could save consumers and manufacturers approximately US$1.4 billion, implying that the frictional costs abolished were equivalent to a 5 per cent tax on the goods traded (Wilson, 1998). Although this is a significant cost reduction, the MRAs are regarded as a second best solution by US industry, which would prefer to rely much more on supplier self-certification instead of third-party conformity assessment.

that nonmembers cannot benefit from the MRA by having their goods tested in MRA countries.

The extant research on product standards suggests that efforts to reduce multiplicity in standards through regional or international harmonization may help reduce overall costs for developing countries. Much also depends on the specifics of the norms that apply—if these are more difficult for developing countries to attain, the result may be trade diversion. Financial or capacity constraints might make it difficult for developing country exporters to comply with the new standards. Finally, the norms may simply be inappropriate for the circumstances prevailing in the developing country.

A question for WTO members, and developing countries in particular, is whether mutual recognition is a viable option to pursue in the multilateral context. The process relies heavily on mutual trust in the competence and ability of the institutions responsible for enforcing mandatory standards and a willingness to be flexible in setting minimum standards. Even if developing countries adopt European, American or international (e.g. ISO) standards, significant institutional strengthening is likely to be required for partner countries to be willing to accept 'home country supervision'. One result of an unwillingness of OECD countries to recognize developing country standards regimes could be a hollowing out of the MFN principle. The potential for recognition to reduce transaction costs and increase the real incomes of WTO members can be significant. The EU now requires third-party testing, certification or quality system registration for certain regulated sectors by organizations certified to the Commission by the member states as technically competent. The requirement that these assessments be undertaken by EU-certified bodies raised the costs of testing and certification to non-EU manufacturers in many sectors and was a prime motivation for EU–US MRA negotiations in the 1990s (Box 5.6).

The publication and notification requirements of the TBT Agreement, in conjunction with the national enquiry points have an important role to play in fostering transparency. They help ensure that traders can readily determine the regulatory situation that prevails in markets to which they want to export. The number of TBT notifications received by the WTO Secretariat during the 1995–2004 period averaged about 610 per year. About 40 per cent concerned measures to protect human health or safety. Other reasons frequently given for notified new measures were prevention of deceptive practices and consumer information and labelling. This suggests that many of the TRS are concerned with solving consumer—producer information asymmetry problems (WTO, 2005).

An important effort has been made by the TBT Committee to increase transparency in the identification and prioritization of technical assistance needs. In particular, the members were encouraged to make use of the Format for the Voluntary Notification of Specific Technical Assistance Needs and Responses and to exchange experiences concerning technical assistance and to identify good

practices in this regard (WTO, 2007). A weakness of the TBT Agreement is that language on voluntary product standards developed by industry associations is largely of a best-endeavours nature. This reflects the fact that WTO disciplines focus on government actions—not the private sector. An important challenge confronting WTO members is to explore avenues for reducing the transactions costs incurred by traders due to differences in TRS and, perhaps more importantly, the excess costs incurred due to redundant testing and certification requirements.

A top–down approach aiming at eliminating TRS-related trade conflicts through harmonization or mutual recognition will be difficult in the WTO context. To date it has only proven possible to a limited extent in the EU and between a few OECD countries. Extending this model to a group of 153-plus economies will be difficult. Initiatives using a bottom–up approach to enforcement are likely to be more fruitful. That is, the emphasis might more productively centre on certification activities and an expansion of the role of the private sector in such activities. In addition to PSI-type models, greater acceptance of the supplier's declaration of conformity could be encouraged (Wilson, 1998). Moreover, given the importance that is accorded to the role of competent international standards-setting bodies in defining standards, an important issue for WTO members and civil society in member countries is to ensure that the process through which TRS are developed allows for participation by affected stakeholders. To date, the major players in standards-setting bodies have been industry and subsets of the scientific community, with relatively little participation by developing countries.

Finally, consideration needs to be given to the implications of the burden of proof that is currently imposed on nonmembers of a MRA that seek to accede. This burden can be quite high and give rise to situations where countries that satisfy technical requirements are nonetheless excluded for political or other reasons. A major policy issue is therefore to ensure that the MFN rule does not get circumvented through the negotiation of MRAs. A necessary condition for this is that nonmembers have the opportunity to join such agreements.

5.8. Sanitary and Phytosanitary Measures

Sanitary and phytosanitary (SPS) measures are requirements imposed by governments to ensure the safety of products for human or animal consumption, or to protect the environment (plant life). Most governments establish minimum standards that products, plants or animals must meet in order to be allowed to enter their territory. Usually these norms will apply equally to foreign and domestically

produced goods, plants or animals. However, as is the case with TRS more generally, differences in norms may act to restrict trade. Such differences became increasingly prominent during the 1980s, with many countries alleging that import-competing industries or lobbies were using SPS measures to restrict trade.

The economic considerations discussed above that arise with respect to TBT also apply to SPS. One qualitative difference is that SPS measures tend to be more diverse across countries than product standards for manufactures, as the marketplace creates strong incentives for products to be compatible where this benefits consumers. Another difference is that there is more scope for 'abuse,' as the norms can be defined so strictly as to ensure that no import ever satisfies them. For example, a country with a large sheep industry but no cows may try to prohibit imports of beef to protect sheep farmers by imposing a health-based SPS measure requiring that beef have a fat content that is very costly to attain (say, less than 1 per cent). Alternatively, if it has a beef industry and could consequently be subjected to a claim of violating national treatment, it might require that the drip content of frozen beef be less than 1 per cent—that is, once unfrozen, no more than 1 per cent liquid is allowed in each carcass. This would be a very difficult standard to meet. Or it could impose a very short shelf-life requirement. It could also use a SPS measure to encourage local processing in cases where it has bound its tariffs. Thus, beef for retail sale might be required to have no more than 3 per cent fat, but beef for further processing could have any fat content. Abuses may also occur in the enforcement of SPS measures. Even if a country uses internationally accepted SPS measures for a product, governments will still inspect imports to ascertain whether they satisfy health requirements. Such inspections may be used as a mechanism to reject imports of politically sensitive goods, even if they meet all health and safety requirements (Box 5.7).

A final very important qualitative difference is that SPS questions give rise to much greater public concern and debate than do TBT-related matters. This is because they pertain to the natural environment, the food that people consume, the technologies that are used to produce food, and to human, plant and animal health. As a result, attitudes to risk and trust in science and scientists play a role in public policy formation in this area in ways that do not arise in the TBT arena.

WTO rules and disputes

The Agreement on the Application of Sanitary and Phytosanitary Measures was negotiated as part of the Uruguay Round Agreement on Agriculture (discussed in the next chapter). It is basically an elaboration of GATT Article XX(b), one of the clauses of the GATT General Exceptions clause, which allows members to impose measures necessary to protect human, animal, or plant life and health, as long as the measure does not result in unjustifiable discrimination between countries or

Box 5.7. International trade and SPS restrictions

Two long running disputes in the 1980s helped motivate negotiators in the Uruguay Round to seek an agreement on SPS measures: Japanese sanitary rules on imports of apples and the EU ban on the use of hormonal substances in livestock and meat products.

Japan formally opened its apple market to foreign competition in 1971. In practice market access continued to be restricted in the decades that followed on the grounds that most imports were not sufficiently protected against pests and plant diseases that could harm Japan's orchards. Apple exporters argued that Japan's phytosanitary regulations were far more stringent than any other country's, and constituted back-door protectionism (GATT Activities, 1987). US trade officials cited Japan's apple import regulations as an unfair trade barrier and regularly raised the issue in bilateral discussions, driven by Congressional representatives from the state of Washington—a major producer. After years of tension, Japanese authorities finally gave in to the external pressure, declaring that certain US orchards had taken adequate measures to eliminate viruses and moths.

In January 1988, the EU banned the use of hormonal substances in the process of fattening animals intended for slaughter and human consumption. This ban affected US exports of meat to the EU, and caused a trade dispute to develop. The US argued that the ban had no scientific foundation—as the use of hormones by US producers was well within safe margins as determined by a variety of scientific agencies—and therefore constituted an unjustifiable trade barrier. According to the US, the ban—if fully implemented—would reduce exports by US$115 million per year. The dispute was brought to the GATT, with the US choosing to invoke the procedures of the TBT Agreement, this being the only relevant instrument at the time. The EU considered that because the ban was aimed at protecting health and concerned production and processing methods—which were not covered by the TBT agreement—the US did not have a case. The US threatened to increase tariffs on certain European goods if the prohibition on importation and sale of meat treated with hormones was implemented. The EU in turn brought the issue of retaliatory measures by the US before the GATT Council (GATT Activities, 1987 and 1988). (For an account of more recent developments regarding the hormones dispute see Chapter 3, Section 3.3).

These examples illustrate why an agreement on SPS measures was considered essential for the trading system. Governments expected that the scope for protectionist abuse of food safety and animal or plant health regulations would be considerably reduced as a result of the agreement, both by establishing clearer rules of the game and providing a better basis for dispute settlement. Both the apple and the hormone cases were brought to the WTO.

acts as a disguised restriction on trade. The agreement applies to all SPS measures that may affect international trade. It applies even if there is no domestic production.

A SPS measure is defined as any measure applied to protect human, animal or plant health from risks arising from the establishment or spread of pests and

diseases; from additives or contaminants in foodstuffs; or to prevent other damage from the establishment or spread of pests. Sanitary and phytosanitary measures include all relevant regulations and procedures, including product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments; provisions on relevant statistical procedures and risk assessment methods; and packaging and labelling requirements directly related to food safety. As in the case of TRS, there is no requirement that members adopt SPS measures. Nor does the WTO draft SPS norms. The WTO simply establishes disciplines if members implement SPS measures. A difference with the TBT agreement, however, is that the distinction between (mandatory) technical regulations and (voluntary) standards is not made: all SPS measures are covered equally.

The SPS Agreement is *lex specialis* to the TBT Agreement—that is, its more specific provisions apply on matters that are also covered under the latter agreement. The basic rules are that SPS measures are not more trade restrictive than necessary to achieve their objectives, do not unjustifiably discriminate between WTO members and do not constitute a disguised restriction on international trade. They should be based on international standards, guidelines or recommendations, if these exist. If tougher standards are imposed, they must be justified with scientific evidence. In contrast to the TBT agreement, the SPS agreement identifies an indicative list of bodies that promulgate international SPS standards—including the Codex Alimentarius Commission, the International Office of Epizootics and the International Plant Protection Convention.

A crucial provision in the agreement that distinguishes it from the TBT disciplines is that SPS measures must be based on scientific principles (Article 2.2), including an assessment of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by relevant international organizations (Article 5.1). Only if there is no relevant scientific evidence may governments invoke the so-called precautionary principle. The risk assessment must identify the diseases a member wants to prevent in its territory, the potential biological and economic consequences associated with such diseases, and an evaluation of the likelihood of entry, establishment or spread of these diseases (Article 5.3). In the assessment of risks, available scientific evidence must be considered, as well as relevant processes and production methods; inspection, sampling and testing methods, and the prevalence of specific diseases or pests and environmental conditions (Article 5.2).

The agreement also embodies a recognition element. World Trade Organization members must accept the SPS measures of other members as equivalent—even if they differ from their own—if the exporting country can demonstrate that its SPS measures achieve the desired level of protection (Article 4). Negotiations to achieve bilateral or multilateral agreements on recognition of the equivalence of specified SPS measures are encouraged. Conformity assessment procedures and fees are to

conform to MFN and national treatment, procedures and criteria should be published, confidentiality respected, and an appeals procedure established.

The Committee on Sanitary and Phytosanitary Measures may grant developing countries specified, time-limited exceptions in whole or in part from meeting the requirements of the agreement. Least developed countries were able to delay application of the provisions of the agreement until mid-2000. The Committee was charged with the development of a procedure to monitor the process of international harmonization and the use of international standards, and the establishment of a list of international standards and guidelines relating to SPS measures that have a major impact on trade.

As under the TBT agreement, an enquiry point must exist to respond to SPS-related queries from trading partners and to provide relevant documents. If the content of a proposed SPS regulation is not substantially the same as that of an international norm and is likely to have a significant effect on trade, the WTO Secretariat must be notified. This must include a description of the regulation's product coverage and a brief indication of the objective and rationale of the proposed regulation.

Scott (2006) notes that the notification requirements and the SPS Committee have had a major role in defusing potential conflicts and that interactions between members in the regular committee meetings have led to agreed elaborations of certain aspects of the agreement. Particularly important, the *ex ante* review and discussion of specific measures, their rationale and possible (or actual) impact on trade have resulted in a number of instances where a WTO member revises a proposed SPS norm or assists developing country trading partners adapt to new regulations. As stressed in Chapter 2, the numerous WTO committees play an important role in supporting cooperation and defusing potential conflicts. In the case of the SPS Committee, between 1995 and 2005, over 200 specific trade concerns were raised in committee deliberations, about half by developing countries (G/SPS/GEN/204/Rev.5). Around half of the issues raised were resolved (Scott, 2006).

In contrast to the TBT agreement, there have been a number of high profile SPS disputes. This reflects both the fact that SPS measures are more frequently the basis on which governments restrict trade and differences between major traders in the way they regulate. In addition to *EC—Hormones* (discussed in Chapter 3), through 2008 four disputes concerned the question of sufficient scientific evidence (Article 2.2), one referred to harmonization (Article 3), seven dealt with risk assessment (Article 5.1), three referred to discrimination and disguised restrictions (Article 5.5), four dealt with alternative measures and the requirement that SPS measures not be 'more trade restrictions than necessary' (Article 5.6), two concerned provisional application (Article 5.7), and two control inspection and approval procedures (Article 8 and Annex C).

As mentioned in Box 5.7, the first SPS-related dispute (in 1997) concerned Japanese testing requirements for agricultural products. In that case the US

complained that for agricultural products for which quarantine was required, Japan prohibited the importation of each variety until the quarantine treatment (fumigation) had been tested for that variety, even though the treatment had proven effective for other varieties of the same product. The products concerned included apples, nectarines, cherries and walnuts. The US argued Japan's measures did not have a scientific justification and were more trade restrictive than necessary. The panel agreed with the US on the first count, but not the second. A footnote to the relevant provision (Article 5.6 SPS) specifies that a measure is 'too' restrictive if another SPS measure exists that is reasonably available (taking into account technical and economic feasibility), achieves the desired level of protection, and is significantly less trade restrictive than the measure that is the subject of dispute. The panel found that only the first and last of these conditions had been demonstrated. The panel also noted that by not having published the testing requirements for any of the products at issue, Japan had violated the transparency provisions of the SPS Agreement.

This case illustrated the importance of being able to document the scientific basis for measures (Article 2.2.) and that these are based on an appropriate risk assessment (Article 5.1). It also sent a clear signal that countries could win cases where these conditions are not met. A dispute brought by Canada in the same year against an Australian prohibition on the importation of untreated fresh, chilled or frozen salmon further clarified the reach of the SPS agreement. The ban was motivated on the basis of preventing the entry of pests and diseases into Australia. Here again it was concluded that the prohibition was not scientifically justified and was not based on an appropriate risk assessment. The panel also found that the measure violated the 'consistency requirement' of the SPS agreement (Article 5.5), which specifies that in comparable situations the same SPS standards should apply. It concluded that Australia had imposed more stringent norms for adult, wild, ocean-caught Pacific salmon and applied lower standards for whole, frozen herring for use as bait and live ornamental finfish. These arbitrary distinctions were found to result in discrimination and act as a disguised restriction on international trade.

In October 1998, the AB reversed the panel's finding that the measure was more trade restrictive than required because the panel had focused on Australia's heat-treatment requirement, rather than the SPS measure at issue (the import prohibition). In considering whether the import ban was excessive, the AB concluded that it was not able to come to a determination given absence of information in the panel report on the relative risks of alternative regulatory options (WT/DS/18/AB/R). In 1999 Australia published an 'Import Risk Analysis' that considered the health risk associated with the importation of fresh, chilled and frozen salmon. Australia also modified its legislation on the quarantine of imports by allowing permits to be issued to release nonheated salmon from Australian quarantine facilities in cases where the product was in a 'consumer-ready form' (defined as skinless fillets of any

size, skin-on fillets or steaks of less than 450g or products further processed). Under the new measures, Canadian salmon was required to be eviscerated, headed, gilled, washed, inspected, graded and come from a population for which there is a documented health surveillance system. Additional certification was required for Atlantic salmon. Canada considered that Australia's new fish import policies were still inconsistent with WTO disciplines because they were, *inter alia*, unnecessarily trade restrictive and there was no scientific foundation for limiting exemptions from quarantine to products in 'consumer-ready form'. A new panel agreed with Canada on both counts in early 2008. Canada and Australia subsequently concluded a MAS that included removal of the consumer-ready requirements.

Few issues raise as many concerns about food safety and environmental impact as does the use of biotechnology and GMOs. Public debates on this matter in most EU countries have revealed that many people are not convinced that these technologies should be used for food production. As a result, the EU has put in place a complex, multilevel and multi-actor process for approval of GMOs, complemented by traceability and labelling requirements. In contrast to the EU, the US and several other major agricultural exporters have moved much faster than the EU in adopting GMOs, with the result that an increasing share of their maize, soybean and other agricultural output use these new technologies. The more restrictive regulatory regime in the EU therefore became a market access concern. In 2004, the US, Argentina and Canada brought a dispute against the EU regime pertaining to GMOs. There were two main claims. The first concerned the elaborate system put in place by the EU for firms to obtain pre-marketing approval for GMOs. The complainants held that this process was not being implemented: there was de facto moratorium on the approval of new GMOs. The second complaint concerned the fact that a number of EU member states prohibited the use of GMOs that *had* been approved by the EU certification process. The prohibitions were responses to public opposition to the free circulation of GMOs, and governments justified their bans on the basis of the principle of precaution.

The three complainants argued that the moratorium and bans violated the SPS agreement because there was no scientific justification. In May 2006, the panel issued a complex ruling that took issue with many aspects of the EU's regulation of GMOs. The ruling did not question the sovereign right of any WTO member to put into place strict bio-safety legislation to regulate GMOs, or to reject an application related to a GMO. Instead, the EU was taken to task for not applying its own rules properly (Ching and Lin, 2006; WTO, 2008). In effect, the EU had ceased to accept requests for approvals because the matter had become so politically sensitive, and for the same reason had been unwilling to confront the member states that were imposing a national ban. Subsequent to the ruling, the EU began to approve new GMOs and to take action against recalcitrant EU member states.

Another SPS-related ruling in 2005 considered that Japan's SPS measures regarding fire blight for imports of apples from the United States was not justified. As a

result, Japan issued a new phytosanitary protocol that complies with the WTO ruling. This resulted in fewer restrictions on imports of apples from the United States by reducing annual inspections from three to one; lowering the required buffer zone from 500 to 10 metres and eliminating the requirement that crates be disinfected. Japanese apple imports from the US increased substantially following the panel ruling (Calvin and Krissoff, 2005; WTO, 2008).

SPS and domestic regulation

The WTO disciplines on SPS measures are valuable because they establish mechanisms to contest arbitrary and unjustified decisions by Customs, Health, Veterinary or Agricultural authorities to reject goods on the basis of noncompliance with standards. They are process-oriented. No attempt is made in the WTO to agree to the substantive content of SPS measures or to define minimum standards. This is left to the relevant international bodies that address standards-related matters, and countries are encouraged to adopt internationally developed—and therefore consensus-based—standards. This makes it important that all WTO members—including developing countries—have the capacity to participate in the fora that develop SPS norms, which affect their industries and consumers. As under the TBT agreement, developing countries need to strengthen SPS-related institutions, including risk assessment and management mechanisms, and to develop mechanisms to reduce transaction costs. The private sector can play a role in this connection through pre-shipment inspection and related certification programmes.

There is significant scope on paper to pursue harmonization towards international standards as a way to facilitate trade. Despite the fact that there are numerous international norms in the SPS area, countries often tend to diverge from them in ways that do nothing more than raise costs and segment markets, with no benefit in terms of public health or safety. Table 5.5 provides an example for two agricultural products, reporting data on the maximum residual limit (MRL) for an insecticide (chlorpyrifos) permitted by countries for fresh vegetables, garlic, onions and spinach. In two cases there is a Codex standard; in two others there is not. The national norms diverge significantly, for reasons that are very unlikely to reflect a substantive health-related rationale. Confronted with this type of situation, exporters have an incentive to try and attain the highest standard as this gives them access to all markets. This may be costly and unnecessary to achieve a specific safety standard. Adoption of uniform (international) standards would remove one source of friction that can impede trade. Of course, the data also reveal that even if there is an international norm many countries will adopt a tighter standard. Making adoption of international standards mandatory will no doubt be difficult to achieve and there are good arguments against such an approach.

Table 5.5. Maximum residue limits for Chlorpyrifos (parts per million)

	Vegetables	Garlic	Onions	Spinach
Japan	0.11	0.01	0.05	0.01
EU	0.1	0.05	0.2	0.05
US	0.76	0.5	0.5	0.05
Australia	0.1	0.01	0.01	0.01
Korea	0.35	0.5	0.5	0.01
Malaysia	0.38	0.5	0.2	n.a.
Philippines	0.48	0.5	0.2	n.a.
New Zealand	0.2	0.01	n.a.	0.01
Thailand	0.48	0.5	n.a.	1
CODEX	0.52	n.a.	0.2	n.a.

Source: Chen, Yang and Findlay, 2008.

World Trade Organization members remain free to define their technical regulations, but must notify diverging national standards and are required to motivate them. Nonconforming standards can be challenged. In the case of SPS measures—where such motivation requires scientific evidence—much depends on how such evidence is evaluated by WTO dispute settlement panels. The *EC—Hormones* case illustrates that even if the science is relatively unambiguous it may be difficult to induce countries to change their SPS regimes (see Chapter 3). In many cases the science will not be clear-cut, providing scope for fundamental disagreements that revolve around differences in risk attitudes of societies.

The WTO case law to date suggests that appeals to the 'precautionary principle' may be difficult to sustain (although the EU did not do so in *Hormones*). Insistence by countries that significant leeway be granted to governments on the basis of the 'precautionary principle' may then lead to situations where governments cannot comply with DSB rulings and are forced to accept retaliation. Such outcomes are clearly not beneficial to the trading system. International cooperation outside the WTO in fora that focus more directly on the substantive public policy and scientific issues is needed. In the case of GMOs such a forum exists in the Cartagena Protocol on Bio-safety.

The precise nature and limits of the disciplines embodied in the SPS agreement are difficult to discern from a reading of its text as there are many fuzzy provisions. The attempt to use scientific standards as the objective basis by which regulations should be judged does not necessarily do much to address consumer fears. Panel and AB decisions can easily be seen as constraining the freedom of member states to respond to the concerns of their citizens by adopting narrow conceptions of risk analysis and a view of the relationship between science and policy that force policymakers to adhere closely to the conclusions of scientific bodies without leaving sufficient latitude for extra-scientific considerations (Philbrick, 2008).

The area of health and safety norms is clearly one where WTO members must strike a balance in ensuring that the rules are clear and protect market access and permitting governments to intervene in instances where they perceive a need to do so to attain noneconomic objectives. In the GATT era governments were free to determine the public policy justification for SPS measures—the focus of disciplines was on nondiscrimination and on minimizing the trade effects of measures. With the introduction of scientific principles and risk assessment as criteria in the SPS agreement, the WTO became more intrusive and judgemental with respect to social preferences of WTO members.

The reversal of the burden of proof by the AB—requiring the complainant to show that the international norm is sufficient—is an illustration of how the AB has interpreted the balance between right to regulate and the additional disciplines imposed by the SPS agreement. One may argue that the result is that too much discretion is given to governments to diverge from international norms. The burden of proof has also been applied in other contexts in a rather arbitrary manner. For example, in a 2005 dispute brought by the EU against the US, the EU argued that its completion of studies and risk assessments for the use of hormones in meat implied that it had come into compliance with the ruling of the AB in the *EC—Hormones* case, and that continued retaliation by the US was therefore illegal. In mid-2008 the panel ruled that continued retaliation by the US violated the DSU, implying that the US should have requested a new panel to determine if the EU was now indeed in compliance. However, the panel also ruled that the EU still did not satisfy the requirements of the SPS Agreement and rejected the EU claim that it was in compliance simply because it had now undertaken a risk assessment.

The end result of the case law is aptly summarized by Trebilcock and Soloway (2002), who argue that WTO rulings in SPS cases 'are not anchored in a coherent conception of an ideal risk regulation process nor in the appropriate scope and limits of supra-national quasi-judicial review of [SPS] measures. Many aspects of the AB's decisions involve elaborate exercises in semantic "shadow boxing" with panel decisions and convoluted parsing of the wording of the SPS agreement'.

In the Doha Round the substantive rules of the SPS Agreement were not up for negotiation. However, EU arguments in favour of recognizing the multifunctional role of agriculture, and attempts to link trade in agricultural products with environmental concerns and objectives, consumer protection and human, plant and animal health all have a link to the SPS agreement. Some countries agree with the EU position and consider that SPS issues should be clarified through an understanding that would assuage concerns of consumers. Others consider that the matter should be discussed in the SPS and TBT Committees rather than be negotiated.

One dimension of the SPS agenda was on the Doha Round agenda: addressing calls by developing countries that they be granted more effective special and

differential treatment and that their implementation concerns be addressed. Developing countries sought more time to comply with other countries' new SPS measures, to ensure a longer 'reasonable interval' between publication of a country's new SPS measure and its entry into force, and put into practice the principle that governments should accept that different measures used by other governments can be equivalent to their own measures for providing the same level of health protection for food, animals and plants. Calls were also made to reinforce the review of the SPS Agreement, encourage developing country participation in setting international SPS standards and improve financial and technical assistance concerning SPS issues.

In April 2003 the SPS committee adopted a principle of applying special and differential treatment for developing countries. This was based on a Canadian proposal whereby members agreed to consultations whenever a developing country identifies a problem with a SPS measure. In 2004 the committee also dealt with the equivalence issue. Equivalence is the mutual acceptance of another member's standards that although different in process have the same effect. The objective is to help developing nations prove that their products are as safe as those in developed nations and to speed up recognition of equivalence of SPS measures for products previously traded or those for which information already exists. In 2002, the World Bank initiated a programme to enhance the capacity of developing WTO members to participate in negotiations and implement standards. The Standards and Trade Development Facility (STDF) included the WTO, the World Health Organization (WHO), FAO, the World Organization for Animal Health (OIE) and the Codex Alimentarius. The principal objectives of the STDF are to increase participation of developing countries in forming international standards and facilitate the implementation of existing requirements.

5.9. Trade-Related Investment Measures

The value of sales by foreign affiliates of multinational firms now exceeds global exports of goods and services. The observed growth in foreign direct investment (FDI) is a consequence of many changes in the world economy, including the decline in communication and transportation costs, and, importantly, liberalization of FDI regimes in many countries. Perceptions about multinational firms and their effects on host countries have undergone a transformation. Most countries are now quite eager to attract FDI; many offer financial incentives to attract FDI and have concluded bilateral investment treaties (BITs). There were close to