

## 3

## Standards, Developing Countries, and the Global Trade System

**P**RODUCT STANDARDS, OR RULES GOVERNING the characteristics of goods, are critical to the effective functioning of markets and provide important support to the trade system. For example, government testing and certification of the bacteria content of imported beef safeguards health and increases consumer acceptance of imported products. Product standards in the international trade system do, however, raise difficult issues for developing countries. These countries' limited technical capability and financial resources make it hard for them to participate effectively in negotiations governing standards or to bring disputes. In addition, pressures sometimes exerted to use trade sanctions in support of labor and environmental standards—legitimate and desirable as these standards may be intrinsically—threaten to restrict developing countries' access to international markets without achieving their professed goals.

The rapid growth of international trade has greatly increased the importance of effective regulation of standards at the international level. This chapter examines how standards imposed by governments in importing countries affect developing-country exporters and discusses the international regulation of some of the more prominent standards addressed in global trade negotiations.<sup>1</sup> Its main messages are as follows:

- Insufficient technical and financial resources limit developing countries' abilities

to play an effective role in the design and implementation of product standards and thus constrain their access to some markets. Many developing countries, particularly the poorest ones, lack the technological capabilities and financial resources to participate effectively in the development of product standards, to meet industrial countries' import requirements, and to bring disputes when standards are used to discriminate against their exports. For example, the European Union (EU) is harmonizing standards for levels of aflatoxin, a substance that may cause liver cancer, in food products. The new standard, which is more stringent than would be suggested by internationally accepted standards, would lower risks by approximately 1.4 cancer deaths per billion per year.<sup>2</sup> The new standard has the potential for substantially reducing exports of cereals from developing countries into Europe (Otsuki, Wilson, and Sewadeh 2000). Few developing countries have the technology to evaluate the dangers of aflatoxin, nor do they have the capabilities in scientific analysis to address the new EU standard. Furthermore, considerable legal and financial resources are needed to initiate a review under the World Trade Organization's (WTO's) dispute resolution mechanism. One achievement of the Uruguay Round agreement was to strengthen international rules gov-

erning product standards in order to minimize their use for protectionist purposes and to create a level playing field. Nonetheless, the lack of capacity in developing countries, particularly the poorest, limits the ability of these countries to benefit from the new rules (Wilson 2000b).

- The adoption and respect of core labor standards—including freedom from discrimination, from exploitative child labor, forced labor, and the freedom to associate and bargain collectively—are desirable and essential. However, the threat of trade sanctions or the imposition of trade barriers are likely to be excessively costly instruments for raising labor standards, and could even be counter-productive in some cases. Barriers to a country's exports hurt workers by reducing demand for the country's products. Even if sanctions force improvements in some sectors, they are unlikely to improve average working conditions in the economy. For example, the result of foreign pressure to reduce the use of child labor in the production and export of garments in Bangladesh was that many of the laid-off children were employed in more harmful occupations, such as prostitution or brick-breaking, and in factories that did not produce for export (*Financial Times*, August 24, 1999). The imposition of trade barriers to improve labor standards is vulnerable to capture by well-organized interests in domestic markets that would benefit from limiting imports. Similarly, trade sanctions are usually ineffective in addressing environmental degradation. Empirical studies show that imposing trade sanctions on exporters can cause considerable losses in output while doing little to reduce pollution.
- Although labor and environmental standards generally improve as countries develop, low labor and environmental standards are not usually a significant source of competitive advantage. Labor and environmental standards are positively correlated with income, both because higher incomes stimulate demand for better stan-

dards and because better standards tend to encourage technological change to economize on inputs. Studies have found only limited evidence that low environmental standards increase competitiveness or attract more direct foreign investment. Experience in both industrial and developing countries shows that the cost of appropriately designed environmental protection is often low in terms of both forgone growth and the capital cost of abatement. Keeping labor standards low is not an effective way of gaining a competitive advantage over trading partners. Indeed, low labor standards are likely to erode competitiveness over time because they reduce incentives for workers to improve skills and for firms to introduce labor-saving technology.

- The international community has more effective means than trade sanctions to encourage improved environmental and labor standards in developing countries. Efforts to support development, such as increasing assistance to countries with good policies, will raise standards. Encouraging greater openness to trade and to foreign direct investment (FDI) will facilitate the diffusion of cleaner technology that can reduce environmental degradation and improve worker productivity, thereby promoting better labor standards. Regional collaboration is appropriate for addressing environmental issues that have a clear regional component, such as trans-boundary emissions and shared water resources.

### The regulation of standards: setting the stage

In the broadest sense, regulations are established because of perceived market failures, when reliance on voluntary market transactions is not efficient from the standpoint of society.<sup>3</sup> For example, market prices may not reflect the full cost of production because firms use public waterways to dispose of waste; consumers may lack information about product defects that can

have serious consequences (unsafe automobiles, for example); and collusion and monopoly may mean increased costs for consumers. Establishment of regulatory standards is appropriate when the benefits of correcting these market failures exceed the costs. For example, current auto safety standards have significantly reduced the chances of injury and death but have not eliminated them, presumably because the cost of doing so is too high. Costs include not only the direct costs facing the regulated firm but also the costs of monitoring compliance and of any potential spillovers in other areas. (Taxing gasoline at the pump to limit pollution imposes a direct cost on consumers, but it also imposes a cost on filling stations and refineries as a result of lower demand.) The more detailed the rules are in defining what goods are produced and consumed, and how, the greater the costs in terms of stifling innovation, reducing choice, and monitoring compliance. Thus, regulatory instruments should use the market as much as possible to encourage flexibility and choice of products and of production techniques. For example, taxes and tradable permits have proved to be an effective and efficient means of controlling air and water emissions in certain circumstances and to be less onerous than traditional regulations that specify maximum levels of pollution.

Because preferences and policy options differ from country to country, regulatory regimes should be determined as much as possible by the communities to which they apply, unless there are spillovers to other communities. Given different preferences and different access to information, regulation that is accountable to the community and meets locally defined needs is likely to be more efficient and legitimate than regulation imposed from afar. In an international context, it is important to ensure that regulation (a) does not discriminate between domestic and foreign producers, (b) relates to products or activities that impose costs on domestic markets, (c) is restricted geographically to the markets affected, and (d) is implemented locally.

These simple principles have powerful implications for the appropriateness of different

kinds of standards. Briefly put, product standards are necessary to support markets and must be applied in a nondiscriminatory fashion. Environmental standards should be addressed by the community affected by the relevant market failure. The impact of pollution is normally limited to domestic or, sometimes, regional markets, although some issues, such as those related to global warming and deep-sea fishing, require global action. Differences in labor standards do not impose costs on foreign markets and hence are not an appropriate area for international trade negotiations.

### **Product standards and regulatory barriers to trade**

Ensuring that imported products meet appropriate standards for protecting health and safety has become increasingly important with the rapid expansion of trade over the past decade. Discriminatory regulations imposed at the border can disadvantage foreign producers and distort commercial markets. The reduction of tariffs and quotas through multilateral trade negotiations has highlighted the use of product standards as trade barriers. Tariffs, quotas, and subsidies continue to restrict trade in several sectors (see chapter 2), but other barriers—technical requirements, testing, certification, and labeling that affect imports—have emerged as important new issues for liberalization efforts (World Bank 2000b). Two significant achievements of the Uruguay Round, the Agreement on Technical Barriers to Trade (TBT) and the Agreement on Sanitary and Phytosanitary Standards (SPS), were designed to address some of these issues. The TBT essentially relates to manufactured goods; the SPS applies to food (sanitary standards) and animals and plants (phytosanitary standards).

#### *The role of product standards*

Product standards are critical to the effective functioning of markets and play an important role in supporting international trade. For consumers, standards provide information and help ensure quality. (For example, food la-

belonging requirements allow easier comparison across products, and regulations increase consumer confidence that electrical fixtures are safe.)<sup>4</sup> Standards are critical for “component” goods such as consumer electronics and computers, where the ability to mix and match components is important. They also help achieve public objectives such as cleaner air; auto emissions standards and fuel economy regulations are examples. Because the export of goods that are physically dangerous or of agricultural products that are harmful to human health obviously damages the exporting country’s (and the firm’s) credibility and the acceptance of its products in the international trade system, there are important incentives for self-regulation.

For producers, standards can facilitate scale economies and the efficient combination of parts and components in production. Standards can also be used to gain access to intellectual property and technology. For example, the European Union’s (EU) licensing of technology based on European Telecommunication Standards Institute (ETSI) standards facilitated the spread of wireless telephones in the European market, highlighting the importance of the relationships between standards and trade in goods and services (Wilson 1997). Standards can facilitate coordination of production that might not be achieved through market forces. For example, countries can improve their integration into global information and telecommunication networks by adhering to international compatibility requirements for electrical products. Shared standards can reduce entry barriers by lowering inspection and testing costs that typically arise from imperfect information concerning the quality of traded goods (Moenius 2000).

#### *Standards as barriers to trade*

Mandatory standards can also act as nontariff barriers to trade, whether or not the intent is discriminatory; regulatory requirements may raise foreign firms’ costs relative to those of domestic firms even if both are subject to the same requirements in the domestic market.<sup>5</sup>

Health and safety standards typically require testing and conformity assessment for all producers, but costs will be greater for exporters than for domestic producers if the exporters must conform to standards different from those in their own market or if they are subject to duplicative tests (Hoekman and Konan 1998). For example, an EU regulation requires that dairy products be manufactured from milk produced by cows kept on farms and milked mechanically. This rule precludes imports from many developing countries, particularly those with many small producers for whom mechanization is not cost-effective (Henson and others 2000). A country may have relatively stringent regulatory requirements owing to a different view of the tradeoff between risks and price. Such requirements may pose a significant compliance cost for exporters but would not be viewed as discriminatory, since they apply to both domestic and foreign producers.

The need to comply with varying standards can raise entry barriers in the form of increased one-time costs of product redesign and creation of an administrative system. For example, manufacturers may need to keep redesigning automobile seat belts to meet changing standards for multiple export markets. Standards may also diminish the ability to compete, owing to the recurrent costs of maintaining quality control, testing, and certification. Often, firms must decide whether to establish a costly platform design that can easily accommodate small modifications—for example, a car chassis that can serve multiple markets—or to design a product solely for the home market, even though costly modifications are required for export. A classic example of the latter is the right-hand or left-hand placement of car steering wheels.

Costs also may be incurred in meeting precise technical regulations and carrying out conformity assessment—that is, in evaluating whether a product “conforms” to a regulatory requirement. These requirements present the largest potential technical barrier to future trade. Governments in importing countries may refuse to recognize tests performed in foreign

laboratories or by foreign public authorities and may not accept declarations of conformity by a foreign manufacturer. For example, Mexico used to allow only Mexican organizations and laboratories to test products subject to Mexican regulations. (Under the North American Free Trade Agreement, or NAFTA, Mexico agreed to allow U.S. and Canadian firms to perform testing and certification.) Such requirements may represent legitimate concerns regarding the quality of administration in the exporting countries, or they may result from administrative shortcomings in the importing country (delays, arbitrary inspections, redundant tests, and the like) that affect both foreign and domestic firms.

The use of product standards for protectionist purposes is a clear threat to an open trade regime. In principle, it is possible to distinguish between the “normal” costs of trade (the kinds of frictional costs described above) and barriers that are designed to limit competition from imports. The SPS agreement provides that trade restrictions can be imposed only to the extent necessary to protect life or health, that they must be based on scientific principles, and that they cannot be maintained if scientific evidence is lacking. Where the weight of scientific evidence is clear and well-accepted, this approach has helped to resolve disputes. For example, the United States successfully challenged Japanese technical regulations on the ground that there was no evidence that costly fumigation tests were necessary for each new variety of fruit imported into Japan. At times, the scientific community is unable to assess risks because the damages are only evident *ex post* (as was the case with asbestos), or the relative newness of the technology may call for caution in accepting existing evidence, as is happening with genetically modified organisms (Messerlin and Zarrouk 2000).

Given differences in historical experiences, levels of development, and risk preferences, differences in product standards among countries will remain an important feature of the trade system. Over time, the accumulation of case law through the WTO dispute settlement

mechanism should help establish precedents for determining what is acceptable under WTO disciplines. This should help resolve disputes earlier and restrain discriminatory government initiatives that clearly conflict with principles of nondiscrimination. In addition, greater reliance on private initiatives, as opposed to government fiat, in designing product standards is desirable. For example, whereas voluntary agreements account for a large proportion of the standards (except for those related to health or the environment) in industrial countries, in developing and transition countries such as China, Russia, and Ukraine, standards in important areas of economic activity continue to be developed and promulgated by governments. Reliance on private norms in developing countries would reduce the use of standards as trade barriers (industry-based standards may have protectionist intent but can be difficult to enforce unless backed up by government regulations), and they can help ensure appropriate expertise in designing standards.

#### *Empirical evidence on standards as trade barriers*

A large proportion of internationally traded goods is subject to standards, including about 60 percent of U.S. exports and 75 percent of intra-EU trade (European Commission 1996; Wilson 1997). The coverage of standards has increased significantly in the past few years (Hoekman and Konan 1998). Few attempts have been made to measure the general impact of product standards on traded goods.<sup>6</sup> The Organisation for Economic Co-operation and Development (1996) found that differing standards and technical regulations, along with costs of testing and certification, can represent between 2 and 10 percent of overall product costs, and the European Commission (1996) found that the average frictional costs of differing standards among EU countries prior to the single-market initiative ranged between 2 and 3 percent of the value of trade. The U.S.-EU mutual recognition agreement on telecommunications and information technology

products, if fully implemented, could reduce costs by 5 percent of the value of goods traded (Wilson 1997). These costs are greater than the average tariff on intra-OECD manufacturing trade (less than 1 percent in 1995) and on developing countries' manufactured exports to industrial countries, which was 3.4 percent (Hertel, Hoekman, and Martin 2000).

There is some evidence that the adoption of common standards tends to reduce imports from other sources. Sectors of EU economies for which common trade regulations were adopted as part of the move to the single market represent one-third of EU value added and one-third of intra-EU trade, but only one-fourth of EU imports from the rest of the world. Conversely, sectors in which the establishment of common trade regulations was less successful represent one-third of both intra-EU trade and EU imports from the rest of the world (Messerlin 1998). Surveys and simulation exercises confirm the role of standards in increasing costs. An OECD (1999) survey of 55 firms in Germany, Japan, the United Kingdom, and the United States found that technical standards and conformity assessment procedures imposed significant costs on dairy products, auto parts, and telecommunications. Typical problems included requirements for testing of each product consignment both before shipping and at the port of entry and for frequent tests following design changes. Simulations with a computable general equilibrium (CGE) model found that a 2.5 percentage point decrease in border costs within the EU (the estimated result of adoption of uniform standards) would generate a short-term welfare gain of up to 0.5 percent of the gross domestic product (GDP) of EU countries (Harrison, Rutherford, and Tarr 1996), in part because of scale economies and increasing competition.<sup>7</sup> The benefit could reach 2.4 percent of GDP over the long term as investment increases as a result of a rise in the real return to capital.

#### *Trade disputes on product standards*

One indication of the importance of standards in restricting trade is the marked increase in the

number of trade disputes over standards and technical barriers during the past five years. (The increase is evident in the U.S. annual reports in the National Trade Estimates series and the EU's annual reports on trade barriers.) In addition, most countries' submissions for the 1999 ministerial conference of the WTO in Seattle stressed the need to address technical barriers in the context of new trade talks (Wilson 1999). The most prominent standards cases in recent years have been in agriculture, such as the dispute between the EU and United States over hormone-treated beef.<sup>8</sup> The use of genetically modified organisms (GMOs) in agriculture is also generating trade tensions. By the end of January 1999, the WTO Dispute Settlement Body had considered 25 disputes that referenced either the SPS or the TBT (Wilson 1999). Nine of the disputes centered on food safety regulations, five involved technical regulations tied to customs requirements, and the remainder were in areas such as quotas, import bans, and disputes over environmental laws. Most of the complaints brought to the WTO are from industrial countries; of the 25 complaints considered by the WTO through January 1999, 16 were brought by industrial countries against other industrial countries, 3 were brought by industrial countries against developing countries, and 6 were brought by developing countries against industrial countries. No low-income country other than India has brought cases to the WTO under the TBT or the SPS or has been challenged under these agreements.<sup>9</sup> Pursuing a case through WTO procedures is expensive and resource-intensive, which may explain in part why many developing countries have not done so.

One indication of the increased focus on WTO dispute settlement—including cases related to standards—by members is the investment by the United States in new staff in the Office of the U.S. Trade Representative (USTR). The budget request for fiscal 2001 includes an increase of 14 percent for additional staff, all of whom would focus on dispute settlement case work at the WTO (Hufbauer, Kotschwar, and Wilson 2000).<sup>10</sup> The least-

developed countries (a UN-designated group of 48 developing countries) are likely to find it difficult to match this type of investment in WTO dispute settlement processes.

Disputes over standards as barriers to trade will undoubtedly become more important as (a) the share of trade in world output increases and developing countries' weight in world trade rises, (b) exports of finished goods by developing countries grow, and (c) large developing and transition countries, such as China, Russia, and Ukraine, whose domestic regulatory systems and import rules require deep reform, join the WTO. A recent review of Ukraine's standards and regulatory system commissioned by the World Bank, for example, reveals serious economic distortions in the design of the government's standards, testing, and certification systems (World Bank 2000a).

### *Capacity in developing countries*

Product standards may work to the disadvantage of developing countries, where capacity to engage in standards development and to comply with standards in export markets is limited. Because of lack of resources, many developing countries find it difficult to diffuse best-practice information on quality standards such as those in the International Organization for Standardization (ISO) 9000 series and to adopt appropriate process and production methods (World Bank 2000b). Certification costs can be particularly significant for small firms. ISO 9000 certification for a single plant can cost up to \$250,000, with additional auditing costs after initial approval. Limits on capacity are particularly important for the least developed countries.

Developing countries lag behind industrial countries in their capacity for effective certification and accreditation of testing facilities (Stephenson 1997), and authorities in industrial countries may not trust developing countries' inspection procedures (Baldwin 2000). Developing countries thus find it difficult to develop standards based on international norms and to reach mutual recognition agreements (MRAs) with other nations. Their pro-

ducers may thus confront higher costs of entry in markets than do producers from countries that can certify compliance through an MRA (see box 3.1). Furthermore, governments and firms in more advanced countries can establish strategic standards that shut out developing-country firms or that alter the terms of competition or the terms of trade in favor of domestic firms (Fischer and Serra 2000; Gandal and Shy 1999; Matutes and Regibeau 1996).

Full implementation of the commitments made in the SPS and TBT agreements will benefit both developing and industrial countries and will strengthen the multilateral system. There have, however, been reservations about developing countries' abilities to meet specific provisions of these agreements. The SPS agreement, for example, encourages the use of relevant international standards; although a country may apply other standards at the border, it has the burden of demonstrating their scientific merit. Since most standards were designed by industrial countries, they may not be appropriate for the technology mix or preferences in developing countries. "Thus for a country to effectively use the WTO agreement to defend its export rights or justify its import restrictions, it will have to upgrade its SPS system to international standards" (Finger and Schuler 2000). Upgrading standards and providing risk assessments for proposed standards can be costly. There are similar questions regarding requirements in the TBT agreement which embody the concept that trade is best facilitated by harmonizing international standards.

Effective compliance with requirements for WTO enquiry points (offices that provide information regarding national technical regulations) can involve substantial costs, including the costs of establishing governmentwide information systems to report regulatory changes and respond to requests.<sup>11</sup> Formal compliance with enquiry point requirements has improved in developing countries, but it remains less than 60 percent for the SPS agreement and 75 percent for the TBT agreement (figure 3.1). It is not clear whether these enquiry points meet all the provisions of the agreements. The num-

### Box 3.1 Mutual recognition agreements

Mutual recognition agreements (MRAs) are specifically encouraged as part of the Technical Barriers to Trade (TBT) agreement. Discussions of MRAs have dominated trade policy discourse since the early 1990s, in part because of internal market harmonization in the European Union (National Research Council 1995; Wilson 1995). Several bilateral MRAs have been completed among industrial countries, including four between the EU and its trading partners. The EU is pursuing negotiations with other countries. Regional talks on MRAs are also underway among, for example, members of the Asia-Pacific Economic Cooperation (APEC). APEC has concluded model MRAs on food, electrical products, and exchange of information on toy safety. There is little quantitative evidence on the economic or trade facilitation benefits of MRAs, although in areas of deep regulatory intervention market expansion may be achieved through convergence in standards over time, if MRAs are fully implemented.

Developing countries find it difficult to participate in MRAs, in particular because more developed trading partners often are less than confident in their

testing and certification procedures. Negotiating MRAs is time- and resource-intensive (as came out in discussions at the WTO Symposium on Conformity Assessment Procedures, June 8–9, 1999). Moreover, the lack of modern technical infrastructure to support an MRA in developing countries poses clear obstacles to implementation. Thus, developing-country firms are likely to be at a competitive disadvantage in exporting to markets covered by MRAs. How MRAs relate to WTO obligations on the most favored nation (MFN) commitment—that is, nondiscrimination—remains unclear. It is unlikely that access to the benefits of an MRA could be offered on a nondiscriminatory basis to developing countries.

Other tools exist to facilitate trade in goods subject to mandatory regulation. For example, manufacturers' declarations of conformity avoid duplicative government or third-party product testing and have been employed for products that pose limited health, safety, or environmental risk. Innovative regional use of declarations of conformity, with countries pooling their resources, could be explored as a way of facilitating developing countries' trade.

ber of notifications by developing countries of new technical regulations and certification rules, as required by TBT and SPS agreements, has grown (figures 3.2 and 3.3), although the increase may not reflect greater ability to meet product standards for export goods.

All in all, the costs involved in complying with TBT and SPS requirements are substantial and are likely to be equal to an entire year's development budget in some least developed countries. (This calculation includes the costs of meeting Trade-Related Aspects of Intellectual Property requirements, or TRIPs, requirements; see (Finger and Schuler 2000).)<sup>12</sup> Such expenditures can improve a country's capacity to participate in international trade, but they must be evaluated in light of other development priorities.<sup>13</sup>

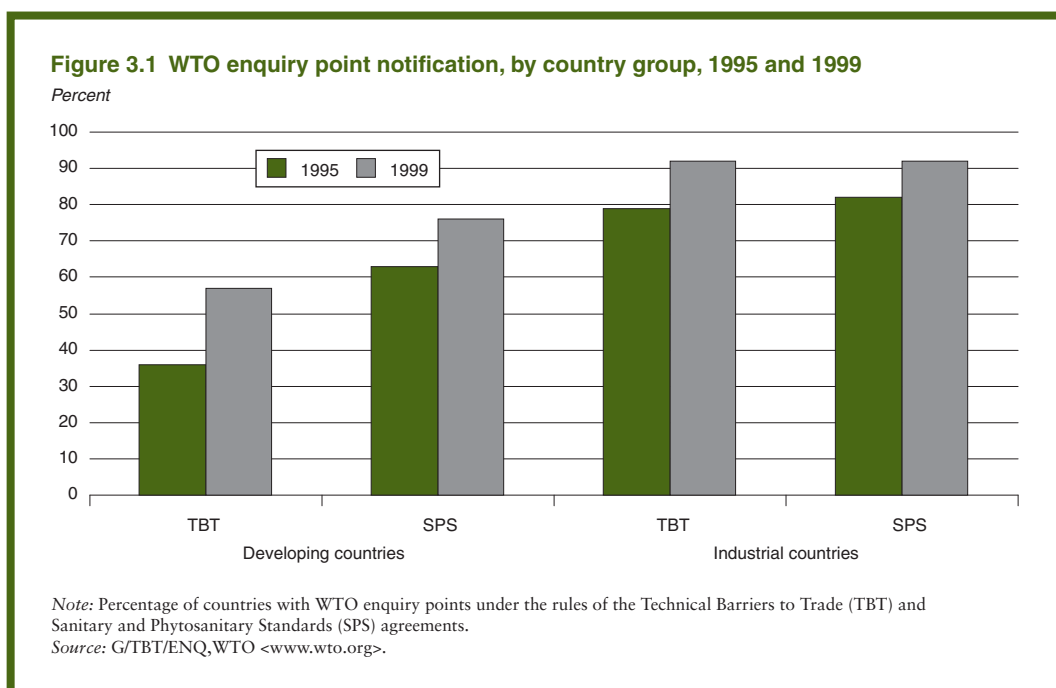
Many developing countries have recommended a targeted review of TBT and SPS

requirements in light of development needs, including extension of the time frame for complying with some provisions and modification of the rules governing notification of new technical regulations. (Providing 60 days to comment on new regulations is of questionable value to developing countries that lack the capacity to analyze and formulate positions on technical requirements quickly.)<sup>14</sup> A serious and thorough use of the results of the Second Triennial Review of the TBT agreement, scheduled to conclude in November 2000, would help address developing countries' concerns.

#### Labor standards and trade sanctions

Adoption and compliance with core labor standards is desirable on moral grounds, and necessary for promoting broad-based and



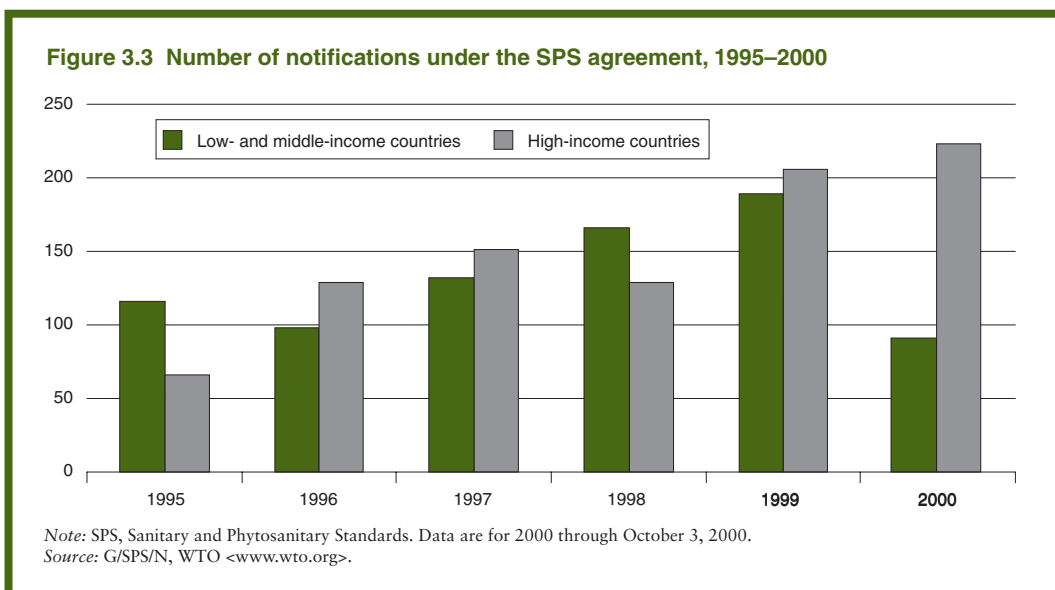
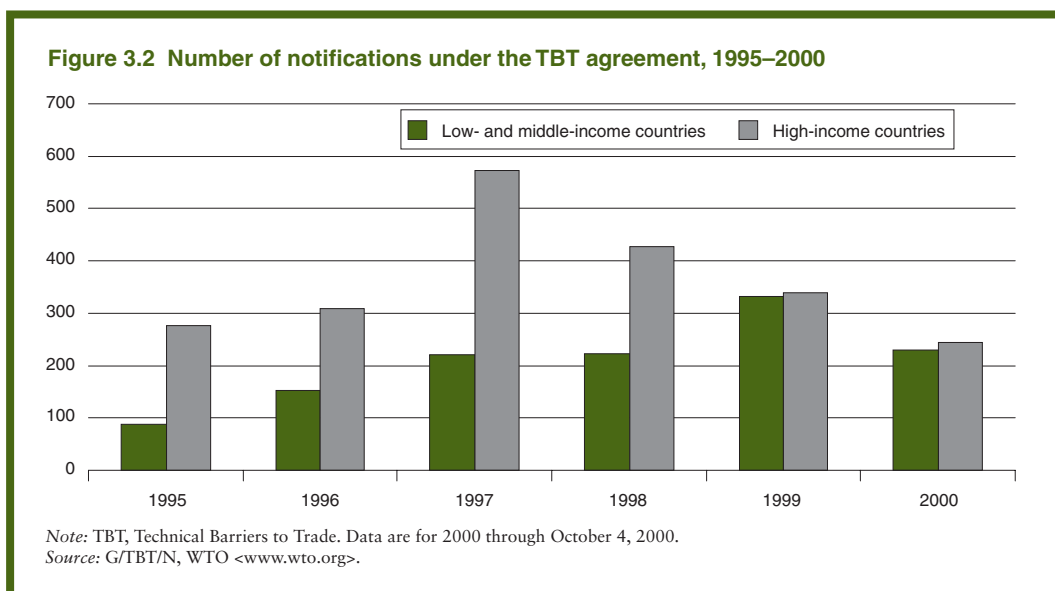


inclusive economic development (World Bank 1995 and Aidt and others 2000). However, imposing trade sanctions to bring about improved labor standards is unlikely to enhance either global welfare or the welfare of developing countries. In terms of the criteria for regulatory decision making outlined in the beginning of the chapter, labor standards should not be the subject of trade negotiations because the level of standards in one country does not affect the welfare of its trading partners, and the workers whom trade sanctions are designed to protect have no role in deciding whether sanctions are imposed. Although higher labor standards are associated with improved living conditions and development, the imposition of trade sanctions is a remarkably costly mechanism. Furthermore, trade sanctions are vulnerable to capture by domestic interests, and are likely to hurt the workers the sanctions are designed to assist. Lower labor standards abroad are not a serious threat to the livelihoods of workers in industrial countries; neither theory nor evidence suggests that

lower labor standards generally provide a competitive advantage.

#### *Core labor standards and their relationship to development*

Core labor standards are commonly defined to include freedom of association and collective bargaining; nondiscrimination in employment; no exploitative child labor; and no forced labor (for example, slavery).<sup>15</sup> Each of these core standards is covered by at least one International Labour Organisation (ILO) convention. By the mid-1990s, only 27 countries worldwide and only 10 OECD countries had ratified all core ILO conventions, although ratifications increased in the second half of the 1990s (OECD 2000). Several countries that have not ratified some of these standards are regarded as being in compliance with them in practice. Their reasons for nonratification appear not to relate to objections on principle, but rather to specific details of the conventions or their interpretations by ILO bodies (OECD 1996).<sup>16</sup> Of course, ratification does



not necessarily imply that core labor standards will be observed, which requires legislative and regulatory changes, as well as monitoring and enforcement to stop abuses.

Adherence to core labor standards, as measured by freedom of association, is weakly correlated with both higher levels, and higher growth rates, of GDP per capita.<sup>17</sup> (Freedom

of association is used because it is easier to measure than some of the other standards.) On average, more-developed countries have better-than-average compliance, while compliance in many of the poorest countries is inadequate. Higher income levels stimulate demand for better standards, and higher standards contribute to growth by increasing work effort

and stimulating innovation, in order to economize on labor.

There is less evidence that adherence to labor standards is correlated with other measures of economic development, such as real wages. In the newly industrializing countries of East Asia, rising real wages have been associated with improved bargaining rights (Maskus 1997). In a larger sample of countries, however, there is no clear correlation between freedom of association and changes in real wages or changes in manufacturing output per worker for the period 1973–92. In a sample of 17 countries that had recorded discrete improvements in legislation and practice regarding freedom of association, there was no uniform tendency for growth to accelerate after the changes (OECD 1996).

#### *Labor standards and economic welfare*

Adherence to core labor standards can make important contributions to improving welfare. The welfare impact depends on the structure of domestic institutions and policies. For example, if monopsonist firms hire workers below their marginal revenue product, allowing worker association and collective bargaining could raise both worker wages and efficiency by boosting employment.<sup>18</sup> Moreover, organized labor can contribute to raising efficiency and welfare in ways that go beyond the adjudication of wages. For example, unions can contribute to firm-specific knowledge and organizational capital, thus raising productivity, and can help improve domestic labor standards by overcoming a “prisoner’s dilemma” low-standards equilibrium (Stiglitz 2000).<sup>19</sup> But if the economy starts from a competitive equilibrium, collective bargaining that raises wages above their marginal revenue product may lower efficiency. If collective bargaining is supported by measures to restrict entry (and in competitive conditions, collective bargaining is not likely to have a long-term impact on wage levels otherwise), the excluded workers are clear losers. Thus, evaluating policies for inducing higher labor standards requires detailed

knowledge of the competitive conditions in the affected labor markets.

In some cases, improvements in labor standards may have unintended consequences and not necessarily improve the welfare of workers. In several countries, labor standards are lower in export-processing zones (EPZs) than in the rest of the country, mainly because of bans on unions or restrictions on strikes (OECD 1996).<sup>20</sup> Workers in most EPZs, however, earn higher wages and enjoy better working conditions than their counterparts elsewhere in the country (ILO 1993; Maskus 1997).<sup>21</sup> It is not clear what effect better labor standards would have on investors the EPZs are designed to attract. Advocates of improving labor standards in EPZs must understand not only the domestic labor market but also the negotiating position of the developing country relative to investors.

#### *Labor standards and competitiveness*

It is often argued that low labor standards impose low wages and thus enhance domestic competitiveness at the expense of trading partners’ workers. In some cases, employer collusion, in the absence of collective bargaining rights for workers, may reduce wages below what they would be with effective labor standards, thus potentially raising production.<sup>22</sup> Such an outcome would require nation-wide collusion since if a firm pays below the prevailing wage, it will eventually lose its employees to other sectors.<sup>23</sup> The key point in this discussion is that standards need to be ratcheted up in a coordinated and economy-wide fashion, i.e. a sectoral or partial approach will have spillover effects which could in many cases be detrimental to a broad group of workers.

Over time, artificially imposed low labor standards are likely to erode competitiveness because they reduce incentives for workers to improve their skills; the earnings gain that can be achieved by upgrading skills is limited by labor market conditions. Similarly, low labor standards reduce incentives for firms to introduce labor-saving technology, as the savings are worth less if wages are low.

The data do not indicate that core labor standards play a significant role in shaping trade performance (OECD 1996). Countries with higher labor standards had higher growth rates in their share of world manufacturing exports from 1980 to 1990, but it is not possible to infer the direction of causality from these results. Of six countries that achieved significant improvements in labor standards, half saw a decrease in the growth of their share in world manufactures, while half saw an increase. Differences in endowments and technology are much more important than labor standards in determining patterns of comparative advantage.

The OECD study (1996) also examined the relationship between labor standards and FDI. Most world FDI flows from OECD countries into other OECD countries, which generally have high labor standards. As for the inflows of FDI to non-OECD countries, it is not clear that countries with low standards are the primary destinations.<sup>24</sup>

#### *Effectiveness of trade sanctions in improving labor standards*

Even where low labor standards reduce economic efficiency and welfare, sanctions are unlikely to improve workers' welfare. It is a familiar principle of economics that the most efficient way to remove a distortion is to address it directly. For example, setting a tariff is an inefficient way to encourage domestic production of a good. Imposing trade sanctions is a vastly inefficient way to encourage better labor standards.

Take a favorable (to those advocating trade sanctions) case, in which government-supported barriers to entry enable monopsonist employers to pay workers below their marginal revenue product. Both employment and wage rates are lower than if the market were competitive. Assume that the rest of the world imposes a tariff on exports of the product, thus reducing the export price. The monopsonist's response to any reduction in demand under this market structure would be to reduce fur-

ther employment and wages in the sector. If the monopsonist were large, that would lead to pressures to reduce wages in the economy as a whole (Maskus 1997).

Trade sanctions on particular export goods are unlikely to improve labor standards for the economy as a whole, even if the sanctions change the behavior of particular firms. For example, barring child labor in one firm or sector without addressing the fundamental causes of child labor is likely to shift children to less-remunerative and perhaps more dangerous occupations in other sectors. In Bangladesh in 1993, the threat of U.S. sanctions led owners of garment factories in Dhaka to dismiss all children under age 16. Anecdotal evidence suggests that many of these children found employment in workshops and factories not producing for export, or as prostitutes, brick-breakers, or street vendors (Panagariya 1999a). There are effective measures for combating abusive child employment, including income-support programs and subsidies for education, but trade sanctions are not among them.

The political-economy arguments against imposing trade sanctions on countries with low labor standards are even more compelling. As discussed above, determining whether particular improvements in labor standards would raise welfare requires considerable information on labor and product market conditions. Determining whether labor arrangements in exporting countries will affect wage rates in importing countries is even more complicated, requiring estimates of various parameters such as demand and supply elasticities in different markets and factor intensities of goods (Maskus 1997). The complexity of these issues, and the decentralized nature of the costs of protection to consumers, increase the potential for decisions to be captured by well-organized domestic interests that would benefit from trade barriers. The fact that labor unions and producers in some protected industries in industrial countries favor using the WTO system to improve labor standards underlines this concern.

While adherence to core labor standards improves welfare, integrating labor standards into the WTO is contentious. Under traditional criteria, which focus on *product* standards, not *process* standards, labor standards would not be considered for trade discussions. The TRIPs agreement has, however, widened the scope for broadening the traditional criteria (see box 3.2).

Inadequate labor standards and poor working conditions are first and foremost, a development challenge that affects sizable populations, whether or not they are involved in trading activities.<sup>25</sup> It may be easy to identify some blatant abuses linked with goods that enter industrial markets, but the large majority of workers in developing countries may suffer from even worse conditions than workers employed in export activities. The keys to improving workers conditions—beyond development itself—lie in assisting countries with the development of domestic institutions to support workers' rights and improve working conditions, and coordinating policies across developing countries to ratchet up standards and escape a low-standard equilibrium.

The ILO has been actively pursuing these activities since its creation in 1919. The ILO regularly monitors working conditions in its member countries, and traditionally provides incentives (such as technical assistance) to encourage improved compliance with ILO conventions. However, it is able to invoke economic sanctions (Article 33 of the ILO Constitution) and did so for the first time in 2000 (against Myanmar), although implementation of the sanctions was postponed to allow the country time to comply.<sup>26</sup> Strengthening the ILO and enhancing its cooperation with other international organizations would be an effective step toward ameliorating working conditions around the world. The private sector, particularly multinational firms, should also play a more active role by promoting uniform corporate codes of conduct and using best-practice production methods in all countries where they or their affiliates operate.

## Environmental standards and trade

The past decade has seen increasing debate over the contribution of trade to environmental degradation. In part, this debate has reflected concern about the role of growth in depleting crossborder public goods; specific issues include the dangers of global warming and the unsustainable pace of fishing and water use in some regions (Nordström and Vaughan 1999). Workers and firms in industrial countries fear that their competitive position is being undermined by environmental regulations that force pollution-intensive industries to move to developing economies. Greater trade integration and access to information, while boosting global welfare, are increasing the intensity of disputes and the potential for domestic interests to be injured by the actions of foreigners.

Although environmental concerns are clearly legitimate, the trade system is rarely the appropriate instrument for addressing them, given the principles outlined at the beginning of this chapter. Only a limited set of environmental issues affect more than one country. To the extent that environmental damage is limited to a single country, decisions on whether to restrict production for environmental reasons should not be imposed through trade negotiations. Imposing trade sanctions to achieve environmental goals is likely to be inefficient and perhaps counterproductive. Countries have different priorities, which are in large part a reflection of different levels of development. Poorer countries are likely to make different choices in facing tradeoffs between growth and environmental goals than do industrial countries—today's industrial countries did the same when they were developing. It is important that developing countries retain access to the international trade system, even if their domestic environmental policies are not those preferred by richer countries. Several international institutions—such as the Joint United Nations Environment Programme (UNEP)—and the international environmental summits, have an environmental mandate and should be the

## Box 3.2 The Trade-Related Intellectual Property Agreement (TRIPs) and developing countries

TRIPs requires all WTO members to set minimum standards for protecting intellectual property rights (including patents, copyright, and trademarks) and to establish obligations regarding the enforcement of rights. Disputes under TRIPs are subject to the WTO's integrated dispute settlement system.<sup>27</sup> Industrial countries were strong advocates of TRIPs, and developing countries may have acceded to it to achieve progress in sectors of importance to them such as agriculture and textiles.

TRIPs makes significant demand for changes in intellectual property regimes, particularly in many developing countries in which protection of intellectual property does not meet minimum TRIPs standards. Changes in legal systems are under way in many countries. However, there is a concern that the tendency to copy intellectual property regimes from industrial countries in order to comply with TRIPs requirements may be inappropriate for many developing countries. For example, these regimes may not adequately protect traditional knowledge, particularly given that the appropriate form of such protection is unknown and will require experience to develop (Finger and Schuler 1999).

Implementation of the TRIPs agreement could have a significant financial impact on developing countries. TRIPs will transfer rents from developing to industrial countries, which hold the overwhelming bulk of patents and copyrights. It is impossible to predict the size of these transfers. Some insight into the orders of magnitude involved can be found in a study by Maskus (2000b). He estimates that had the TRIPs agreement been in place in 1988, transfers could have amounted to \$8.3 billion (in 1995 dollars) to the top six industrial countries, with slightly less than half this amount coming from the developing countries in his sample.<sup>28</sup> A second area of concern regarding the financial impact of the TRIPs agreement is the considerable cost of administering intellectual property rights, particularly for the poorer developing countries. In addition, developing countries may not benefit from the most advanced technologies, due to the costs involved. Beyond pure economic costs, there is concern that TRIPs may

constrain countries' access to critical drugs such as those for treating AIDS or malaria. Some of the relatively advanced developing countries may be able to produce these drugs domestically. To do so, they could invoke an exception in the TRIPs agreement to grant compulsory licenses for the domestic production of drugs. (The agreement allows for compulsory licensing under certain conditions, one being bona fide negotiations between the local government and the foreign manufacturer regarding the terms on which the manufacturer would be willing to supply the domestic market. In either case, compensation is due the foreign patent holder.) Less-advanced countries may have difficulties in producing or importing cheaper drugs because, although TRIPs does not entirely foreclose the possibility of exporting drugs produced under compulsory licenses, it does limit it (Subramanian 1999).

The negative impacts of TRIPs for developing countries were intended to be mitigated by several factors. First, they had longer transition periods for implementation, though these have largely expired except for least developed countries (which have until January 2005). Second the TRIPs obligations do not apply to products and processes that were already on the market before TRIPs took effect. The net impact will eventually depend on the existence or development of substitutes, which could reduce the market power of patent or copyright holders, and the price elasticity of consumer demand.

In the long run, stronger protection of intellectual property in developing countries may contribute to growth by removing a disincentive for owners of technology to export and license, encouraging foreign investment, and by stimulating both domestic and foreign research and development. Such benefits are likely to be greatest for the larger and richer developing countries, which can enforce patent protection and imitate technology (Maskus 2000b). In addition, to counter some of the perceived imbalance in the initial agreement, developing countries have made various proposals to ensure that indigenous culture, knowledge and genetic resources are protected and remunerated.

forums for discussing environmental goals. In addition, donor countries and international agencies can and do condition their assistance on achievement of environmental goals, including those that affect important aspects of the global commons.

### *The impact of trade integration on the environment*

Trade integration influences growth, the technology mix, and the composition of output. Increased openness will raise economic growth and living standards, which, other things being equal, will increase environmental degradation. This *scale effect* is empirically important, especially for countries that are specialized in environment-intensive activities, such as mining, fisheries, and forestry, as in Chile, and wood and wood products, industrial chemicals, and petroleum, as in Indonesia (Lee and Roland-Holst 1997).

Although the scale effect is always positive (as long as trade integration induces growth), it can be counterbalanced by two other effects: the technique effect and the composition effect.<sup>29</sup> Trade integration changes access to technology (through, for example, capital goods imports), and this *technique effect* may have a positive or negative impact on environmental degradation. New technology may result in savings on energy and other inputs, reducing the pollution intensity of growth. The *composition effect* may also have a positive or negative impact on environmental degradation. Trade integration and growth affect the composition of output, owing to changes in the relative endowments of factors, the increasing consumption of (relatively cleaner) services that accompanies higher incomes, and the increased affordability and desirability of pollution reduction, which indirectly lead to better environmental protection.<sup>30</sup>

The impact of trade integration on the environment has varied considerably, depending on the nature and strength of these three effects, but outward orientation has reduced the pollution intensity of output in several countries (Birdsall and Wheeler 1992), and

outward-oriented economies have lower pollution intensity of aggregate output than inward-oriented ones. During the 1980s outward-oriented growth was associated with declining pollution intensity because the industrial activities of outward-oriented economies became more diversified, shifting away from heavy manufacturing (Lucas, Wheeler, and Hettige 1992).<sup>31</sup> FDI and the use of technology-laden imported inputs have helped transmit cleaner technologies from the regulated industrial-country market to developing countries—for example, in the paper and pulp industry (Wheeler and Martin) and the steel industry (Reppelin-Hill 1999).

Conversely, in many countries import-substitution strategies have been pollution- and resource-intensive because of price distortions and lack of competitive discipline. There is strong evidence that under an import-substitution strategy, countries have specialized in pollution-intensive manufacturing activities in which they are not truly competitive. The resource content of goods in such countries is much higher than that of comparable goods in open economies (Jha, Markandya, and Vossenaar 1999; Vukina, Beghin, and Solakoglu 1999). Some distortions have stronger environmental consequences than others. For example, subsidized energy usually implies a more energy-intensive economy and therefore more emissions.

Trade liberalization and other reforms have helped correct policy distortions that subsidize environmental degradation. For example, energy use per unit of aggregate product in 12 former centrally planned economies declined drastically with market reform, in part because of the rise in domestic oil prices and the cleaner composition of manufacturing output following trade and price liberalization. Energy intensity in China fell by 30 percent between 1985 and 1997 as market-oriented reforms were introduced (Vukina, Beghin, and Solakoglu 1999; World Bank 1997). Similar findings emerge for use of natural resources. For example, in Sri Lanka, trade liberalization increased the demand for land to be planted in

tea, which is less erosive than other crops, thus generating both environmental and economic benefits (Bandara and Coxhead 1999).

Some countries do show increased pollution following trade liberalization, owing to both scale and composition effects. Beghin and Potier (1997) suggest that some countries faced more domestic pollution following trade liberalization because their aggregate activities expanded, not necessarily because they specialized in “dirty” activities. Several countries, however, did see increased specialization in dirty activities following trade liberalization because they happened to be competitive in these activities. In this category are Indonesia (Lee and Roland-Holst 1997; Strutt and Anderson 1999); China (Dean 1999; Dessus, Roland-Holst, and van der Mensbrugge 1999; Jha, Markandya, and Vossenaar 1999); Costa Rica (Abler, Rodriguez, and Shortle 1999; Dessus and Bussolo 1998); and Turkey (Jha, Markandya, and Vossenaar 1999). Ferrantino and Linkins (1999), using simulations with a CGE model to estimate the effects of trade liberalization on output of toxic emissions, suggest that specialization is more important than scale in determining the impact of trade liberalization on pollution. Table 3.1 summarizes the evidence from economywide studies on the relationship between trade liberalization and pollution. Panel studies found a mixed effect of outward orientation. Rock (1996) found that the composition effect of outward orientation was positive or ambiguous. Lucas, Wheeler, and Hettige (1992) found a negative composition effect. Negative results in a study by Vukina, Beghin, and Solakoglu (1999) were robust.

One concern about trade and financial integration is that countries with relatively weak environmental regulations will attract dirty industries away from countries with stronger regulations, and that because of competitiveness concerns integration will inhibit the imposition of strong environmental regulations (“regulatory chill”). A related conjecture is that states could strategically decrease environmental protection to attract new indus-

tries, setting off a “race to the bottom.” The emergence of such a race is theoretically possible (Klevorick 1997; Wilson 1997), particularly in political and regulatory environments that are not transparent and are vulnerable to capture by dirty-industry interests. (Capture by “green” interests is also possible—environmental protection would exceed public preferences.) The several methodological approaches used to study this question generally find mixed evidence as to whether environmental regulation is eroding competitiveness in relatively “clean” countries (see table 3.2 and box 3.3).

#### *The cost of environmental protection*

One reason for the paucity of evidence that environmental regulations impair competitiveness is that the cost of environmental protection is often low, as measured by forgone growth or the capital cost of abatement. Despite the inefficiency of the command-and-control approach that most OECD countries have used in addressing pollution, the cost of compliance to industries has been surprisingly small, and abatement has been significant (Jaffe and others 1995). Simulations using applied general equilibrium models of developing economies have found that the cost of abatement for most types of emissions is modest in terms of forgone GDP growth. This finding was robust, having been generated from models of 7 developing economies with different assumptions on abatement possibilities and for 13 types of pollution. The only type of pollution that was found to be expensive to abate was bioaccumulative toxic releases in water (Beghin, Roland-Holst, and van der Mensbrugge forthcoming). Detailed qualitative case studies of individual industries undertaken by the United Nations Conference on Trade and Development (UNCTAD) confirm these findings (Jha, Markandya, and Vossenaar 1999).

Malaysia provides an interesting case of specialization in resource-intensive activities accompanied by environmental protection (Jha, Markandya, and Vossenaar 1999). The palm oil industry adapted to a rapidly imple-



**Table 3.1 Summary of economywide studies assessing the impacts of trade liberalization on pollution**

	Policy change	Scale	Composition	Technique	Total pollution
Mexico <sup>a</sup>	Trade liberalization with NAFTA	+	–	n.a.	Small decrease
United States <sup>a</sup>		+	+	n.a.	Increase
Canada <sup>a</sup>		+	+	n.a.	Increase
Mexico <sup>a</sup>	Trade liberalization with NAFTA plus investment liberalization	+	+	n.a.	Increase
United States <sup>a</sup>		+	+	n.a.	Increase
Canada <sup>a</sup>		+	+	n.a.	Increase
Mexico <sup>b</sup>	Trade liberalization, better terms of trade with United States and Canada	+2.8 to 3.7%	–4.3 to 2.6%	–0.7 to 3.5%	–0.2 to 6.4%
Costa Rica <sup>c</sup>	Trade liberalization	9.4%	5.6 to 10.6%	+ but small	15 to 20%
Vietnam <sup>d</sup>	Trade liberalization	5 to 8.8%	–6.3 to 8%	1.1 to 7.5%	0.8 to 23.1%
Indonesia <sup>e</sup>	Trade liberalization with Japan	0.87%	–.36 to 2.86%	n.a.	0.51 to 3.73%
Japan <sup>e</sup>	Trade liberalization with Indonesia	0%	–0.09 to –0.02%	n.a.	–0.09 to –0.02%
Global <sup>f</sup>	Multilateral liberalization	n.a.	n.a.	–0.02 to 0%	–4.32 to 0%

n.a. Not available.

Note: NAFTA, North American Free Trade Agreement. The data cited in notes a–f are reproduced from Beghin and Potier 1997.

a. Grossman and Krueger 1992; percentages not available.

b. Beghin, Roland-Holst and van der Mensbrugge 1995. The scale effect range refers to production and absorption. The ranges for composition and technique effects refer to 13 measures of pollution emissions.

c. Dessus and Bussolo 1998. The scale effect is the increase in output. The composition effect is the difference between total and scale effects.

d. Dessus and van der Mensbrugge.

e. Lee and Roland-Holst 1997. The range of composition effects refers to 10 pollutant types. The authors also report a human toxicity index.

f. Ferrantino and Linkins 1999, tables 7 and 9. Scale and composition figures are not disaggregated.

mented set of environmental regulations and taxes. Compliance is high, and exports are stable, even though opportunities to pass the cost-increase on to consumers were limited by the highly competitive nature of the industry. State-funded research helped develop commercial by-products from palm meal, reducing the cost of compliance by generating revenues from the by-products instead of treating them or dumping them and paying fines and fees (Jha, Markandya, and Vossenaar 1999; Khalid and Braden 1993). The Malaysian electronics industry also continued to grow despite tighter environmental regulations, in part because the strong FDI presence facilitated the introduc-

tion of the latest technology (Jha, Markandya, and Vossenaar 1999).

### *Trade policy and environmental protection*

Tariffs are usually ineffectual instruments for tackling pollution and environmental degradation. Only when the externality originates in trade are trade taxes effective in addressing the problem (Subramanian 1992). A ranking of instruments for addressing pollution emissions follows the targeting principle (Bhagwati and Srinivasan 1997), which, broadly, says “the closer, the better.” Hence, emissions taxes are the best instrument for dealing with pollu-

**Table 3.2 Evidence on international competitiveness and environmental regulation**

Approach	Study	Conclusion
Cross-sectional Heckscher-Ohlin (H-O) model	Kalt 1988	U.S. manufacturing exports negatively affected by environmental regulation
	Tobey 1990	World trade in dirty commodities not affected by environmental regulation
	Han 1996	Small negative impact of regulation, decreasing over time
	Valluru and Peterson 1997	Grain trade not affected by environmental regulation
	Diakosauvas 1994	Exports of the five most polluting crops negatively affected by regulation
	Xu 1999	Environmentally sensitive exports of 34 countries not influenced by regulation
Investigations of FDI flows	Albrecht 1998	United States found to import pollution-intensive industries more than it exports them
	Eskeland and Harrison 1997	No pollution-intensive bias in French and U.S. FDI in developing economies
	Xing and Kolstad 1995	U.S. FDI influenced by weak regulation only in chemical industries
Plant location: firm surveys	UNCTAD 1993	Negative effects of environmental policy on location
	Levinson 1997a, summary	Marginal impact of compliance cost except for self-declared U.S. dirty industries
Plant location: econometric approach	Levinson 1997a	No effect
	Bartik 1989	Small and negative effect
	Mani, Pargal, and Huq 1997	Positive effect of one measure of environmental stringency on plant location
	Metcalfe 2000	Negative effect of regulatory stringency on small U.S. livestock operators

tion emissions and minimizing distortionary effects elsewhere in the economy. If emissions taxes are not feasible, input taxes are preferable to production taxes, which in turn are preferable to tariffs (Beghin, Roland-Holst, and van der Mensbrugge 1997; Lloyd 1992; Ulph 1999). This point has been documented empirically in the case of forestry products (Barbier and Rauscher 1994), as well as for the Indonesian economy (Lee and Roland-Holst 1997). With increasing economic integration, Indonesia is tending to specialize in resource- and pollution-intensive activities. Pollution emissions at the national level (as distinguished from the sector level), however, cannot be decreased even modestly by using tariffs. By contrast, production taxes proportional to the pollution content of output make the targeted pollution abatement feasible at a reasonable cost in forgone growth.

There have been few trade disputes over technical requirements related to the environment. Whalley and Hamilton (1996) report only a limited number of environment-related trade disputes for the period 1982–96, and very few such disputes have been brought to the WTO since 1995 (WTO website). Only two of the 43 requests from developing countries—concerning reformulated U.S. gasoline and the U.S. ban on certain seafood products—involve environmental objectives. Of 300 cases of trade impediments to U.S. agricultural exports, only one was based on environmental goals; most involved food safety and protection of crops and livestock from pests and disease. It is not clear whether the paucity of environment-related disputes reflects the limited impact of environmental regulations on traded goods, the high costs of litigation, or the scope of disputes provided for under WTO rules.

### Box 3.3 Evidence on the “race to the bottom”

Empirical studies of the pattern of trade, the allocation of FDI, plant location, and profitability have found limited or no evidence that environmental regulations have reduced investment or lowered competitiveness. As might be expected, evidence for a race to the bottom is somewhat stronger for the dirtiest industries, although even here there are conflicting results. There is no evidence that intracountry differences in environmental regulations affect investment. Large firms appear better-able to accommodate environmental regulations than smaller firms.

Studies of the *patterns of trade* have used the cross-sectional Heckscher-Ohlin (H-O) model, which explains specialization on the basis of environmental abundance, to examine indirectly the effects of environmental regulation on international competitiveness. The results are mixed. Using 1977 data, Kalt (1988) found that U.S. environmental regulation had a significantly negative effect on competitiveness, as measured by net exports of manufacturing goods. Tobey (1990), using 1975 data, found no evidence that increased regulation affected output in pollution-intensive industries. Han (1996) tested the environmental H-O model using panel data (across industries and over time) and actual expenditure data on pollution abatement as a measure of the environmental input. He found that increased environmental regulation has had a significantly negative effect on competitiveness, but that this effect has decreased over time as many countries tightened their regulations and as abatement costs fell with new capital vintages, learning by doing, and new technologies. Valluru and Peterson (1997) and Diakosauvas (1994) found little evidence that environmental regulations have had a significant negative economic effect on agricultural trade except for the most-polluting commodities such as cotton and tobacco. Xu (1999) found that the export performance of environmentally sensitive industries in 34 countries was unchanged between the 1960s and the 1990s despite the emergence of environmental standards in most industrial countries since 1970.

The evidence on the *allocation of FDI* provides little support for the existence of pollution havens. The United States is importing more pollution-intensive industries than it is exporting, and dirty industries are no more likely to invest abroad than other industries (Albrecht 1998, cited in Nordström and Vaughan 1999; Eskeland and Harrison 1997). Eskeland and Harrison (1997) find no evidence of

pollution-intensive bias in the allocation of French and U.S. FDI flows going into manufacturing industries in Côte d'Ivoire, Mexico, Morocco, and the Republica Bolivariana de Venezuela. Xing and Kolstad (1995) find that U.S. FDI in chemical industries seems to be influenced by weak environmental regulation, as proxied by sulfur dioxide emissions, but they also find that FDI in cleaner industries was not influenced by environmental stringency.

Studies have found only limited evidence that environmental regulation has a significant effect on *plant location*. Surveys of the relocation of transnational corporations provide some support for the notion of a race to the bottom (Runge 1994; UNCTAD 1993). Surveys, however, tend to be less reliable than actual data because they report what is said rather than what is done (Levinson 1997a). Levinson finds, for many industries and measures of stringency, that interstate differences in environmental regulations do not systematically affect the location choices of most manufacturing plants in the United States. Mani, Pargal, and Huq (1997) find, surprisingly, that a proxy for different levels of enforcement of federal environmental policy in Indian states is positively related to decisions on the location of new manufacturing plants for a wide range of manufacturing industries and for the smaller subset of pollution-intensive industries. It is possible that the proxy for stringency (the share of the state budget spent on environmental programs) measures the efficiency of state administration, which induces firms to locate in states with higher environmental expenditures.

Several other studies have looked at the impact of environmental regulation in agriculture, but mostly in OECD countries. Metcalfe (2000) finds that stringency had little impact on the location of U.S. hog production across states and over time. Stringency did have a negative impact on small operators but not on large, modern, confinement livestock producers. Hettige and others (1996) found evidence of economies of scale in environmental compliance for many other industries in several countries.

Finally, studies have found a positive relationship between environmental performance and the profitability of U.S. firms (Cohen and Fenn 1997; Repetto 1995). Although environmental compliance is not free, it creates new market opportunities and may induce further efficiency gains that may offset its (small) cost. Environmental performance appears to be systematically associated with higher profitability.

Several global environmental treaties have been concluded over the last 25 years, notably the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)<sup>32</sup> protecting trade in endangered species, and the Montreal Protocol<sup>33</sup> banning the use of ozone-depleting chemicals (for example CFCs, widely used as a coolant in refrigerators and air conditioners.) These agreements typically provide incentives for compliance through both technical and financial assistance. In addition, many also provide for trade sanctions to enforce compliance. The compatibility with WTO rules of trade sanctions potentially allowed by such treaties has not been tested.

#### *Alternative policies for environmental protection*

Although trade sanctions are not effective means of inducing environmental protection, foreigners can affect environmental choices in other ways. In some cases, foreign countries could provide subsidies to encourage better environmental practices. For example, in the U.S.-Mexican dispute over protecting dolphins, an alternative policy would have been for the United States to equip Mexican fishermen with improved nets.<sup>34</sup> The cost of this option would have to be compared with the overall losses resulting from trade restrictions. This is to some extent an empirical issue, but the option would at least reduce dolphin kill, which neither trade sanctions nor a consumer boycott is likely to do.

Ecolabeling schemes enable foreign consumers to choose goods produced in an environmentally benign way. These schemes can be a source of trade friction, even though the markets they cover are still relatively small, because of the increased production costs involved in the certification process. For example, ecolabeling schemes in textiles require multiple production standards for dyes, fibers, and bleaching chemicals (OECD 1997a). In addition, most schemes impose fees. Canada's Environmental Choice Program imposes a 0.5 percent charge, based on the price of the good, on sales up to Canadian \$1,000,000. Certifi-

cation under industrial-country labeling schemes may be difficult for developing countries to obtain (Jha, Markandya, and Vossenaar 1999; Jha and Zarrilli 1994; OECD 1997a; Zarsky 1994). For example, none of the 48 licenses granted under the EU Commission's ecolabel went to a developing-economy firm, although it is not clear whether any of these firms applied (Nimon and Beghin 1999). Ecolabeling schemes can be used in a discriminatory way, especially in markets dominated by developing economies, such as textiles. Domestic industries have more say in defining ecostandards than do foreign competitors. The standards are likely to favor technologies that are feasible in industrial countries rather than the input mix and technology set of developing countries.

Local ecolabels are emerging in developing countries, especially in timber-based products, but also in textiles, to promote better practice and preempt discriminatory labeling in industrial countries. For example, Malaysia supports ecolabels and standards that apply to all types of timber and are based on internationally agreed standards, not merely on standards developed by one or a few countries (Jha, Markandya, and Vossenaar 1999).

Another approach is to help trading partners implement market-based environmental policies that have proved effective in tackling environmental problems in developing countries. Reducing subsidies on pollution-intensive activities or raising taxes on polluting activities, through discharge, input, or output taxes, has reduced pollution and increased tax revenues in Bangladesh, Brazil, Indonesia, and other countries (World Bank 1997). Market-based instruments also provide incentives to save on the taxed resource and become more resource-efficient. The more targeted the instrument, the better. Some countries, such as China and Malaysia, have used emissions charges with some success. When the cost of monitoring is not prohibitive, the market instrument can be very targeted; for example, many countries use stumpage fees to foster sustainable forest management (World Bank

1997). China has been successfully abating pollution for the past 20 years by using levies (Wang and Wheeler 2000).

Privatization and competition, or incremental reform in this direction, can promote better resource management. Several studies identify state firms as worse polluters than firms in the private sector (Pargal and Wheeler 1996) or centrally planned economies as worse than market economies (Vukina, Beghin, and Solakoglu 1999). Incentives to economize, combined with increased resources for better management, have improved the performance of public entities in many countries. For example, in several countries, water-user associations have been substituting for the government in allocating irrigation water.

Engagement of the public is essential to successful environmental protection. This process can foster partnership among the public, firms, and authorities. The government can be a facilitator for private industry by disseminating information on new technology and environmental regulations. Alternatively, the process can be coercive, relying on disclosure of violation of environmental regulations, such as illegal discharges. The coercive approach has been effective in developing economies such as China (Dasgupta and Wheeler 1997), although complaints tend to be positively associated with higher income and greater human capital.

Regional approaches to environmental standards may prove more effective than global approaches, particularly on issues with a clear regional component such as transboundary emissions and shared water resources. A regional approach does not imply uniform standards for domestic environmental problems; the case against harmonization of policies is overwhelming in most settings because of different valuations of the marginal benefits of environmental protection.

## Notes

1. The regulation of standards in a local or national economy, particularly with respect to appropriateness and efficiency impacts, is another important topic for

many developing countries, but it is not the main subject of this chapter. The effects of voluntary product standards are touched on summarily.

2. Many international food standards are set by the Codex Alimentarius Commission, which is based in Rome and is a joint commission of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

3. This framework is taken, in part, from Rollo and Winters 2000.

4. For a primer on standards and trade, see National Research Council 1995.

5. This section draws on Maskus and Wilson, forthcoming.

6. The Development Economics Research Group of the World Bank is carrying out a major project on trade and standards that includes construction of a new global database on standards barriers to support future empirical and policy research in this area.

7. The estimate of the decrease in costs attributable to the adoption of uniform standards is taken from Gasiorek, Smith, and Venables 1992.

8. An overview of all WTO dispute settlement cases may be accessed through the WTO website at <[www.wto.org/wto/dispute/bulletin.htm](http://www.wto.org/wto/dispute/bulletin.htm)> and the WTO Document Distribution Facility at <[www.wto.org/ddf](http://www.wto.org/ddf)>. The U.S.-EU case on hormone-treated beef is cataloged under WT/DS26 and WT/DS48.

9. WTO cases involving only industrial countries may have implications for developing-country exporters' market access. For example, the EU's restrictions on U.S. exports of genetically modified grains could have major implications for the exports of similar products from countries, such as Argentina and Brazil, where GMO varieties have been widely planted.

10. The budget of the Office of the USTR in fiscal 2000 was \$25.5 million, and the office had 178 (full-time equivalent) staff members; see <<http://www.ustr.gov/reports/spy.pdf>>.

11. For additional background, see Wilson 2000a and 2000b.

12. The (unweighted) average development assistance budget as a share of GDP for low-income countries was 11.2 percent in 1998.

13. The World Bank has an active program to assist developing countries in improving their standards infrastructure. Further information is available at <<http://www1.worldbank.org/wbiep/trade/Standards.html>>.

14. This discussion is taken from formal positions submitted to WTO General Council, January–November 1999.

15. These core labor standards were enunciated in the June 1998 ILO Declaration on Fundamental Principles and Rights at Work.

16. The 1996 OECD study was updated in a more recent report (OECD 2000), reaching broadly the same conclusions as the earlier study.

17. This analysis should be viewed with some caution, for several reasons: simple correlations provide no information on the direction of causality; the lack of a theoretical model of the determinants of growth means that the measured correlations between standards and growth may be misleading; and it is difficult to construct adequate quantitative measures of the extent of adherence to core labor standards.

18. Alternatively, the worker association could restrict entry of workers and enable them to bargain for a higher wage, improving the welfare of workers in the association at the expense of excluded workers. The outcome would depend on the goals of the association and the relative bargaining power of workers and capital (Maskus 1997).

19. The “prisoner’s dilemma” in this context refers to the fact that if a country attempts to improve standards it will lose a competitive edge if it acts alone. As a result, in the absence of coordination, no country will attempt to improve standards.

20. Maskus (1997) points out, however, that labor turnover in EPZs is rapid, in part because assembly employment is dominated by women, who leave to marry. In any event, high labor turnover results in low unionization rates, even in EPZs in which union organization and the right to strike are protected.

21. Firms in EPZs may pay higher wages than other domestic firms for several reasons: they benefit from less burdensome regulations and can operate more flexibly; they tend to be larger and thus enjoy scale economies; they are governed by the policies of foreign-owned firms that are bound by their headquarters’ best practices in labor standards; they need to attract labor to move to the area; or pressures to maintain quality to satisfy export requirements may encourage them to pay higher wages to induce greater effort (Maskus 1997).

22. Even here, the impact of higher exports on wages in importing countries is likely to be small, particularly in the familiar case of highly labor intensive goods such as apparel, footwear, and electronics (Maskus 1997).

23. This analysis depends on the structure of labor market conditions. For example, employers who collude to reduce labor standards can benefit if there are effective barriers to labor mobility.

24. In the 1990s China, whose labor standards have been criticized, was the largest beneficiary of FDI flows among developing countries. Significant anecdotal evidence indicates, however, that U.S. FDI in China is establishing above-market-wage, high-standards operations. Clearly, firms are investing in China for many

reasons, but the attraction of a large and rapidly growing market is the most significant motive.

25. Labor markets in developing countries have been a subject of increasing involvement by the World Bank—including the seminal 1995 World Development Report on “Workers in an Integrating World”—in large part because of the recognition that they play a key role in poverty reduction and economic development. Bank projects with a labor market component have increased dramatically since the early 1990s. Efforts are also underway to enhance dialogue with NGOs and other external partners, including regular consultations with representatives from the International Confederation of Free Trade Unions (ICFTU) to discuss areas of mutual concern.

26. For more information, see <http://www.ilo.org/public/english/bureau/inf/pr/2000/27.htm>.

27. To date, six cases against developing countries have been initiated, all by the EU and the United States. Four cases deal with pharmaceuticals and agricultural chemicals and two concern compatibility of domestic regulations with TRIPs obligations. The countries involved are Argentina, Brazil, India, and Pakistan; see [http://www.wto.org/english/tratop\\_e/dispu\\_e/stplay\\_e.doc](http://www.wto.org/english/tratop_e/dispu_e/stplay_e.doc).

28. The transfers refer to the net present value of payments from 1988 on, based on the 1988 structure of patents.

29. The scale effect, almost by definition, has an elasticity of 1 with respect to growth. Thus, if an economy grows by  $x$  percent, all else being equal, emissions will also increase by  $x$  percent.

30. A significant body of literature on the “environmental Kuznets curve” (EKC) posits that pollution intensity follows an inverse-U-shaped curve with respect to income. At low levels of development, pollution tends to increase with economic growth; above a certain income level, it declines. There is evidence, at least for some types of pollutants, that the turning point in some developing countries is occurring at lower levels of income than was witnessed in industrial countries earlier. If this tentative evidence is borne out, it suggests that several factors are working in favor of a more rapid transformation to a cleaner environment in developing countries. These factors include technological diffusion of both cleaner production processes and abatement technologies and greater awareness of the costs of environmental damage on the part of both officials and the general public. This literature is summarized succinctly in Nordström and Vaughan 1999.

31. See Rock 1996, however, for a critique of the measurement of openness and market integration.

32. For more information see <http://www.wcmc.org.uk/CITES/index.shtml>.

33. For more information on the Montreal Protocol, see <http://www.unep.org/ozone/montreal.htm>.

34. The United States placed trade restrictions on the import of Mexican tuna because Mexican tuna fishing techniques led to the indiscriminate killing of dolphins.

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