RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

Gerald R. Ford School of Public Policy
The University of Michigan
Ann Arbor, Michigan 48109-1220

Post-Print Paper No. 3

International Labor Standards and Trade: A Theoretical Analysis

Drusilla K. Brown
Tufts University

Alan V. Deardorff
University of Michigan

Robert M. Stern
University of Michigan

1996

RSIE Post-Print Papers are available on the World Wide Web at:
http://www. fordschool.umich.edu/rsie/workingpapers/ppp.html

Post-printed from Jagdish N. Bhagwati and Robert E. Hudec, eds., *Fair Trade and Harmonization: Prerequisites for Free Trade?* MIT Press, 1996.

International Labor Standards and Trade: A Theoretical Analysis*

Drusilla K. Brown
Alan V. Deardorff
Robert M. Stern

5.1 Introduction

The interaction of labor standards and international trade policy is not, as we will note, a new issue. Nonetheless, it has assumed new importance because of the concerns of labor interests in the United States and elsewhere that labor issues were ignored in the Uruguay Round of Multilateral Trade Negotiations and therefore should be placed high on the agenda of any future negotiating round. Issues of labor standards were also at the center of the public debate surrounding the North American Free Trade Agreement (NAFT A). Prominent among the objections to the NAFT A were concerns that labor standards are not enforced at a sufficiently high level in Mexico, and therefore that the competition that will ensue from the NAFTA will place U.S. domestic industries at a disadvantage vis-a.-vis their Mexican competitors. The result, it is feared, is that either U.S. firms will shut down or move production to Mexico, or that pressure will be put on the United States to lower labor standards domestically.[1] Because of these concerns, President Bill Clinton placed labor standards on his list of three issues for which side agreements had to be negotiated before bringing the NAFTA to Congress for approval.

While issues of labor standards have obviously taken on a high profile in policy discussions and negotiations, there has been comparatively little theoretical analysis of the connections between labor standards and trade. It is our purpose in this paper to explore these connections more fully. In contrast to and complementing Bhagwati and Srinivasan (1995), who examine principally whether diversity of standards is compatible with the case for free trade, our focus will be on the welfare and other effects of standards themselves, and whether it is in a country's interest to adopt common standards internationally.

After first reviewing the institutional and historical background of labor standards and trade in section 5.2, we will devote the rest of the paper to examining several theoretical approaches to the issue. In section 5.3, we begin with a partial equilibrium analysis of standards as a general problem, not limited necessarily to labor standards. Our

* We wish to thank Asad Alam, Jagdish Bhagwati, Steve Chamovitz, Robert Hudec, Greg Schoepfle, participants in the July 1993 Fairness-Harmonization Project Meeting and the September 1994 project conference, and members of the International Economics and the Labor Economics seminars at the University of Michigan for helpful comments on earlier versions of this paper.

[1] For a theoretical evaluation of this "race to the bottom" problem, see Wilson (1995). An assessment of this issue, taking the empirical aspects into account, can be found in Bhagwati and Srinivasan (1995), Klevorick (1995), and Levinson (1995).

first conclusion is that if one abstracts from effects of labor standards on a country's terms of trade, then the general economic interest of a country will determine the level of its labor standards independently of standards that exist abroad. Similarly, to the extent that countries agree internationally on the implementation of a common standard, it is not necessarily the case that each country's self-interest is in establishing an international standard most like its own. Rather, their position in international trade, as either a net exporter or net importer of those goods most affected by labor standards, will determine whether they favor international standards that are high or low.

The reason for this result turns out after all to have to do with the terms of trade, and we therefore turn in section 5.4 to several models that focus explicitly on the effects of standards on the terms of trade. The models here are all two-sector general equilibrium models. They differ in the extent to which countries are assumed to be specialized in production, and in whether the standards themselves merely divert resources from production in all sectors, or whether they instead raise production costs directly in particular sectors. In all cases, in this section of the paper, we confine attention to standards that are imposed exogenously, rather than explicitly modeling the market failure to which they may be a response.

In section 5.5 we make a first attempt at modeling the market failure, considering a case in which standards take the form of occupational health and safety regulations. Looking at a case in which workers choose among industries that differ in their inherent riskiness of illness or accident, we allow firms to select endogenously the levels of occupational safety that they provide, at some cost, and also the wage that they will pay their workers. With homogeneous preferences over safety and wages on the part of workers, or with enough competitive firms to tailor their offerings to heterogeneous worker preferences, there is no apparent market failure. If the government nonetheless intervenes, mandating a higher standard than is provided endogenously, then we work out the effects that this standard will have, in a context of international trade, both on the level of worker safety and on the trade, terms of trade, and welfare of the country as a whole. We then modify the model to allow for heterogeneous workers. With more kinds of worker preferences than there are firms to cater to those preferences, this heterogeneity causes a market failure that may plausibly be the basis for policy. We examine this case too, showing the possibly perverse effects that such standards may have in the context of. international competition.

In section 5.6 we summarize the main results of our theoretical inquiries and conclude by examining the implications for the international harmonization of labor standards.

5.2 Labor Standards in Historical Perspective

5.2.1 Definition and General Principles of Labor Standards

Because labor standards are multifaceted, it is useful to begin by detailing the most important standards and by outlining the general principles involved in their

interpretation and implementation.[2] For this purpose, we shall follow the definitions 'and principles set out by Lyle (1991. pp. 20-31). These are summarized in the Appendix. It should be noted that the definitions and principles listed in the Appendix do not cover all aspects of international worker rights. Rather, they are intended to highlight those worker rights standards that are set forth in U.S. trade law, but not to give the full legal text. The standards include (1) freedom of association. (2) the right to organize and bargain collectively, (3) freedom from forced labor, (4) a minimum age for employment, and (5) acceptable conditions of work, including a minimum wage, limitations on hours of work, and occupational safety and health rights in the workplace. We shall have more to say later in this chapter on these standards when we address issues of modeling and analysis of the presence or absence of particular standards in the context of international trade and the effects of harmonization of standards between trading countries.

5.2.2 Trade Effects of Intercountry Differences in Labor Standards

As will be noted in more detail later, there has been long-standing concern in the world economy about the absence or relatively weak official acknowledgment and enforcement of labor standards, especially in developing countries. The sources of concern have been both ethical and economic. It has been maintained on ethical grounds that there are certain basic human rights that are universal to mankind, and that governments everywhere should therefore be urged or maybe even coerced to institute measures that will insure that these rights are available to their citizens. The economic argument is that countries that do not guarantee and enforce these rights domestically may have an undue cost advantage in their export trade insofar as private costs do not fully reflect the social costs that would incorporate various standards. This argument presumes that the labor standards are defined to be absolute and universal rather than matters to be decided by sovereign nations. Of course, the issue becomes immediately ambiguous if it is recognized and granted that the choice of labor standards may depend on a country's stage of development and per capita income, and therefore that the weights attached to standards in an individual nation's social welfare function may differ. Clearly, many of the world's developing countries have found themselves in a situation historically of opting for standards lower than those that prevail in richer neighboring countries, and many continue to do so today.

In more advanced countries in which high labor standards are articulated and legally enforced, private and social costs will presumably be reconciled through policy. There may be a perceived disadvantage for the country's firms, however, as import-competing firms may argue that they cannot compete effectively against imports from countries with lower labor standards. Exporters may likewise argue that they also cannot compete effectively in third markets against foreign firms whose costs are artificially low because of the absence or weak enforcement of labor standards abroad. Import-competing and exporting firms in the high-standards country may respond to this situation by instituting measures to adjust to the domestic standards by undertaking capital-labor substitution, or, depending on their market power, by depressing wages. Exporting firms

[2] For additional details and perspective on the history of labor standards, see Leary (1995).

may also decide to relocate some of their production to foreign locations with lower standards. Another conceivable consequence is that efforts may be made to induce the government authorities to weaken or remove what are believed to be particularly onerous and costly standards.

To avoid all this, it seems appealing to urge or require that the foreign government raise its standards to the same levels as in the high-standard nation. If the foreign nation resists, the high-standard nation may wish to take punitive measures of some kind that are designed to bring about the desired change. Such actions could involve imposing import restrictions or some other type of sanction that will be costly to the foreign nation.

There is evidently, therefore, a range of responses that may occur in the high-standard country, and it is not always clear what the economic effects of the responses may be. As will be developed more fully in our theoretical discussion, the economic effects of certain responses may be counterintuitive and indeed counterproductive from a welfare point of view.

The preceding discussion abstracts from the political economy of protectionism and trade liberalization insofar as the focus is on the particular issue of the presence or absence of effective labor standards. What is missing is that both import-competing and export firms and workers may use issues of lower foreign labor standards to further their own narrow interests to the detriment of their nation's welfare. Thus, for example, there may be pressure for trade restrictions or some other restrictive measures ostensibly aimed at getting the foreign nation to raise its labor standards. In such an event, we encounter the same problem that is found generally when a government is requested to intervene in trade, namely, how to separate the ostensibly genuine motive from the more purely protectionist motive. It is also possible that forcing developing countries to adopt cost-raising labor standards may be harmful to their economic interests and could interfere with their efforts to pursue less interventionist and more export-oriented economic policies.[3,4]

5.2.3 International Monitoring and Enforcement of Labor Standards

As noted by Hanson (1983, pp. 11 ff.), the call for international legislation dealing with labor standards dates from the first half of the 19th century in Europe.[5] These early movements were motivated in large measure by ethical considerations and were designed

---

[3] The view being expressed here is at variance with the view of the so-called neoinstitutionalists, who argue that the imposition of labor standards may have positive welfare and growth effects. These positive effects may result from the labor-income-raising effects of capital-labor substitution, greater harmony in the workplace, more emphasis on worker training, and increased incentives for productivity-enhancing investments. For a more complete statement of this neoinstitutionalist position and a critique of the "neoclassical" view with its emphasis on comparative advantage and the gains from (free) trade, see Hanson (1983, esp. pp. 53-63), Herzenberg (1988), Kochan and Nordlund (1989), Office of Technology Assessment (1992, esp. pp. 77-78), Portes (1990), and Singh (1990).

[4] Bhagwati (1995) provides further insight into the issues involved in the arguments made in support of reducing the diversity of institutions and policies among trading nations. See also Howse and Trebilcock (in process) and Schoepfle and Swinnerton (1994).

[5] This section is based in large measure on Alam (1992, esp. pp.]0-44), Charnovitz (1986, 1987, 1992), Hanson (1983, esp. pp. 11-32), and ILO (1988).

especially to improve working conditions in relation to hours of work, women's and children's labor, the use of hazardous materials, and so on. The links between labor standards and trade were recognized then and later. But, as Alam (1992, p. 13) points out. the early reformers generally took free trade as a given and desirable objective and sought to use moral suasion and international agreements to deal with differences in labor standards. Various international meetings were convened in the latter part of the 19th century and in the first part of the 20th century to deal with international labor standards on ethical as well as competitiveness grounds. By and large, however, the results of these (and later) efforts could be characterized as "rather modest" on the whole (Charnovitz, 1987, p. 580).

Following World War I, as Part XIII of the Treaty of Versailles of 1919, the International Labor Organization (ILO) was founded. The methods and principles set out in the ILO constitution deal with all conceivable aspects of labor standards, although no explicit trade sanctions are included. As stated in ILO (1988, p. 4), ILO action designed to promote and safeguard human rights takes three main forms: (1) definition of rights, especially through national adoption of ILO conventions and recommendations; (2) measures to secure the realization of rights, especially by means of international monitoring and supervision but not by imposition of trade sanctions; and (3) assistance to nations in implementing measures, particularly through technical cooperation and advisory services. Since World War II, the role and influence of the ILO regarding labor standards have been central to the declarations and efforts of the United Nations and associated regional organizations designed to protect and promote human rights.

As noted by Charnovitz (1987, pp. 566-567) and Alam (1992, p. 16), issues of alleged unfair competition involving labor standards were addressed in Article 7 of Chapter II of the 1948 (Havana) Charter of the (stillborn) International Trade Organization (ITO): "The members recognize that unfair labor conditions, particularly in the production for export, create difficulties in international trade, and accordingly, each member shall take whatever action may be appropriate and feasible to eliminate such conditions within its territory." Since the General Agreement on Tariffs and Trade (GATT) was conceived with a more narrow mandate in mind, it did not address issues of labor standards, except in Article XX(e), which provides for prohibition of goods made with prison labor.

Charnovitz (1987, p. 574) notes that as early as 1953 the United States proposed (unsuccessfully) adding a labor standards article to the GATT. The proposed standard, which was supported by organized labor, was very broad and would have empowered GATT members to take measures against other countries under GATT Article XXIII. The United States continued to push for negotiation of a GATT article on labor standards in both the Tokyo and Uruguay rounds of multilateral trade negotiations. While receiving some support from other GATT member countries, the U.S. efforts continued to be unsuccessful.[6] The issue of labor standards in the GATT is thus in a state of limbo. However, in its April 1994 statement at the Marrakesh signing of the Uruguay Round accords, the United States put the international community on notice that it intends to pursue issues of labor standards in future multilateral negotiations.

[6] See Marshall (1990) for a forceful argument in favor of trade-linked labor standards as part of the GATT system and Charnovitz (1992) for some recommendations on GATT actions regarding labor standards.

Issues of worker rights have also been given prominence in the European Community (EC) because of concern over low-wage competition from some EC member countries. It is interesting that many of the arguments that have been voiced in the United States about the potentially detrimental effects of imports from developing countries with lower labor standards have been made in the EC context as well. As De Boer and Winham (1993, p. 17) note, the issue of a Community-wide social charter was first broached in 1972. Subsequently, with the issuance in 1985 of the white paper intended to remove remaining barriers to trade and creation of a single market, the Community Charter of Fundamental Social Rights for Workers was drafted in 1988. This charter was adopted in 1989 on a voluntary basis by all EC members except the United Kingdom. It was hoped to incorporate the Social Charter into the Maastricht Treaty in December 1991, but this action was opposed once again by Britain. The Social Charter was subsequently approved by the other eleven EC members, but on a voluntary basis and not as part of the Maastricht Treaty.[7]

The issue of a social charter for North America was brought up in the context of NAFTA as a possible means of protecting the interests of workers.[8] It is interesting, accordingly, to consider what lessons, if any, the experience of the EC has for NAFTA. The answer appears to be not much. First, the EC efforts to forge a social charter have to be regarded in the broad context of the integration process that is intended to harmonize social programs and policies in the EC member countries.[9] Second, while limited in amount, the EC provides financial transfers to the less advanced and lower-income regions and countries in the Community to assist with structural adjustment and development. Being a free trade agreement, the NAFT A does not contemplate an EC type of economic and eventual political union, and, at least for now, funds have not been set aside to deal with problems of low-wage workers. This is not to say of course that there is no scope for the harmonization of labor standards in the NAFTA. In this connection, Weintraub and Gilbreath (1993) favor a tiered agreement on issues of labor standards, with the timing of the implementation of particular standards geared to increases in Mexican real wages.[10] But there is a catch to all this, as Watson (1993) points out, since a North American social charter would affect Mexico asymmetrically and have

---

[7] The highlights of the EC Charter of Fundamental Social rights are summarized in De Boer and Winham (1993, pp. 36-37), and the full text is to be found in Commission of the European Communities (1990). See also Campbell (1990). For an analysis of the economic effects of social protection in the EC, see Abraham (1994).

[8] A useful reference is Lemco and Robson (1993).

[9] Bhagwati (1995) notes that the EC can be viewed as representing a process of building a *federal* political structure, close, say, to those of the United States, Canada, and India, and therefore having a set of *minimum* labor standards makes *political* sense. See Sapir (1995) for a review of the process of social harmonization in the EC from the 1950s to the present. Sapir concludes that, while there have been noteworthy efforts to formalize the objectives of EC social policies, the implementation of explicit measures has remained limited and is not likely to change at least in the near future.

[10] In connection with the NAFTA debate, Bhagwati (1995) notes that he favored asking for some minimum labor standards because the NAFTA could be construed as a *preferential* gift to Mexico for which something could be asked for in exchange. Notwithstanding this suggestion, it seems apparent that the EC model became the prototype for a number of nongovernmental organizations that were seeking to introduce explicit labor standards requirements into the NAFTA, which were reflected in the side agreements on the environment and labor that were negotiated.

detrimental effects by trying to force up Mexican real wages. It would also constitute perhaps an unwarranted intrusion into Mexican sovereignty. Watson's conclusion, therefore, is that it would be preferable to forgo completely a North American social charter, in the expectation that the NAFTA may increase Mexican real wages, and to provide technical and financial assistance to Mexico to help them raise and maintain their standards.[11]

We have provided a brief historical overview of efforts to deal with international labor standards on a global and regional basis, and we have made some reference to the unsuccessful U.S. efforts to include labor standards on the agenda of the GATT negotiations. This should not be taken to mean, however, that U.S. policy has remained otherwise silent on these issues. Rather, the opposite is the case as, in the last decade, the United States has introduced a number of unilateral policy measures dealing with labor standards, to which we now turn.

5.2.4 Labor Standards in U.S. Trade Policy and Law

The evolution of labor standards in U.S. trade policy and law is set forth in Table 1. The earliest prohibitions of imports were directed against imports made by prison and forced labor. A fair labor standards provision was included in the National Industrial Recovery Act (NIRA) of 1933, but the NIRA was subsequently judged by the Supreme Court to be unconstitutional. Beginning in the 1980s, it is evident that there have been a number of legislative actions establishing criteria for eligibility for trade preferences, as in the cases of the Caribbean Basin Economic Recovery Act (CBERA) of 1983 and the 1984 renewal of the Generalized System of Preferences (GSP). Adherence to worker rights was made a condition in a 1985 amendment covering the activities of the Overseas Private Investment Corporation. In 1986, U.S. firms in South Africa were required to adhere to fair labor standards, and similar conditions were attached to the 1987 U.S. participation in the Multilateral Investment Guarantee Agency of the World Bank.[12] Finally, the denial of worker rights was made actionable under Section 301 of the 1988 Omnibus Trade and Competitiveness Act. The 1988 Trade Act also expanded the requirements of the Departments of State and Labor to submit periodic reports to Congress on human rights abuses and foreign adherence to internationally recognized worker rights. It is thus evident that labor standards have become explicitly linked with U.S. trade (and investment) policy in a number of different legislative measures in the past decade.
It is noteworthy that the CBERA and GSP stipulations on labor standards are linked with U.S. preferential trade concessions. In the case of the CBERA, the stipulations were made advisory, but they are mandatory for continued GSP eligibility. As Lyle (1991, p. 9) notes, official U.S. investigations of worker rights under the GSP are carried out by an interagency subcommittee of the Trade Policy Staff Committee, which includes members from the Office of the U.S. Trade Representative and several cabinet departments. Investigations of worker rights violations are initiated in response to petitions from

[11] Further support for this view is to be found in Morici (1993) and Garcia Rocha (1990). It will be interesting, accordingly, to analyze the content and potential economic effects of the side agreement on labor issues in the NAFTA that has been negotiated among the three NAFTA nations.
[12] See Perez-Lopez (1993) for a discussion of voluntary codes of conduct that have been proposed for U.S. corporations operating in countries with allegedly questionable labor practices.

interested parties, using information contained in the State Department's annual country reports on human rights, reports from U.S. embassies and consulates, ILO findings, and other pertinent information, including public hearings. Recommendations are made to the president, who has the final say in determining continued GSP eligibility. If GSP privileges are removed or suspended, a country must reapply to have the privileges reinstated.

In April 1991 GSP privileges were removed from Sudan, and in prior years similar actions were taken with respect to Burma, the Central African Republic, Chile, Liberia, Nicaragua, Paraguay, and Romania. The U.S. experience with GSP may thus provide some useful insights into the design and implementation of policies and procedures governing trade-linked labor standards in other contexts. Perhaps the most noteworthy features are that trade concessions can be withdrawn if investigation concludes that labor standards are not being upheld, and that evidence of a change in policies abroad is a condition for reinstatement of the concessions.[13]

Having set the context and discussed some of the possible consequences of intercountry differences in labor standards and experiences in the monitoring and enforcement of labor standards globally, regionally, and with reference especially to the United States, we turn now to our central task of the theoretical modeling and analysis of international labor standards.

5.3 International Standards Coordination – A Simple Model

In this section we use a partial equilibrium model to examine how standards in general may be set by countries acting individually and how these countries would be affected if instead they were to coordinate on a common standard. In a world with countries that are too small to affect their terms of trade, we will argue that if governments act in their independent national interests, then they will set possibly diverse standards that will be optimal from the point of view of the world.[14] However, it will be in the interests of particular groups of producers within these countries to press for higher standards abroad than would otherwise obtain. Also, it will be in the countries' national interests (including both producers and consumers) to press for either higher or lower standards for the world as a whole depending upon whether, as countries, they are net exporters or net importers of the good in question.

---

[13] See Dorman (1989) for an evaluation of the procedures and decision-making criteria regarding worker rights in the implementation of the U.S. GSP; case studies of El Salvador, Malaysia, and Chile; and recommendations for improving the procedures and decision making criteria in investigating alleged violations of worker rights standards. The reports prepared by the Bureau of International Labor Affairs (ILAB) are also worth noting. They include evaluations of worker rights in export processing zones (see U.S. Department of Labor, 1989-90, and Schoepfle, 1990), child labor, worker rights restrictions in East Asia, and characteristics of the informal sector in a number of developing countries (see U.S. Department of Labor, 1992, and Schoepfle and Perez-Lopez, 1993). For some background discussion of the issues involved in the renewal of the GSP in late 1994, see Lande and Dybner (1994).

[14] Note that we are referring here to purely domestic externalities as compared to transborder externalities. Bhagwati and Srinivasan (1995) distinguish the two types of externalities, noting that the Pareto optimality proposition applies only to domestic externalities. Labor standards involve domestic externalities, except in cases in which one country may affect standards in another country due to a "good" or "bad" example or because there may be a "race to the bottom." We shall abstract from such possibilities.

The theoretical modeling of labor standards in international trade is complicated by the fact that, in any country large enough for the world to care about it, standards that affect trade also affect the terms of trade. This statement is true not only of labor standards, but of other standards as well, and this problem is a common one for any analysis of policies and regulations that are intended to deal with externalities and other social concerns in a context of international trade. The effects of such policies on international prices are undoubtedly important, and we will explore them more fully and carefully in subsequent sections of this paper. However in almost all cases, these terms of trade effects are not the central concern of proponents of such policies, and to include them in the analysis inevitably intertwines the concerns of the policy advocates with the effects of trade in ways that cloud, rather than clarify, the issues.

Therefore, in this first theoretical section, we attempt to consider the general problem of international policy coordination in a way that will most clearly capture the concerns of the policy advocates, and thus in a way that abstracts from effects on the terms of trade. This task is not easy. For one country to have no effect on its terms of trade, it must be small. For a particular trading partner, whose policies the first country wishes to influence, also to have no effect on world prices requires that it too be small. But if that assumption is true, the first country will care about the second country's policy on only moral grounds.[15] We look here at a world of many countries, each one of which is assumed to be too small to affect world prices. Each country's interest is then in its own policy choice, plus the collective choices of the other countries. In this context, no country on economic grounds would care about the policy choices of other individual countries. They would, however, care about international agreements that might alter the policy choices of all other countries collectively.

In this context, as we will later explain more fully, we model a standard as a policy that raises the costs of firms while at the same time providing a benefit to society as a whole. At the end of section 5.4 we will discuss the mechanisms by which the particular labor standards mentioned in section 5.2 do in fact raise costs.

Consider then a partial-equilibrium, perfectly competitive model of many small countries, each of which supplies and demands a good that is traded freely by all. World supply and demand are the sums of the individual-country supplies and demands, and these interact to determine a world price that is taken as given by all. The situation of a representative importing country is shown in Figure 1. The world price is p^w, the country's supply and demand curves in the absence of any policy are S and D, with D intersecting p^w to the right of S because we have selected a country that imports the good.

Suppose now that the behavior of suppliers in the absence of any policy is such as to impose an additional cost on society that is not captured in the supply curve. This could be an external diseconomy of the usual sort (such as pollution), or, to accord better with our topic of labor standards, it might be a measure of the societal opprobrium associated with, say, employing children. For this section of the paper at least, it does not matter what the source of the social cost is, merely that it exist and be somehow quantifiable.

To quantify the social cost in a relevant way, however, we must also consider what will be done about it. There is one cost that is appropriate if the suppliers are allowed to continue their behavior unchanged and nothing is done about it. There is a

[15] For a discussion of moral considerations, see Bhagwati (1995).

second that is appropriate if suppliers continue their behavior but the government devotes its own resources to undo the damage. And there is a third cost that is appropriate if the suppliers are required to discontinue the offending behavior, the cost of doing so then being borne by the suppliers themselves. Presumably an optimal policy will select whichever of these alternatives, or a combination of them, imposes the lowest cost on the country as a whole. It will also clearly require that the suppliers bear this cost at the margin, either by paying a production tax equal to it, or by directly changing their means of production, since otherwise their choice of output would be higher than optimal. To capture all this, then, we include in Figure 1 a curve representing this minimum social cost per unit of output *C* and assume that it represents both the cost of optimally solving this problem and an addition to the costs of suppliers when the solution is implemented.

We will speak, then, of a "standards policy" as one that adds this social cost *C* to the costs of private firms for all levels of output, and at the same time eliminates a cost to society at least equal to *C*. The supply curve in the presence of the standard is then *S* + *C*, the private supply curve *S* displaced upward by the social cost *C*.

The effects of the standard are easily seen from the figure. Because the country is small, the world price is unchanged, as is the domestic quantity demanded Q_0^D. Quantity supplied to the domestic market by domestic suppliers falls, however, from Q_0^S to Q_1^S, and the quantity of imports increases by this same amount.

As for welfare effects, demanders are of course unaffected, since they still buy the good at the unchanged world price. Suppliers bear the increased cost *C* of production due to the policy, and their welfare would have been unchanged if the price had risen to p^w + *C*. Since it did not, they lose producer surplus equal to area *c* in the figure. Society, on the other hand, gains at least the areas *a* + *b,* recalling that *C* represented the least-cost way of dealing with the social cost, and was therefore no larger than the cost itself in the absence of the standard. The country as a whole, therefore, gains at least the triangular area *d,* since by construction *c* + *d* is equal to *a* + *b.*

All of this was done taking the world price as given, which the country, as a small open economy, was bound to do. No standard was imposed in the rest of the world, and as suppliers would surely remind us, the imposition of the standard has cost them dearly. However, there is no question that the standard was a desirable policy: the country gained more from its imposition than the suppliers lost, and assuming as usual that they could somehow be compensated if it were viewed as desirable to do so, the country's welfare has gone up. The absence of a standard abroad may have altered the size of the gain, as we will soon see, but it cannot have undermined it totally.

Nor is there a case here for interfering with trade. Suppliers, of course, would welcome a tariff equal to *C* along with the standard, so that the domestic price would rise exactly enough to offset all cost to them. But if this were done, we would have the usual deadweight losses associated with a tariff, and welfare would fall, not rise. Thus free trade remains here the optimal policy, even though the standard was not matched by standards abroad.

Suppose, however, that the standard *were* matched by standards abroad. That is, suppose that all other countries were in exactly the same situation as this one (except that some export rather than import the good), and that they too responded by setting the standard *C*. In that case, at the initial world price p^w, all suppliers would supply less and the world price would have to rise. To determine how much it would change, we would

need to construct the relevant curves, but that is not necessary. Given the same standard in all countries, it is clear that the world price could not rise as high as $p^w + C$, since if it did, all supplies would remain at their initial level (see Figure 1), while all demands would fall. Therefore, we can be sure that a common standard of C set by all countries would lead to a rise in world price by something less than C. Exactly how much it would rise depends, as usual, on the various supply and demand elasticities, and need not concern us here.

Figure 2, then, shows the situation with such a common standard. The suppliers' cost still rises by C, but now the world price also rises by a fraction of that amount, and the suppliers' loss in producer surplus is confined to the smaller area c (which is smaller than c in Figure 1). Society still gains at least the area $a + b$ (which still sums to $a + b$ in Figure 1), but now demanders also lose from the rise in price. The loss in consumer surplus is area $e + f + g + h + i + j$, giving a net effect on the country as a whole of $+ d - (h + i + j)$. As drawn, this change in country welfare is negative, and would be so for any country that imports a significant amount of the good in comparison to its domestic production. The reason is that consumers of the imported good do not share at all in the social benefit of the standards imposed abroad, but bear part of the cost due to the rise in world price.

This outcome would be reversed if the country were an exporter of the good. In that case (and also if the country were an importer but of only a small amount), as the reader can verify, the losses of both producer and consumer surplus are more than made up for by the gain from eliminating the social cost.

We set out in this section to abstract from effects on the terms of trade and to focus theoretical attention only on the sorts of effects that seem to be the concern of the advocates of labor standards. The small country assumption worked well for this purpose so long as we considered only standards in one country. But as we have just seen, once multilateral standards are considered, terms-of-trade effects inevitably play a role. It is quite possible for a country to lose from imposing a standard, even when that standard is optimally configured from the point of view of undoing or correcting a social cost, simply because of the country's position in the trade of the good involved. A country that imports a good on which a standard is imposed is likely to lose from the standard because of the rising cost to its consumers. A country that exports such a good, on the other hand, has a more than normal interest in obtaining multilateral standards.

This result, especially for an importing country, is very much at variance with the stated arguments of most advocates of standards, in the labor arena and elsewhere. The reason may be that these advocates often have a point of view that is narrower than that of the country as a whole, perhaps identifying only with producers. Or they may recognize the consumers' interests but reject them as being illegitimate, on the grounds that consumers were benefiting immorally from the low price permitted by the absence of a standard previously. Whatever may be the case, it is useful here to be able to separate the several welfare effects of a standard, and this our partial equilibrium model is nicely suited to do.

That is, in comparing Figures 1 and 2, one can easily see why countries are reluctant to impose standards unilaterally, even when those standards would raise welfare in the country overall. As long as the interest of the policy makers is to give greater weight to producer interests and to social costs than they do to consumer interests, then it

is quite natural to press for multilateral standards. These will achieve greater reduction in social cost worldwide, and they will lessen (though not remove) the burden on producers.

So far we have assumed that multilateral standards are set all at the same level. If the problem at hand were a social cost that was the same, per unit of production, for all countries, then that would be a natural assumption. But in fact, as we have already noted in passing, countries often disagree as to the level of cost associated with a particular market failure, sometimes for cultural reasons, sometimes because of differences in levels of development. Suppose then that the social costs C were to vary across countries.

Without a multilateral standard, countries would each have an incentive to impose standards at the level of their own social cost, as we saw in Figure 1, and this choice would indeed be optimal for the world as a whole. The collective effect of these diverse standards would be qualitatively the same as shown in Figure 2, except that there would be no assurance that the world price would rise by less than the size of a particular country's standard. High-standard countries would find the world price rising by substantially less than their own standard, and thus have their producers bear a larger proportion of the cost. Low-standard countries would, in contrast, experience price increases that would be larger in comparison to their own standards and that might even be larger absolutely than the standards themselves. In that case, their producers would gain, not lose, from the multilateral standards.

It is this possibility, presumably, that motivates demands that the standards of different countries be "harmonized," which in this case may be taken to mean set at the same level. As this model makes clear, however, there is nothing in the economics of the situation that calls for such harmonization. On the contrary, world efficiency is best served by letting each country set its standard in accordance with its own needs and perceptions of cost. To do otherwise – to require that all countries impose the same standards – will mean that some countries impose higher standards than the corresponding social costs or that others will impose lower standards than social cost. Either way, outputs will then be set inappropriately low or high, as the case may be, and welfare will not be maximized.

To conclude this section, let us return one final time to the terms-of-trade effects that we tried so hard to exclude. Suppose now that some countries are not in fact small, but instead that they can influence the terms of trade through their policies. How they will behave will of course depend on the direction of their trade in the product in question. Any standard they set, regardless of their pattern of trade, will cause the output of their own producers to fall and will then lead to a rise in the world price. If they import the good, as does the country in Figure 1, and if they attempt to maximize their entire country's welfare, then this worsening of the terms of trade will lead them to cut back on the policy, setting a standard that is lower than the social cost. Exporters, in contrast, recognizing that their standards not only correct the social cost but also improve their terms of trade, will set their standards higher than social cost.

This is exactly the kind of outcome that we sought to avoid in this section, for it means that standards are being used for purposes that have nothing to do with the problems they are ostensibly intended to solve. But the result does have an interesting and perhaps rather surprising implication. Exporting countries are presumably those with lower cost, as a result, one hopes, of comparative advantage. Since, as we have just seen, it is exporters who have the incentive to set standards too high, and importers who have

the incentive to set standards too low, it follows that standards will be used to bring costs closer together across countries.

Throughout this discussion, we have confined our attention to a single industry in partial equilibrium. This approach is appropriate for problems that in fact arise in only one or a small number of industries, as long as those industries are small relative to other markets in the economy. For some kinds of standards, that may well be the case. But for labor standards, which are likely to apply across the board to all industries, it certainly is not. We used partial equilibrium here, as we said, in an effort to abstract from terms-of-trade effects, and to decompose the effects of standards into those on producers and consumers. But it is time to leave this framework and turn instead to models of general equilibrium. We begin this task in the next section.

5.3.1 Summary

Let us sum up what this partial equilibrium analysis has told us. We have modeled a standard as policy that imposes additional cost on domestic firms, the purpose being to correct an externality of some sort that imposes a cost on society that would not otherwise be borne by the firm. The first result is that, if countries are too small to affect their terms of trade and if the social cost of the externality is borne only by the country where the firm is located, then domestic policies that internalize the externality are welfare improving from the points of view of both the individual country and the world as a whole. This is the case whether or not the partner country also imposes a standard. Furthermore, trade sanctions that punish trade partners for failing to do so are not beneficial.

Pressure for international standards may nevertheless emerge, in part since separate interests within each country desire different outcomes. For obvious reasons, producers that are subject to these standards would prefer not to be. At the same time, producers would also prefer that higher standards be set abroad, since these will raise world prices to their own benefit. Therefore, for example, if optimal standards are diverse across countries, producers in the high-standard countries will press for adoption of a common standard worldwide, even though that would not be socially optimal.

National interests also diverge from the optimum when it comes to finding international agreement on the level of standards to set. Since national welfare (including both producers and consumers) rises with the world price of a net export and falls with the world price of a net import, and since standards tend to raise world prices, net exporters will press for higher-than-optimal international standards while net importers will press for lower-than-optimal ones. This observation is true even though individually, as small countries, the standards they would set for themselves would be optimal.

Finally, allowing countries to be large enough to influence world prices by their own actions, these incentives to distort standards for terms-of-trade purposes also extend to the setting of their own standards. Net exporters, for example, will set standards higher than optimal, since high standards will secure the additional benefit of a higher world price and improved terms of trade.

5.4 Effects of Imposed Labor Standards on Trade and the Terms of Trade

In this section we examine how standards alter welfare in a large country, and how this effect depends on the resources that are used by the standard itself.[16] Depending on the particular model that applies, we find that countries now have an incentive to set standards either too high or too low, and that there is a clear case for some form of coordination, if not full harmonization, to achieve the world optimum. In one case, where countries specialize completely in different traded goods, each country's standard will act like any trade restriction and thus improve its terms of trade. Such countries will set standards too high, will prefer that other countries set no standards at all, and will need to coordinate to reduce the level of standards that would be arrived at independently. In a second case, where countries produce the same tradable goods but in different proportions, the effect of a labor standard depends on the resources that it withdraws from world production of tradable goods. If the standard, say, uses primarily labor, then it will make labor more scarce, raise the world prices of both labor and labor-intensive goods, and improve the terms of trade of labor-abundant countries. Because countries now experience the same price changes from labor standards but differ in the welfare implications of these prices changes, standards will now be set too high in some countries and too low in others, making it desirable for both that the world harmonize on a level of standards somewhere in between.

In contrast to the previous section, where we tried to abstract from terms of trade effects, we begin our general equilibrium analysis by examining effects that a country's labor standards may have precisely on its trade and terms of trade. For this purpose we initially ignore whatever distortions may exist in the economy that provide the reason for the labor standards, and assume instead that they are simply imposed exogenously. This assumption does not mean that the standards are without purpose, but it does mean that their purpose is not to offset or correct a distortion in the economy that would in turn have its own effects on production and trade, and that might change with the imposition of the standard. We will consider such distortion-correcting labor standards in section 5.5.

For now, consider a generic labor standard Z that may be imposed at some level in a country and that uses resources that would otherwise be used for production. We will consider several different models of trade and of the interaction between the labor standards, production, and trade, in order to determine how the standard will alter the country's output and trade, its potential to gain from trade, and the terms of trade between it and the rest of the world. We will also consider the issue of harmonization of labor standards in these models, asking how a country's welfare will be affected by standards abroad, and how these standards, if set optimally, will interact with one another.

Once again the standard is modeled simply as a policy that raises cost of production, now being explicit about which resources are used up in this process. At the end of the section we will discuss how the particular labor standards described in section 5.2 relate to this theoretical formulation.

[16] The models of this section, as well as many of the results, draw heavily on Alam (1992).

5.4.1 Model 1: Labor Standards in a Specialized Economy

We consider first a country that is specialized in the production of a single tradable good *X*, which it exports in exchange for a second tradable good that it does not produce, *Y*. The potential imposition of a labor standard takes the form of producing a nontraded good *Z* at some level, and this production withdraws resources from the production of tradable *X*. It is not necessary, in this model, to be specific about what these resources are. Instead we merely assume a production possibility frontier (PPF) between X and Z that summarizes the trade-off.

Figure 3 illustrates. In the top quadrant appear a family of indifference curves, indicating the welfare that the country derives from consumption of the two traded goods *X* and *Y*. The downward-sloping straight lines also indicate, for some particular world prices, the rate of exchange between the two goods.

The bottom quadrant shows the PPF between *X* and *Z*. Initially, without any labor standard, *Z* is set at zero and production is at point *P*. A portion of the output of *X* is exported in exchange for *Y*, and the country consumes at point *C*.

When a labor standard is imposed at some level *Z′*, production moves to point *P′,* less *X* is produced, and less is also exported in exchange for *Y*. As long as both tradable goods are normal goods, consumption of both will fall to point *C′,* as will the quantities of trade. Assuming for simplicity that preferences are homothetic, consumption and trade all decline by the same percentage, equal to the fall in the output of *X*.

Clearly the country loses welfare in terms of what it derives from consuming the traded goods. That result does not mean that the standard was ill-advised, however, since we have not specified its purpose. If we assume that there is a benefit to be obtained from the standard – one that is separable from the benefits of consuming *X* and *Y* and that does not alter the economics of the *X* and *Y* industries – then presumably the standard could be set optimally, balancing the marginal benefit from the standard against the marginal cost in consumption.

If the country were small, this would be the end of the story, since the reduced trade would have no effect on equilibrium world prices, or on anything else of concern to the foreign economy. If the country were small, however, its labor standards would not be an international issue. We therefore assume for the rest of this section that the countries we consider are large enough to influence their terms of trade.

The direction of the effect is obvious. Since at initial prices the country both exports less of *X* and imports less of *Y*, the world price of good *X* will rise relative to *Y*, That is, the country's terms of trade will improve. This is a benefit to the country imposing the standard, and a cost to its trading partner.

Now, consider the issue of harmonization. At one level the question is simply whether a country will benefit more by imposing a labor standard unilaterally, or would instead do better getting its trading partner to impose the same standard. To answer that question, we need first to know how a standard imposed by the other country will affect welfare at home. In this model the answer is clear: since the other country is specialized in good *Y* and will withdraw resources from its production if it imposes a standard, the foreign labor standard has an effect on world prices that is opposite to that of a domestic standard. If we use a standard, it improves our terms of trade; if they use one, it improves theirs but worsens ours. Thus each country would prefer to go it alone.

At a slightly deeper level we can assume that each country's labor standard will be set optimally, given the standard of the other, and we can ask how the standards will differ depending on whether they are set noncooperatively or cooperatively (harmonization). In this model, because each country's standard imposes a negative external effect on the other by altering the terms of trade, each will have an incentive to set too high a level of the standard. If countries can cooperate, they will need to harmonize their labor standards to *lower* levels than they would set unilaterally.[17]

This result, which is quite different from the kind of harmonization that one sees called for by labor activists, arises because the effect of the labor standard that is driving the result is quite different from what labor activists are likely to have in mind. In section 5.5 we will try to consider alternative models that are closer in spirit to the views of labor. Nonetheless, the possible terms-of-trade effect of a labor standard is certainly a valid one, and also a potentially important one that can arise in general equilibrium. It should be taken into account in any complete analysis of international labor standards.

The terms-of-trade effect will not, however, always work in this direction. This first model with complete specialization is quite special in that regard, as we will now see.

5.4.2 Model 2: A Heckscher-Ohlin Model with Economy-Wide Labor Standards

Suppose now that the countries produce both of the traded goods, using two factors of production and identical, constant-returns-to-scale production functions in the manner of the Heckscher-Ohlin trade model. For this model, assume that labor standards are again imposed separately from production of the tradable goods, so that they simply withdraw a portion of the factors that would have been available for production of tradable goods. How a standard affects output and trade now depends on the factor intensity of the standard itself – that is, the ratio of the factors withdrawn from tradable production as a result of the standard – in comparison to the factor intensities of the tradable goods.[18]

Figure 4a illustrates. The outer PPF between tradable goods X and Y shows the maximum outputs of the two goods if all of the home country's (A's) resources are devoted to their production. We assume that good X is labor intensive and that the home country is labor abundant, so that in free trade equilibrium it produces at P, consumes at C, and exports good X to the world market.

If a labor standard is now imposed, this will use up some of the labor and capital that underlie the outer PPF, and will therefore shift it inward. The direction of the shift depends on the factors used by the standard. An especially simple but special case is shown in the figure, where the PPF is shifted proportionally inward by the standard. This would happen if the standard withdrew the two factors in the same proportions as they exist in the endowment of country A.

---

[17] Asad Alam has pointed out to us that if countries are symmetric, in the sense that the terms-of-trade gain to one is of the same magnitude as the terms-of-trade loss imposed by the other when each raises its labor standards, any cooperative solution would neutralize the terms-of-trade effects. Both countries would still gain, however, so long as the level of the standard is such that the marginal benefit exceeds the marginal cost from reduced consumption.

[18] It should be clear that this problem is identical to that of the effects of accumulation of factors of production. In that sense, our results are merely applications of known results and techniques from the literature begun by Rybczynski (1955).

In this special case, we find once again that the standard will unambiguously, at initial prices, cause a fall in the country's trade. This in turn will cause its terms of trade to improve when we allow for equilibrium on the world market.

However, the similarity with Model 1 ends here. It is not the case that the same labor standard imposed in the other country will improve *its* terms of trade. As shown in Figure 4b, the foreign PPF shifts inward, not proportionally, but rather in the same direction as that of country *A*. assuming that the labor standard there requires the factors in the same proportion as in the home country. But since the foreign country produces the goods in quite different proportions, because of its greater abundance of capital, this is a shift that is very much biased toward continuing to produce its export good.

In fact, since the ratio of the drops in output of the two goods is the same as the ratio of production in the home country, and since this is less than the common ratio of consumption in both, it must be the case that the foreign country's production of good *X* falls by more than its consumption, and it actually increases its demand for good *X* from the world market. Hence, a labor standard that matches in its factor requirements the factor endowments of the home country will necessarily improve the home country's terms of trade regardless of which country implements it.

More generally, what matters in this model for the effect of a labor standard on the world market and the terms of trade is how the factor requirements of the standard compare to the factor requirements of *world* production. If a standard uses, say, a higher ratio of labor to capital than is available in the world market, then it will withdraw from tradable-goods' production – in either country where it is implemented – amounts of factors that will reduce the country's output of the labor-intensive good relative to its consumption of that good. As a result, such a labor standard will raise the world relative price of the labor-intensive good, regardless of who exports it.

Thus the only completely neutral labor standard will be one that uses factors in the same proportion as world endowments. Any other labor standard will tilt the world prices in favor of one country or the other. Considering the harmonization issue, this finding means that a labor-abundant country will get an extra terms-of-trade benefit from a labor-intensive standard, and will tend to overprovide it, while a capital-abundant. country will experience a loss and will tend to underprovide it. Harmonization in favor of a more uniform standard will therefore be desirable from the world-efficiency perspective.

5.4.3 Model 3: A Heckscher-Ohlin Model with a Standard That Raises Production Cost

In our analysis up to now, labor standards were assumed simply to divert resources from the country as a whole. Here we allow for the standard to be implemented within an industry in a manner that raises that industry's cost. For simplicity we allow for the standard in only one of the two industries of a Heckscher-Ohlin model.

Figure 5a shows the PPF for a home country exporting the labor-intensive good *X* prior to imposition of a labor standard. The effect of a labor standard will be to increase the factor requirements of production in *X,* and therefore to shift the PPF inward. The exact nature of that shift, however, depends on how factor requirements in the industry are changed by the labor standard.

A simple possibility is shown in Figure 5: the standard is Hicks neutral in the sense that it raises the required amounts of both factors in the same proportion and therefore leaves the shapes of all *X* isoquants unchanged. Were one to draw the Edgeworth production box for this situation, the standard would leave the efficiency locus unchanged in appearance, with only the levels of *X* output along it reduced by the percentage of the increased cost. Thus the PPF is shifted proportionally to the left in Figure 5a, with the level of output of *X* that corresponds to each level of *Y* being cut by a fraction.

It follows immediately that, once again, at given prices of the goods the country will trade less. This result in turn will cause an improvement in its terms of trade to clear the world market.

At the same time, in Figure 5b, the same shift in the PPF of the partner country causes it to trade more, and this outcome also will lead to a further improvement of the home country's terms of trade. As in the case of economy-wide labor standards in Model 2, it is the standard itself that favors one country or the other, and not the identity of the country that implements it.

Figure 5 shows only one very special case. A labor standard in an industry could just as easily increase the industry's factor requirements in ways that are biased toward one factor or the other, and this bias would change the way that the *PPF* shifts because of the standard.[19] We will not go through any more of these cases here, but will merely note that the result just found, of a standard that raises the world price of the industry where it is imposed, is in some sense the normal outcome but is not inevitable. One can construct a case in which a standard imposed on an industry actually leads the relative output of that industry to expand and drives down its price. That, however, is a rather skewed and unusual outcome.

5.4.4 Factor Requirements of Labor Standards

Having identified the importance of the "factor requirements" of labor standards for their effects on trade, let us pause a moment and relate our discussion to our earlier list of labor standards noted in the Appendix. In what sense can actual labor standards be accurately modeled as diverting factors from other uses, and which factors do they divert?

Freedom of Association and Right to Organize: These two standards do not, in any obviously important way, divert resources. Presumably a small amount of labor is needed to administer a labor union, for example, but this must be a negligible aspect of a union's economic effects.

Freedom from Forced labor: If an economy is making use of forced labor, the question here must be whether that labor would continue to be available if it were not forced to work, presumably at a higher wage. If at least some of the forced workers would choose not to work, or not to work as much, then this standard will reduce the supply of labor to the economy. It is a purely labor-using standard.

Minimum Age for Employment: A standard that prohibits children from working simply removes them from the labor force. It too is a purely labor-using standard.

[19] The results may also change if preferences are nonhomothetic.

Minimum Wage: A minimum wage does not obviously alter the quantity of factors available, but only, supposedly, their price. However, if one believes that labor markets function well, then an effective minimum wage will price out of the market some marginal workers, and the labor force will be reduced. In this sense, a minimum wage is, again, a labor-using standard.

Hours of Work: An upper limit on hours of work, if it is effective (and not merely circumvented by workers taking second jobs), is a straightforward reduction in the labor force. It too, then, is labor using.

Occupational Safety and Health: OSH regulations are therefore the only standard we consider that may not be purely labor using. These regulations may well require investments in capital (safer machines) or land (to reduce overcrowding) in order to be implemented. Depending on the nature of the particular regulation, therefore, and the technologies available for satisfying it, OSH regulations could easily be less labor intensive than world production as a whole.

In summary, with the exception of OSH regulations, most labor standards appear to be primarily labor using. That is, they remove a portion of a country's labor force that would otherwise be available. Such standards will tend to make labor more scarce in the countries where they are implemented. This scarcity will in turn increase the world prices of labor-intensive goods, improving the terms of trade of those countries that export labor-intensive goods and worsening the terms of trade of others. Thus it would appear that the general economic interests of advanced countries, whose comparative advantage presumably is based on factors other than labor, would favor limiting the spread of these standards rather than imposing them on the less-developed world. Similar conclusions or the opposite, however, could apply to OSH regulations, depending on the factors required for their implementation.

All this, however, neglects the role of any distortions that may exist and provide the basis for having labor standards in the first place. We now turn to the modeling of such distortions and their interaction with standards and trade.

5.5 Endogenous Working Conditions and labor Standards

In the preceding sections we have analyzed two aspects of labor standards in international trade: (1) correcting market failure due to the presence of an externality in an international trade environment, and (2) the resource costs of labor standards and their implications for the terms of trade. In the first of these cases, where we dealt with market failures, we did not identify the source of the market failure, but we did make the assumption that the government had the ability to correct the externality.

However, much of the labor literature on occupational safety and health is devoted to analyzing specific sources of market failure and the tools used by governments to address these problems.[20] Generally, it is found that establishing

[20] See U.S. GAO (1993) for comparative information on the design and operation of occupational safety and health programs in the United States and Canada and references to earlier reports comparing the United States and Mexico.

minimum labor standards rarely corrects, or even partly corrects, labor-market failure associated with worker safety.

In this section, we analyze legally mandated minimum safety standards using a model in which occupational safety and health are endogenously determined. First, we consider a setting in which the market is able to provide the socially optimal level of worker safety. In this case, government intervention in the form of a minimum safety requirement naturally reduces social welfare, both nationally and from a world point of view.

We then turn to evaluate a market that is not able to provide the socially optimal level of worker safety because of heterogeneity of worker preferences over working conditions and wages. The existence of a market failure raises the possibility that the government might usefully intervene. However, in the case analyzed here, we find that government-mandated working conditions will not restore Pareto optimality.

Our conclusions concerning international bargaining over labor standards depend, as in section 5.3, on whether the minimum safety requirement is imposed on the export industry or on the import-competing industry. The implications for working conditions are more surprising. A minimum safety standard always improves working conditions in the industry in which it is imposed. In addition, as long as the labor standard is applied in the capital-intensive sector, then wages and working conditions improve in all sectors of the economy. This is the case in both regulated and unregulated industries. However, if the standard is imposed in the labor-intensive sector, then workers in all sectors of the economy are made worse off. Money wages decline in all industries. Safety rises in the regulated sector, but not by enough to compensate for the fall in wages. Finally, both wages and safety actually decline in the unregulated sector.

5.5.1 Endogenous Safety without Market Failure

Generally, if labor markets are perfectly competitive and sufficiently deep, then firms and workers will choose the Pareto optimal level of safety in each plant. In this case, government intervention that establishes a minimum safety level is, of course, not defensible on efficiency grounds. Nevertheless, governments occasionally attempt to raise standards despite the absence of an identifiable market failure. Therefore, it is useful to analyze the implications of minimum standards for wages, working conditions, and international trade when labor markets are functioning efficiently.

The sufficient conditions for Pareto optimality when the safety level is endogenous are well established (see Dickens, 1984):

1. All markets are perfectly competitive.
2. Firms set safety and wage levels to maximize profits.
3. There is a large enough number of workers and firms such that for the safety level chosen by the firm there exists some wage at which the firm can hire any amount of labor it wants but can hire no labor at a lower wage.
4. Workers and firms have perfect knowledge of wage and safety levels at all other firms.
5. There are no external economies.

Obviously, Pareto optimality can fail for several reasons. One case will be discussed in this section. However, consider, first, safety setting in an economy that satisfies the efficiency conditions listed.

Suppose, as in section 5.4, that there are two goods: X the labor-intensive export good and Y the capital-intensive import-competing good. Labor and capital are taken to be freely mobile between sectors and traded in perfectly competitive markets.
For present purposes we will take technology to be Cobb-Douglas, so that

$$X = K_x^{\alpha} L_x^{(1-\alpha)}$$
$$Y = K_y^{\beta} L_y^{(1-\beta)} \tag{1}$$

where $\beta > \alpha$

There is some danger to workers producing both X and Y, but each firm can improve working conditions if it chooses to do so. We assume that safety is produced using the same technology required to produce a unit of X. Further, the X sector is taken to be inherently more dangerous than the Y sector, so that it takes g_x>1 times as much expenditure per worker in the X sector to achieve a particular level of safety compared to what would be required for the same level of safety per worker in the Y sector. Finally, all workers are assumed to have identical preferences over safety and money wages.

There are three basic conditions that characterize firm behavior in the labor market. First, for each firm in sectors X and Y, the cost of providing the worker with a wage-safety combination must equal the worker's marginal value product. That is

$$p_x MP_L^x = p_s g_x + w_x \tag{2}$$
$$p_y MP_L^y = p_s + w_y \tag{3}$$

where p_i and w_i, $i = x, y,$ are goods prices and wages in sector i, and p_s is the price of a unit of safety in sector y. Second, workers must be indifferent between the X-sector and Y-sector wage-safety combinations. This indifference implies that

$$U(s_x, w_x) = U(s_y, w_y) \tag{4}$$

Third, cost-minimization requires that each firm choose a wage-safety combination so that the worker's marginal rate of substitution between safety and wages equals the ratio of the wage to the price of safety. That is,

$$MRS_{s,w}(s_x, w_x) = \frac{w_x}{g_x p_s} \tag{5}$$
$$MRS_{s,w}(s_y, w_y) = \frac{w_y}{p_s} \tag{6}$$

These labor-market conditions are depicted in Figure 6. For each industry, the worker's indifference curve is tangent to the line that depicts all combinations of safety and money wages that cost the firm the worker's marginal value product. In addition, the level of utility achieved by a worker in sector X is the same as that in sector Y.

Two points are worth noting about this equilibrium. First, the marginal-value product of labor in the X sector is higher than in the Y sector. This relationship can be seen by comparing the wage-intercept of the X-iso-labor-cost line to that of the Y-iso-labor-cost line in Figure 6. The economic intuition is straightforward. Since safety in the X sector is more expensive than in the Y sector, it costs an X firm more money to provide

a particular real income to one of its workers than for a firm in the *Y* sector. Hence, an X-sector worker must have a higher marginal value product than a *Y*-sector worker.

Second, suppose that we hold the world prices constant while increasing the capital intensity of production in both sectors. Then the marginal value product of labor must rise at a slower rate in the *X* sector than in the *Y* sector.

To see this point, recall that equilibrium in the capital market requires that

$$p_x MP_K^x = p_y MP_K^y \tag{7}$$

or at constant world prices

$$\hat{M}P_K^x = \hat{M}P_K^y \tag{8}$$

where the circumflex indicates percent change. For the purposes of the assumed technology, this condition can be written as

$$\hat{M}P_K^x = -(1-\alpha)\hat{k}_x = -(1-\beta)\hat{k}_y = \hat{M}P_K^y \tag{9}$$

where k_x and k_y are the capital-labor ratios in the *X* and *Y* sectors, respectively.

The implication for the labor market, however, is that, since $\alpha < \beta$

$$\hat{M}P_L^x = \alpha\hat{k}_x = \frac{\alpha(1-\beta)}{1-\alpha}\hat{k}_y = \hat{M}P_L^y \tag{10}$$

for $k_x, k_y > O$. That is, there is a magnification effect on the marginal value product of labor in the *Y* sector.

Now, let the government impose a minimum safety standard in sector *X* that exceeds the equilibrium level in Figure 6, holding world prices fixed. In the new equilibrium, *Y*-sector firms are not constrained by the minimum standard, so that the worker's safety-wage indifference curve must still be tangent to the *Y* firm's labor isocost curve. However, *X*-sector firms are not so characterized. For these firms it is merely necessary that the worker's indifference curve pass through (or touch) the *X* firm's labor isocost curve at the minimum safety level. Tangency is not required, since competing firms are legally prohibited from reducing cost by trading off worker safety for higher wages.

These conditions are clearly not satisfied at the minimum safety level in Figure 6. If the firm pays the safety-wage combination at *b,* it can hold on to its workers, but it is then paying those workers more than their marginal value product. On the other hand, if the firm pays the safety-wage combination at *a,* then it will lose all of its workers to the *Y* sector.

The government might expect that the new standard will cause the real wage to rise. However, this is not the case. In order to satisfy the labor-market-clearing conditions, raising the real wage requires that we expand the labor-intensive sector *X*. All firms would become more capital intensive so that the marginal value product of labor would rise and the two labor isocost lines in Figure 6 would begin to shift out. However, as noted previously, the *X*-sector isocost will shift out proportionately less than the *Y*-sector isocost. Therefore, it will be impossible to find a pair of isocost curves that satisfies the equilibrium conditions as characterized earlier.

Contracting the labor-intensive *X* sector has the opposite effect. As capital intensity falls, the marginal product of labor in the *X* sector falls more slowly than in the *Y* sector. The isocost curves shift left, rendering a new equilibrium as depicted in Figure 7.

Clearly, the safety in the *X* sector has risen. We can see, though, that as long as safety is a normal good, safety in the *Y* sector has fallen, since real income of workers declined.

Now consider the consequences for international trade. We can see that *X* production has fallen. Since *X* is the export good, it is likely that the terms of trade will improve with the standard. A similar standard in the partner country will also contract *X* supply onto the world market, further improving the home country's terms of trade. Therefore, the home country might seek an international standard if its objective is to improve its terms of trade or, more likely, if the home country is concerned with the level of employment in the *X* sector.

It is interesting to consider reversing the factor intensity ranking, letting *X* be the capital-intensive sector. In this case, increasing capital intensity in both sectors will cause the iso-labor-cost curve in the *X* sector to shift out faster than in the *Y* sector. A minimum labor standard that affects only industry *X*, then, would require a contraction of the *X* sector, thereby raising the real wage, increasing the capital intensity of production, and shifting the iso-labor-cost curve in the *X* sector out faster than in the *Y* sector.

Unlike the previous case in which the X sector is labor intensive, the standard *raises* the real wage. In addition, the safety level rises in *both* sectors even though the standard binds only on the *X* sector. Nevertheless, if world prices are variable, the terms of trade would still improve with the standard as long as it is imposed in the export sector. Thus an international standard would be desirable from the point of view of the home country. Conversely, a country's interest in harmonization on terms-of-trade grounds would be reversed if the standard were applied to the import-competing sector.

Our analysis of models with endogenous safety comports well with the model discussed in section 5.4. As before, the trade status (export or import) of the industry in which government intervention occurs determines the terms-of-trade effects associated with the standard. In addition, the terms of trade improve for the exporter of the relevant good no matter which country imposes the standard.

The two classes of models differ, though, in their predictions concerning worker safety. In the previous section we assumed that the standard would improve working conditions. By contrast, in models with endogenous safety, if a standard is imposed in the labor-intensive sector, then real wages fall economy-wide and the level of safety actually falls in the capital-intensive sector. We can be guaranteed that working conditions improve for all workers only if the minimum standard is imposed in the capital-intensive sector.

5.5.2 Endogenous Working Conditions and Market Failure

We turn now to consider a case in which the market does not give rise to efficient working conditions. One labor-market failure can come about even in a perfectly competitive environment if worker attitudes toward risk are highly heterogenous and nonuniformly distributed across the labor force. In this case, we find that if attitudes toward risk are normally distributed across workers, then safe plants that hire safety-conscious workers may not be safe enough. That is, workers preferring a safer plant but lower wages could compensate their coworkers preferring higher wages in a less safe

plant. By contrast, the more dangerous plants may be too safe given the distribution of non-safety-conscious workers employed.

For the purposes of this model we will retain the assumption that the *X* sector is the labor-intensive export sector and *Y* is the capital-intensive import-competing sector. Worker attitude toward safety, however, will be handled somewhat differently.

We will make two assumptions concerning worker preferences. (1) no two workers have the same set of preferences over safety and money wages; and (2) near the mean of the distribution of preferences over safety and money wages, workers are more similar to each other than in the tails. We impose one final condition: there is a floor below which labor employment in a particular firm cannot fall. As we will see, without this condition, each plant would employ only one worker.

To get a sense of this model, consider the wage-safety trade-off for two industries, *X* and *Y*, with *X* as before requiring greater expenditure to achieve a given level of safety. Each firm must choose a safety-wage combination along its industry isocost line. Now, however, the available workers have varying preferences for safety and wage income. Rather than having to offer a safety-wage package that all workers will regard as equivalent to what is available elsewhere, each firm can target a group of workers and tailor its safety-wage package to the members of that group. Equilibrium requires that each employee like the compensation package at least as much as others available, and thus that the marginal employee be indifferent between his or her employer's package and those packages that are most similar offered by other firms. The heterogenous preferences are shown in Figure 8 by several indifference curves, each for a different worker.

Recall that there is a minimum number of workers required for each firm. In the case shown, that number of workers supports three firms, numbered 1, 2, and 3, in the safer industry *Y*, plus three other firms, numbered 4, 5, and 6, in the more dangerous industry *X*.

Firm 1 has selected the highest level of safety and the lowest wage, and employs only workers from the safe tail of the preference distribution. Firm 2 selects somewhat less safety and a higher wage, employing the next group of workers. The indifference curve connecting the safety-wage packages of firms 1 and 2 is that of the marginal worker, who would be indifferent between the two firms. Continuing down and to the right in the figure, the safety-wage choices of firms 3 through 6 are shown, together with the corresponding indifference curves of the marginal workers in each case. There are also, of course, some lucky inframarginal workers (indifference curves, not drawn) for whom their current job is unequivocally more attractive than the next best alternative

Note a couple of points about Figure 8. First, for each marginal worker, because the indifference curve passes below the isocost line, there are many safety-wage combinations that are more attractive to the worker and cheaper for the firm. However, a new entrant who tries to locate between two plants, to capture the marginal workers, will not be able to attract a sufficiently large number of workers to meet the minimum start-up size.

As a corollary, no firm would ever locate so as to hire more than the minimum number of workers. Otherwise, an entrant could come in, offer a cheaper wage-safety combination, and still hire enough workers to undertake production.

Second, plants toward the center of the distribution have more similar safety levels than plants out in the tails. This conclusion follows from our assumption that in the center, the safety-wage trade-off is densely populated with workers. It also implies that the marginal-worker indifference curves pass further below the isocost lines at the tails of the distribution than they do toward the center. That is, workers in the tails are less satisfied with wages and working conditions than those with preferences closer to the mean.

The safety level within a plant has properties very much like a public good. Pareto optimality is achieved if the average marginal rate of substitution between wages and safety at each plant is equal to the price of safety.[21] As long as each plant is drawing equally from workers who prefer more safety and workers who want less safety, then the condition for Pareto optimality will be satisfied. However, if the entire distribution of worker tastes has a central tendency, as we assume, then our condition for efficiency will fail to obtain.

There is much debate among labor economists as to the direction of the resulting bias in plant safety. The model described here is strongly disposed to the conclusion that plants safer than average are, in fact, not safe enough, whereas plants more dangerous than average are too safe, given the allocation of workers across plants. This result follows from the fact that each plant draws more workers from an extreme of the wage-safety distribution than from the center. As a consequence, the distribution of preferences at each plant is skewed despite the fact that the overall distribution of worker preferences is symmetric.

Take, first, the plant located at the mean of the worker distribution. If the distribution of worker preferences is symmetric, then the central plant hires half of its employees from the population of workers that prefer more wages and less safety than average, and the other half from those who prefer more safety and less wages. This one plant, therefore, is likely to meet the requirement of Pareto optimality that the average MRS is equal to the firm's relative price of safety.

Now consider the adjacent next-safer plant. The central plant and the next-safer plant are going to divide the workers lying between them on the distribution. We can see, though, that since the distribution of workers is more dense close to the central plant than the next-safer plant, the central plant will be able to attract more of these intermediate workers than the next-safer plant. In order for the next-safer plant to acquire a full complement of workers, therefore, it must hire more than half of its workers from the group that would prefer an even safer plant.

The opposite is the case for plants below the mean. We conclude then that the presence of a central tendency in worker preferences will cause plants more safe than the mean to be too dangerous for the workers that they employ, whereas the plants that are more dangerous than the mean are too safe for the workers employed.

The consequent market failure, then, requires that safe plants become even safer. The government may therefore attempt to introduce a minimum safety standard that applies only to the safer of the two industries. Such a policy is depicted in Figure 8.

Suppose that we consider a minimum safety standard in the Y sector that is between the safety levels of the two most dangerous plants in this sector. Clearly, if the

[21] See Dickens (1984) for a demonstration.

most dangerous *Y* plant tries to move from its current position and locate at the minimum standard, it will not be able to attract enough employees to meet the start-up requirement.

Further, the most dangerous plant employed in the *Y* sector must shut down. The owners of the next most dangerous plant now realize that they can lower costs by offering less safety and higher wages. This is the case because they no longer have to compete with the *Y* sector's most dangerous plant for workers. They are bounded, of course, by the minimum safety standard.

Some of the resources released by the most dangerous *Y*-sector plant will find their way to the *X* sector. The resulting increase in production of the labor-intensive good will raise the real wage and shift both labor isocost curves outward. However, as before, the *Y*-sector isocost line will shift out faster than the *X*-sector isocost line.

A new *X*-sector plant will open up at a position like *a* in Figure 9. Such a plant could not have existed in the absence of a minimum standard in sector *Y*. For without the minimum standard, a *Y*-sector firm could have located at point *b*, stolen all of firm *a*'s labor, and still broken even.

It is unclear what happens to the level of safety in the economy. The average level of safety rises in both sectors, but the more dangerous industry has expended and the safer industry has contracted.

However, in any event, the market failure has not been corrected. The safe plants are still too dangerous and the dangerous plants are still too safe given the employees working at these plants.

The terms-of-trade effects are similar to those in the previous model. If the industry targeted for the minimum standard is in the import sector, then terms of trade deteriorate, and an international standard will make the home country worse off. Otherwise, the standard improves the terms of trade, and harmonization is attractive.

5.5.2 Summary

In the previous sections of this chapter we analyzed international bargaining over labor standards under the presumption that the government could usefully intervene to correct labor market failure. In this section we considered whether commonly used government policies, such as occupational safety and health regulations, do in fact have the desired effect.

We found that, under fairly reasonable assumptions, the labor market is capable of generating an efficient level of worker safety, so that no government intervention is necessary. Working conditions may vary across plants and industries, but this variability is largely a reflection of varying worker attitudes toward risk.

Nevertheless, the assumptions necessary to guarantee efficient working conditions may not apply in all industries. However, in most cases of market failure, government-mandated minimum working conditions will not restore Pareto optimality. We examined the case of heterogeneity of worker preferences over risk and money wages, and found that safety standards did little to correct the market failure.

Moreover, minimum safety standards can hurt the very workers they are intended to protect. A minimum standard applied to the labor-intensive sector will reduce money wages for workers in all sectors of the economy, and safety will decline in the

unregulated sector. Safety rises in the regulated sector but not by enough to compensate for the lower money wages.

We can be certain that workers gain from the standards only if the standard is applied to the capital-intensive sector. In this case wages and safety levels rise in all sectors of the economy, whether regulated or not.

5.6 Conclusions and Implications for International Harmonization of Labor Standards

Historically, labor standards began to emerge in the middle of the 19th century for reasons that had little to do with international goods trade. Reforms were generally concerned with the welfare of disadvantaged labor groups such as women, children, and prisoners. In some cases, the objective of the reforms was to eliminate techniques of production that had such horrible health consequences for workers that the reformers could not believe that the workers would take these jobs if they were aware of the dangers. The interest in international standards turned more on the desire to eliminate certain practices worldwide than on the desire to alter the trade in goods or gain an advantage in trade.

Over time, the pursuit of international labor standards has taken on a more protectionist tone. In some cases the protectionist intent is barely disguised. In fact, it is quite commonly feared that countries with below-average labor standards are gaining unfair advantage in trade.

In analyzing the economics of international labor standards we have sometimes found support for this view. However, the consequences of harmonization depend very much on the market setting. Frequently, harmonization is not found to be in the interest of the high-standard country. Some of the results of our analysis are summarized in the following list:

Summary of Main Results

1. In a price-taking environment, standards that are least-cost methods of fixing a market failure, like internalizing an externality, are welfare improving whether or not trade partners behave similarly. Welfare gains associated with setting price equal to social marginal cost are not contingent upon correct pricing in the rest of the world. Intervention in trade to punish foreigners who do not comply would not be welfare improving, since a price-taking economy cannot affect world prices.

2. Point 1 does not imply that a small country has no interest in international labor standards. On the one hand, action by all foreign governments could raise the world price of the affected goods, a result that would be beneficial to domestic producers of the good.

   Domestic consumers would, of course, be made worse off because they would suffer an increase in price but might not benefit from the improved allocation of foreign resources. However, domestic consumers could benefit despite the increase in price if the labor standard has a moral basis, such as eliminating child or forced labor.

   On the other hand, if home-country consumers do not benefit from foreign standards, and if the domestic sector is small enough, a small country could actually

be made worse off by an internationally coordinated attempt at correcting a market failure. But even so, such a country may still pursue harmonization if producers have a disproportionate role in policy making.

3. World welfare is best served when all countries internalize external effects. However, for cultural or economic-development reasons, the external cost of a labor-market abuse often varies by country. In such a case, harmonizing on an international standard will not produce an efficient outcome.

   Pressure to harmonize may still be applied, nevertheless, particularly by countries where the externality is large. For these countries, the cost of the standard borne by their producers will exceed the increase in the world price. Governments may therefore seek relief for their producers by demanding harmonization.

4. The standards themselves may have resource costs. In most cases, such as freedom from forced labor, child labor laws, maximum hours limitation, and a minimum wage, the standard is labor using. Or, as in the case of child labor laws that increase education, they may be unskilled labor using but skilled labor augmenting. These standards can be analyzed in the same manner as a change in the endowment of labor.

   However, other standards, such as occupational safety, require resources other than labor. The factor proportions of the safety industry then play a role in determining the effects of safety standards.

5. In a setting in which each economy is completely specialized in production, any standard that diverts resources away from the production of goods will contract the supply of exports to the world market. A terms-of-trade gain then results.

   A partner country imposing a standard will also improve its own terms of trade, thereby hurting the home country. Thus each country should prefer to go it alone.

   Because standards not only have a direct beneficial effect on labor but also improve a country's terms of trade, each country may be tempted to set a standard above the level necessary to correct any market failure that may exist. In such a setting, therefore, noncooperative behavior will leave the world with standards that are above the Pareto optimal level. International cooperation will be called for, but, as with tariffs, the treaty will call for a mutual lowering of labor standards.

6. The result under point 5 is quite fragile, however. Once we move away from a model with complete specialization to a Heckscher-Ohlin model, the outcome is quite different. Surprisingly, the terms-of-trade effect of a labor standard is entirely independent of the country that imposes the standard. The only parameter that matters is the factor proportions employed in implementing the standard relative to the world's factor endowments.

   If the standard has a higher capital-labor ratio than the world's endowment of capital relative to labor, then the price of the capital-intensive good will rise on the world market. The capital-abundant country will gain, whether or not it was the source of the standard.

   In such a setting, the capital-abundant country will tend to want a high labor standard, whereas a labor-abundant country will want a low standard. Harmonization would, therefore, improve world efficiency.

7. Labor standards that apply to only one industry have a similar property. Gains from the standard are determined by the country that exports the affected good, not the country that imposes the standard.

8. Finally, we explicitly modeled the market for safety. First we considered the case in which the market chooses the efficient level of safety. The results under point 7 carry over to the endogenous safety model. A standard will improve the terms of trade if applied to the export sector but worsen the terms of trade if applied to the import sector.

   There are two curious features of this model. The imposition of the safety standard will raise real wages only if the regulated sector is capital intensive. Otherwise, real wages fall. This is a consequence of the Stolper- Samuelson theorem. Also, if the regulated sector is capital intensive, then the safety level will rise in both the regulated and unregulated sectors.

   The gains from trade are difficult to establish in this model because government intervention introduces a distortion into the economy. However, gains are more likely if the export rather than the import sector is regulated, because increasing the price of the export good reduces the distortion caused by the regulation.

   We then turned to a model in which excessive worker heterogeneity gives rise to a market failure. As in the efficient endogenous safety model, terms of trade improve if the regulated sector is also the export sector.

   This model can also be used to illustrate that minimum safety standards frequently do not address the underlying market failure. Informational externalities are sometimes offered as an explanation for government regulation of working conditions. However, as in the heterogeneous worker model, a minimum safety level does not correct the market failure.

It should be evident from the foregoing summary that we have relied on a variety of models that have been designed to reflect settings in which different national characteristics may determine the outcome of the introduction of labor standards. Our intention accordingly has been to investigate the relationships between labor standards and trade primarily on a theoretical level. While our effort is by no means the final word on the subject, it appears to us that a fruitful next step would be to identify the interest groups and industries that are seeking to influence policy making in the design and implementation of international labor standards in different nations and to assess the economic effects of alternative policies.

5.6.1 Implications for International Harmonization of Labor Standards

Harmonization as a principle of negotiation in the GATT has served us well when applied to tariffs. It is established from a world-welfare point of view that harmonization on a zero tariff is best. This follows from the remarkably robust result that intervention at the border is virtually never a first-best policy.

It is natural to try to carry over the principle of harmonization to other aspects of negotiations, such as environmental and labor standards. Unfortunately, the principle that serves us so well with tariffs cannot be appropriately applied to the regulation of internal policies.

It is true that world welfare is best served by eliminating market failures where they exist, and the labor market is no exception. To the extent that labor standards are the appropriate remedy, then national governments should certainly enact them. However, there is little to suggest that such market failures are uniform across countries and, therefore, should be countered with similar measures. Hence, international harmonization of labor standards cannot be supported from a world-welfare point of view.

Furthermore, each country has a strong incentive to correct the market failures that exist within its borders. Therefore, there is not a strong case for international pressure to do so.

Our first conclusion, then, is that we should expect diversity in working conditions as the norm. As a terminological matter, it seems inappropriate to label as "unfair" the trade that follows from differences in labor standards as long as the labor standards are consistent with efficient resource use.

There is one important exception, however, to this conclusion. There are some cases in which labor standards are designed for income redistribution rather than to correct a market failure. Slave labor and child labor are two obvious examples. In the latter case, there are certainly efficient allocations that are highly inequitable, especially where children are concerned.

The international imposition of labor standards is even more difficult to defend because standards as commonly enacted rarely if ever address existent market failures. In our theoretical analysis, we offered as an example a minimum safety standard that was intended to address the market failure associated with diversity in tastes between wages and working conditions for workers within a plant. We found that the minimum standard raised real wages only if they were imposed in the capital-intensive sector. Otherwise, real wages fell economy-wide, and safety declines in the sector were not bounded by the minimum safety standard. Furthermore, the standard did not correct the market failure. We turn now to consider the likely effect of harmonization on high- and low-income countries. First, do high-income countries gain from imposing standards on low-income countries?

On the one hand, low-income countries tend to be abundant in unskilled labor. Minimum standards that impose restrictions on hours worked, child labor, prison labor, and the like remove some labor from the workforce. According to Heckscher-Ohlin type reasoning, the effect will be a contraction in the supply of labor-intensive production on the world market. As a consequence, the terms of trade of low-income countries will rise at the expense of high-income countries, thus making high-income countries worse off.

On the other hand, if the labor standard happens to be imposed in the capital-intensive sector, then the low-income countries will expand their export of labor-intensive goods. In this case, the terms of trade of the high-income countries will turn to their advantage.

Of course, the objective of labor standards in high-income countries may not be to raise national welfare, but rather to protect their scarce factor (unskilled labor). Labor standards in low-income countries will support this objective, but they will do so only by lowering welfare of both the high-income countries and the world as a whole.

In any event, the important point to realize here is that the gains from trade for the high-income countries do not depend on efficient resource use in low-income countries. The gains from trade stem simply from the opportunity to trade at prices other than

autarky prices. Therefore, high-income countries should be willing to trade with low-income countries whether or not they have optimally configured labor markets.
This conclusion naturally raises the opposite question. Do low-income countries gain from having standards imposed upon them? There are several reasons why this might be the case.

First, for various reasons a breakdown in the political process may prevent governments from enacting legislation that corrects a market failure. An international requirement to do so, therefore, may be politically useful. However, it must be kept in mind that, for this argument to be compelling, we would have to be confident that the required policy does indeed correct the labor-market failure. This point has yet to be demonstrated, as we discussed previously.

Second, as a historical matter, the right to organize has been a precursor to the development of democratic institutions. Supporting nascent labor organizations may be a legitimate activity for existing democracies.

Third, as noted earlier, standards that withdraw labor from the market will contract the supply of labor-intensive goods. The terms of trade of the low-income countries will therefore improve as a consequence. However, again, it should be kept in mind that the reason the low-income countries are gaining stems from the fact that the standard is helping labor to collude and exercise market power by withdrawing their services from the market. This outcome may be in the interest of the workers, but it lowers world welfare.

We finally come to the question of whether it would be appropriate to countervail against low-standard countries. There are some conditions under which countervailing would be counterproductive or unjustified. For example, if all countries in the world are essentially price takers, then a countervailing action by one country against another will serve only to reduce the welfare of the countervailing country and have no effect on the exporter.

More realistically, it seems entirely likely, indeed certain, that efficient use of the world's resources will require varying labor standards across countries. These varying labor standards will probably give rise to some trade flows. However, it seems inappropriate to punish countries whose exports are stimulated by low standards as long as the trade of these countries is consistent with the efficient use of productive resources.

Countervailing may be justified if labor standards that are necessary for efficient resource allocation have not been enacted. In this case, the absence of labor standards could depress the wages of unskilled workers worldwide. However, it should be noted that a countervailing duty in this case could lower wages in the offending country, thereby further worsening working conditions in the low-income country.

Consider a duty imposed by a high-income country on the labor-intensive exports from a low-income country. Within the high-income country, the duty will have the desired effect. The price of labor-intensive goods will rise, pulling up the return to labor. In contrast, the opposite will occur in the low-income country. The duty will lower the price of exports of the labor-intensive good. As a consequence, the return to labor in the low-income country will tend to fall.

To sum up, we would have to say that the case for international harmonization of labor standards is rather weak. As genuinely motivated as such calls for international harmonization may be, the theoretical case has not been made. Furthermore, it is likely

that international harmonization of labor standards will have unintended adverse consequences for the very people they are intended to protect.

APPENDIX

Worker Rights Standards

I. Freedom of Association
   A. Definition: The right of association concerns relations between unions and governments and involves the right of workers and employers
      1. to establish and join organizations of their choosing without previous authorization;
      2. to draw up their own constitutions and rules, elect their representatives, and formulate their programs;
      3. to join in confederations and affiliate with international organizations; and
      4. to be protected against dissolution or suspension by administrative authority.
   B. General principles
      1. Freedom of association applies to everyone *except* military and police.
      2. Unions should be independent of the government or ruling party.
      3. Restrictions on the right to strike are legitimate only for government service (civil servants engaged in the administration of the state) and "essential services" (only those services whose interruption would endanger worker or public safety and health). When denied, there should be an effective alternate process for mediation, arbitration, and settlement of grievances.
      4. Unions' civil liberties must be respected.
      5. Unions may form and join federations, confederations, and international confederations.

II. The Right to Organize and Bargain Collectively
   A. Definition: The right to organize and bargain collectively concerns relations between unions and employers and involves the right of workers
      1. to be represented in negotiating the prevention and settlement of disputes with employers;
      2. to protection against interference with union activities;
      3. to protection against acts of antiunion discrimination; and
      4. to protection against refusal of employment, dismissal, or prejudice resulting from union membership or participation.
      5. Government should promote processes for voluntary negotiations between employers and workers and their organizations.
   B. General principles
      1. Voluntary collective bargaining should be protected by law and should be practiced.
      2. Antiunion discrimination by employers should be illegal.
      3. Speedy and effective processes should exist to review union/worker complaints of antiunion discrimination.

III. Forced Labor

A. Definition: Forced labor should be prohibited and suppressed in all its forms. Although there are certain exceptions, forced labor refers to work or service exacted from any person under the menace of penalty and for which the person has not volunteered. "Menace of penalty" includes loss of rights or privileges as well as penal sanctions.

B. General principles

1. Forced labor should *never* be used for the following purposes:
    a. economic development.
    b. to enforce racial, social, national, or religious discrimination.
    c. as political coercion or education, or punishment for holding or expressing political views opposed to the established political, social, or economic system.
    d. for labor discipline.
    e. as a punishment for having participated in legal strikes.
2. The following do not constitute "forced labor" as defined under the international standards:
    a. certain forms of prison labor, *only* when imposed following conviction for a crime in a court of law.
    b. national service obligations (compulsory military service and normal civic obligations).
    c. genuine emergency, limited to a "sudden, unforeseen happening, calling for instant countermeasures, such as war, calamity or threatened calamity such as earthquakes, floods, pestilence, etc."
    d. minor communal services, defined as services performed by community members in the direct interest of the community.

IV. Minimum Age for Employment

A. Definition: The minimum age standard aims at the effective abolition of child labor by raising the minimum age for employment to a level consistent with the fullest physical, mental, and social development of young people.

B. General principles

1. The minimum age for employment should be set no lower than 15, with an option for a lower minimum of 14 for developing countries with a level of economic development that makes the realization of the higher standard impossible. Countries that set the minimum age at the lower level, however, should be trying to progressively change conditions so that they can meet the higher standard.
    a. Exceptions: light work is permissible for 13-15-year-olds; minimum age of 18 for dangerous work; work in connection with education or training; participation in artistic performances.
2. Minimum age legislation should cover all economic activity, not just employment under contract.
3. Education should be provided for all children and should be compulsory. The minimum age for employment shall not be less than the age for completion for compulsory schooling.

4. Minimum age legislation should have an effective enforcement system that includes an adequate number of inspectors and penalties that serve as effective deterrents. Penalties should include fines and/or imprisonment.

V. Acceptable Conditions of Work

A. Definition: The standards for acceptable working conditions provide for the establishment and maintenance of systems, adapted to national conditions, that provide for minimum working standards: wages that provide a decent living for workers and their families; working hours that do not exceed 48 hours per week, with a full 24-hour rest day; a specified annual paid holiday; and minimum conditions for protection of the safety and health of workers.

B. Basic principles

1. Minimum wage principles
   a. There should be a national, statutory minimum wage.
   b. It should be set realistically, preferably as a result of an open, public, or tripartite process, with certain specified criteria.
   c. Wages should be protected, that is, paid in money, and workers should be able to choose where and how they spend their wages.
2. Hours of work
   a. Working hours should not exceed 48 hours per week, with a full 24-hour rest day. Workers should have a specified annual paid holiday.
   b. Overtime should be regulated, remunerated at a higher rate than for "normal" working hours, and prohibited from exceeding a certain number of hours in a given period.
3. Safety and health principles
   a. Workers should have health and safety rights in the workplace, including a complaint process for hazardous conditions and the right to remove themselves from hazardous situations.
   b. The government should set health and safety standards as part of an open, public, or tripartite process.
4. Enforcement principles
   a. There should be a legislatively mandated enforcement system for minimum wage, hours of work, and safety and health.
   b. Inspectors should have the right to enter the workplace, should have access to workers and their representatives, and have the right to issue citations for violations.
   c. Workers and unions should be protected against adverse action in filing complaints.
   d. Penalties for violations should not be limited to warnings, but should include fines and prison sentences.

Note: As stated in Lyle (1991, p. 20): "These are not intended to be legal definitions, nor to encompass the entire spectrum of internationally recognized worker rights. Rather, they represent general guidance intended merely to highlight the basic principles behind each of the five internationally recognized worker rights found in U.S. trade law."
Source: Adapted from Lyle (1991, pp. 20-31).

REFERENCES

Abraham, Filip. 1994. "Social protection and regional convergence in a EMU." *Open Economies Review* 5:89-114.

Alam, Asad. 1992. "Labor standards and comparative advantage." Unpublished doctoral dissertation, Columbia University.

Bhagwati, Jagdish. 1995. "The demands to reduce domestic diversity among trading nations," Chapter 1 in this volume.

Bhagwati, Jagdish, and T. N. Srinivasan. 1995. "Trade and the environment: Does environmental diversity detract from the case for free trade" Chapter 4 in this volume.

Campbell, Duncan C. 1990. "EC 1992: The social dimension at issue," in Jorge F. Perez-Lopez, Gregory E. Schoepfle, and John Yochelson, eds., *EC* 1992: *Implications for U.S. workers,* Proceedings of a Working Roundtable, jointly sponsored by the U.S. Department of Labor and Center for Strategic and International Studies. *Significant Issues Series,* 12:97-124.

Charnovitz, Steve. 1986. "Fair labor standards and international trade," *Journal of World Trade Law* 20:61-78.

Charnovitz, Steve. 1987. "The influence of international labour standards on the world trading regime: A historical review." *International Labour Review,* 126:565-584.

Charnovitz, Steve. 1992. "Environmental and labour standards in trade." *The World Economy,* 15:335-356.

Commission of the European Communities. 1990. *The Community Charter of Fundamental Social Rights for Workers.* European File 6/90. Brussels: Commission of the European Communities.

De Boer, Elizabeth, and Gilbert R. Winham. 1993. "Trade negotiations, social charters, and the NAFTA." In Jonathan Lemco and William B. P. Robson, eds., *Ties beyond trade: Labor and environmental issues under the NAFTA.* Canadian American Committee: C. D. Howe Institute (Canada) and National Planning Association (U.S.A.).

Dickens, William T. 1984. "Occupational safety and health regulation and economic theory," In William Darity, Jr., ed., *Labor economics: Modern views.* Boston: Kluwer-Nijhoff.

Dorman, Peter. 1989. *Worker rights and U.S. trade policy: An evaluation of worker rights conditionality under the general system of preferences.* U.S. Department of Labor, Office of International Economic Affairs, Bureau of International Labor Affairs. Washington, DC: U.S. Government Printing Office.

Garcia Rocha, Adalberto. 1990. "Mexico." In Stephen A. Herzenberg, Jorge Perez-Lopez. and Stuart K. Tucker, eds., *Labor standards and development in the global economy.* Washington, DC: U.S. Department of Labor, Bureau of International Labor Affairs.

Hanson, Gote. 1983. *Social clauses and international trade: An economic analysis of labour standards in trade policy.* New York: St. Martin's Press.

Herzenberg, Stephen A 1988. "Institutionalizing constructive competition: International labor standards and trade." Economic Discussion Paper 32, U.S. Department of Labor, Bureau of International Labor Affairs, Office of International Economic Affairs, Division of Foreign Economic Research.

Howse, Robert, and Michael J. Trebilcock. In process. "The fair trade free trade debate: Trade, labour and the environment," University of Toronto.

International Labor Organization (ILO). 1988. *Human rights: A common responsibility.* International Labor Conference, 75th Session, 1988. Geneva: ILO.

Klevorick, Alvin K. 1995. "Reflections on the race to the bottom." Chapter 12 in this volume.

Kochan, Thomas A., and Willis Nordlund. 1989. *Reconciling labor standards and economic goals: An historical perspective.* U.S. Department of Labor, Office of International Economic Affairs, Bureau of International Labor Affairs. Washington, DC: U.S. Government Printing Office.

Lande, Stephen, and Ariel Dybner. 1994. "The future of the U.S. Generalized System of Preferences:" Overseas Development Council, *Policy Focus,* No.5.

Leary, Virginia A. 1995. "Workers' rights and international trade: The social clause (GATT, ILO, NAFTA, U.S. Laws)." Chapter 5 in Volume 2 of this work.

Lemco, Jonathan, and William B. P. Robson, eds. 1993. *Ties beyond trade: Labor and environmental issues under the NAFTA.* Canadian American Committee: C. D. Howe Institute (Canada) and National Planning Association (U.S.A.).

Levinson, Arik. 1995. "Environmental regulation and industry location: International and domestic evidence." Chapter 11 in this volume.

Lyle, Faye. 1991. "Worker rights in U.S. policy." *Foreign Labor Trends,* 91-154, U.S. Department of Labor, Bureau of International Labor Affairs. Washington, DC: U.S. Government Printing Office.

Marshall, Ray. 1990. "Trade-linked labor standards." In Frank J. Macchiarola, ed., "International trade: The changing role of the United States." *Proceedings of the Academy of Political Science,* 37:67-78.

Morici, Peter. 1993. "Implications of a social charter for the North American Free Trade Agreement." In Jonathan Lemco and William B. P. Robson, eds., *Ties beyond trade: Labor and environmental issues under the NAFTA.* Canadian American Committee: C. D. Howe Institute (Canada) and National Planning Association (U.S.A.).

Office of Technology Assessment (OTA), Congress of the United States. 1992. *U.S.-Mexico trade: Pulling together or pulling apart?* Washington, DC: U.S. Government Printing Office.

Perez-Lopez, Jorge F. 1993. "Promoting international respect for worker rights through business codes of conduct." *Fordham International Law Journal,* 17:1-47.

Portes, Alejandro. 1990. "When more can be less: Labor standards, development, and the informal economy." In Stephen A. Herzenberg, Jorge Perez-Lopez, and Stuart K. Tucker, eds., *Labor standards and development in the global economy.* Washington, DC: Bureau of International Labor Affairs.

Rybczynski, T. M. 1955. "Factor endowment and relative commodity prices," *Economica,* 22:36-41.

Sapir, Andre. 1995. "Trade liberalization and the harmonization of social policies: Lessons from European integration." Chapter 15 in this volume.

Schoepfle, Gregory K. 1990. *Labor standards in export assembly operations in Mexico and the Caribbean.* U.S. Department of Labor, Bureau of International Labor Affairs. Washington, DC: U.S. Government Printing Office.

Schoepfle, Gregory K., and Jorge Perez-Lopez, eds. 1993. *Work without protections: Case study of the informal sector in developing countries.* Washington, DC: U.S. Department of Labor, Bureau of International Labor Affairs.

Schoepfle, Gregory K., and Kenneth A. Swinnerton, eds. 1994. *International labor standards and global economic integration: Proceedings of a symposium.* Washington, DC: U.S. Department of Labor, Bureau of International Labor Affairs.

Singh, Ajit. 1990. "Southern competition, labor standards and industrial development in the North and South." In Stephen A. Herzenberg, Jorge Perez-Lopez, and Stuart K. Tucker, eds., *Labor standards and development in the global economy.* Washington. DC: U.S. Department of Labor, Bureau of International Labor Affairs.

U.S. Department of Labor, Bureau of International Labor Affairs (I LAB). 1989-90. "Worker rights in export processing zones." *Foreign Labor Trends,* FLT 90-132, including Volume 2, "Worker rights in export processing zones: Mexico." Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor, Bureau of International Labor Affairs (ILAB). 1992. *International worker rights: Child labor, special categories in East Asia, informal sector.* Biennial Report to Congress. Washington, DC: U.S. Department of Labor.

U.S. General Accounting Office (GAO). 1993. *Occupational safety and health: Differences between programs in the United States and Canada.* GAO/HRD-94-15FS (December).

Watson, William. 1993. "A skeptical view of the social charter." In Jonathan Lemco and William B. P. Robson, eds., *Ties beyond trade: Labor and environmental issues under the NAFTA.* Canadian American Committee: C. D. Howe Institute (Canada) and National Planning Association (U.S.A.).

Weintraub, Sidney, and Jan Gilbreath. 1993. "The social side to free trade." In Jonathan Lemco and William B. P. Robson, eds., *Ties Beyond Trade: Labor and environmental issues under the NAFTA.* Canadian American Committee: C. D. Howe Institute (Canada) and National Planning Association (U.S.A.).

Wilson, John Douglas. 1995. "Capital mobility and environmental standards: Is there a theoretical basis for a race to the bottom?" Chapter 10 in this volume.

Table 1

Evolution of Labor Standards in U.S. Trade Policy Legislation

Year	Act	Labor Standards Provisions
1890	McKinley Act	Prohibited imports made by convict labor.
1930	Tariff Act	Prohibited imports of goods made by convict labor, forced labor, or indentured labor under penal sanction.
1933	National Industrial Recovery Act (NIRA; judged unconstitutional by U.S. Supreme Court in 1935)	Imports permitted only if produced according to U.S. domestic fair labor standards, including the right to organize and bargain collectively, limits on maximum hours of work and minimum wages.
1974	Trade Act	Directed the president to seek the adoption of fair labor standards in the Tokyo Round of GATT negotiations.
1983	Caribbean Basin Economic Recovery Act (CBERA)	Criteria for eligibility as a beneficiary country extended to include the degree to which workers are afforded reasonable workplace conditions and enjoy the right to organize and bargain collectively.
1984	Generalized System of Preferences (GSP) Renewal Act	Criteria for eligibility as a beneficiary country extended to include whether or not the country has taken, or is taking, steps to afford its workers internationally recognized worker rights defined as including freedom of association, the right to organize and bargain collectively, freedom from forced labor, minimum age for the employment of children, and acceptable conditions of work with respect to wages, hours of work, and occupational safety and health.
1985	Overseas Private Investment Corporation Amendments Act	The corporation is to insure, reinsure, guarantee, or finance a project in a country only if the country is taking steps to adopt and implement internationally recognized worker rights as defined for GSP purposes.

1986	Anti-Apartheid Act	Made it incumbent on U.S. firms employing more than 25 persons in South Africa to follow a code of conduct that includes fair labor standards.
1987	U.S. participation in Multilateral Investment and Guarantee Agency of World Bank	Made U.S. participation conditional on countries affording internationally recognized worker rights to their workers.
1988	Trade Act (Omnibus Trade and Competitiveness Act)	Made the systematic denial of internationally recognized worker rights (as defined above) by foreign governments an unfair trade practice and liable for U.S. countermeasures where such denials cause a burden or restriction on U.S. commerce.

Source: Adapted from Alam (1992, p. 25)

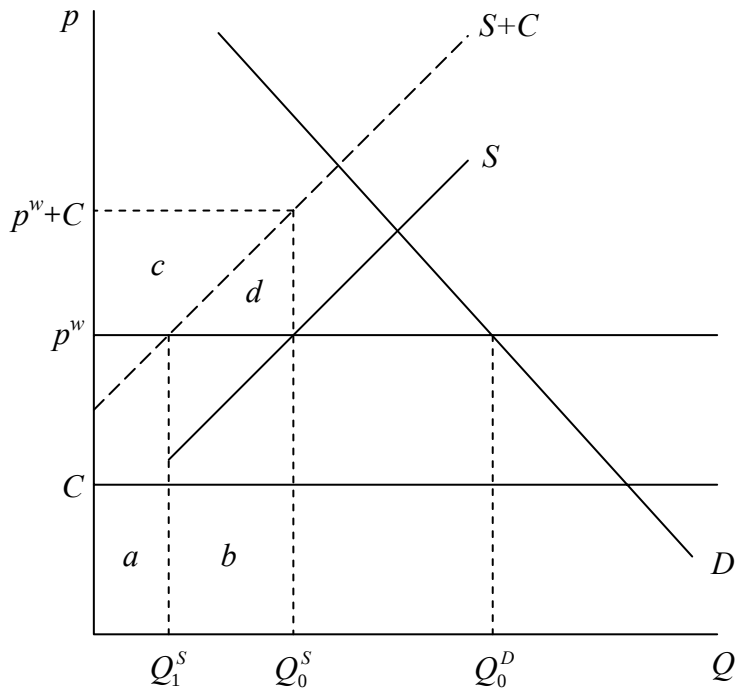

Figure 1
Partial Equilibrium Effects of a Standards Policy in a Small Country

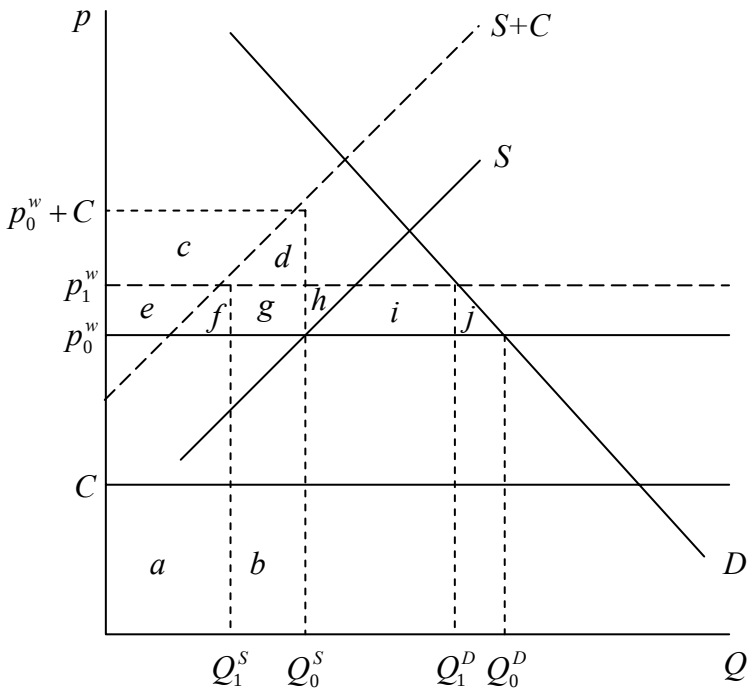

Figure 2
Partial Equilibrium Effects of a Common International Standard in a Small Country

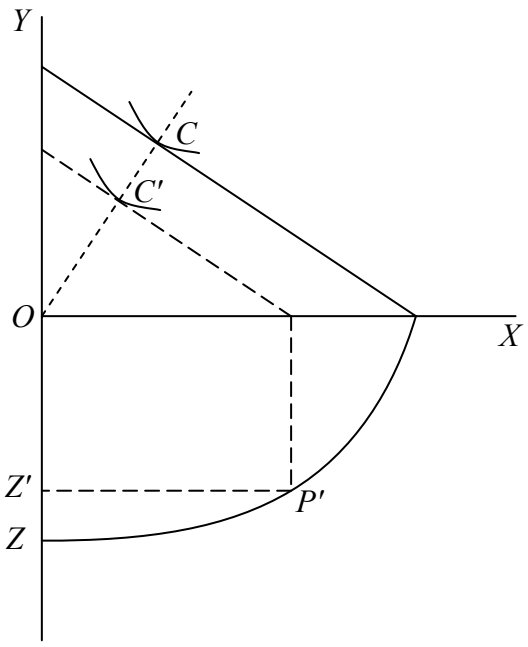

Figure 3
General Equilibrium Effects of a Standards Policy in a Specialized Economy

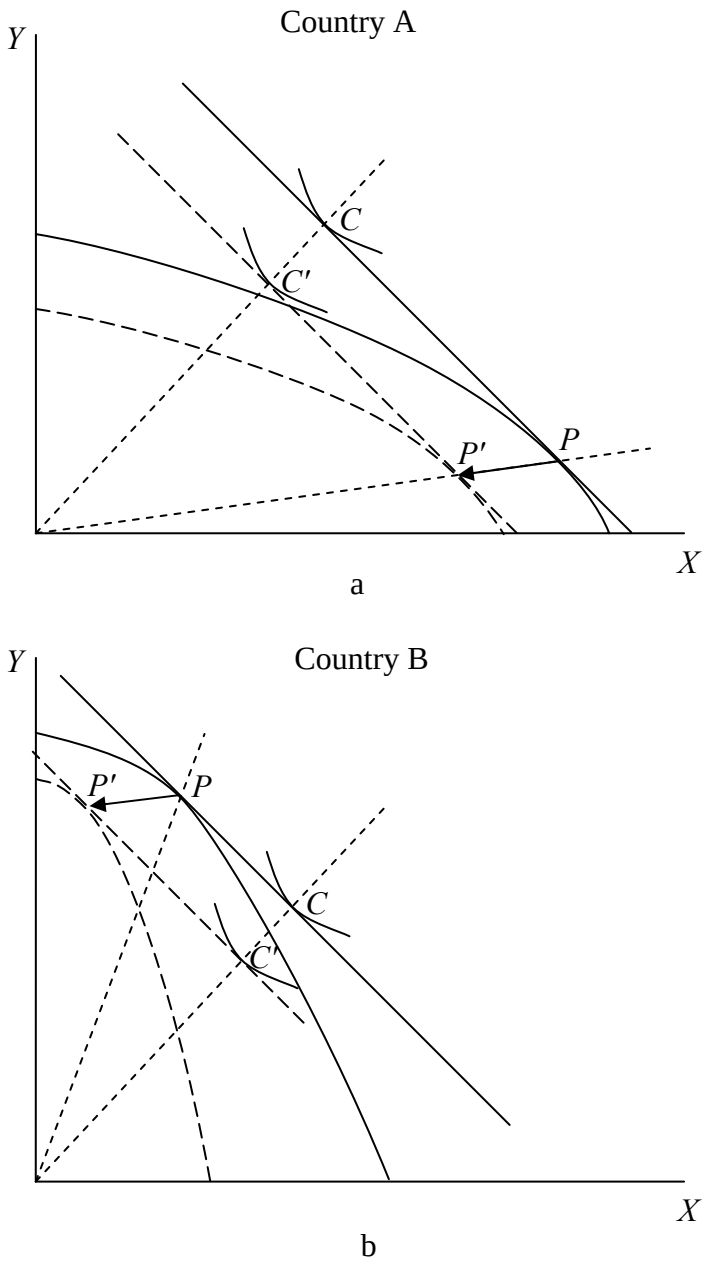

Figure 4
General Equilibrium Effects of Economy-Wide Labor Standards in a Heckscher-Ohlin Model

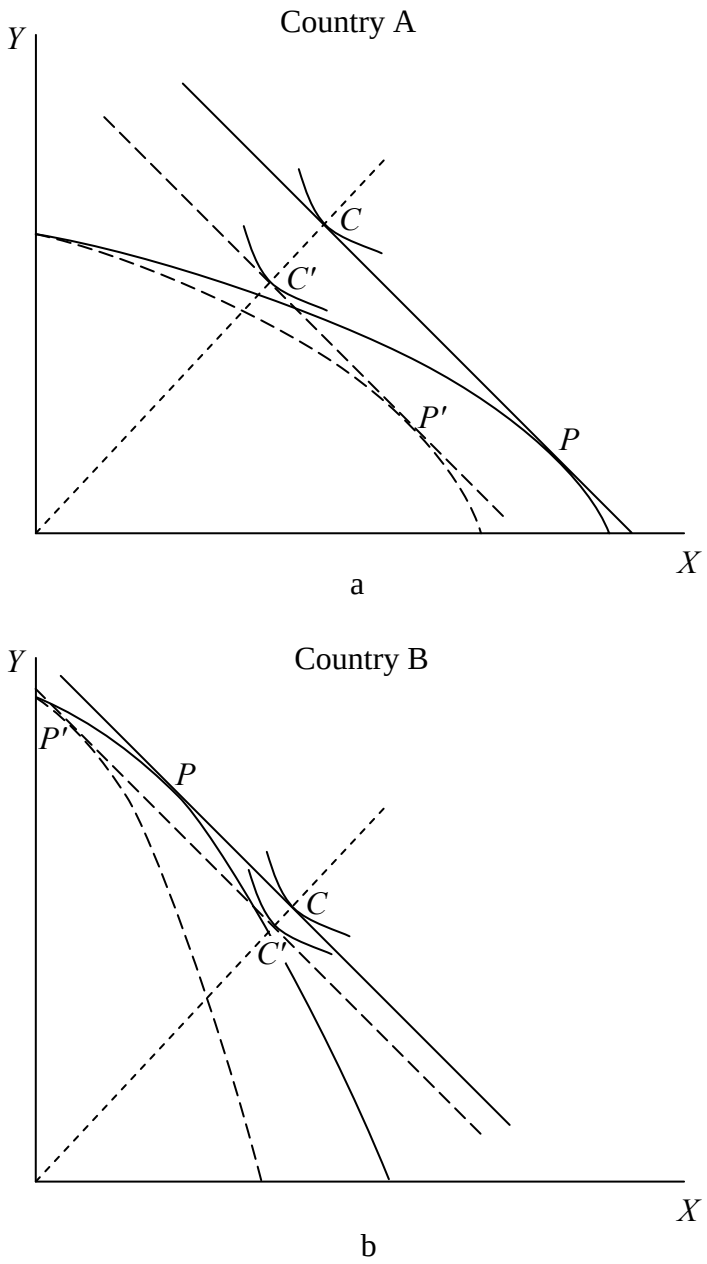

Figure 5
General Equilibrium Effects of an Industry Labor Standard in a Heckscher-Ohlin Model

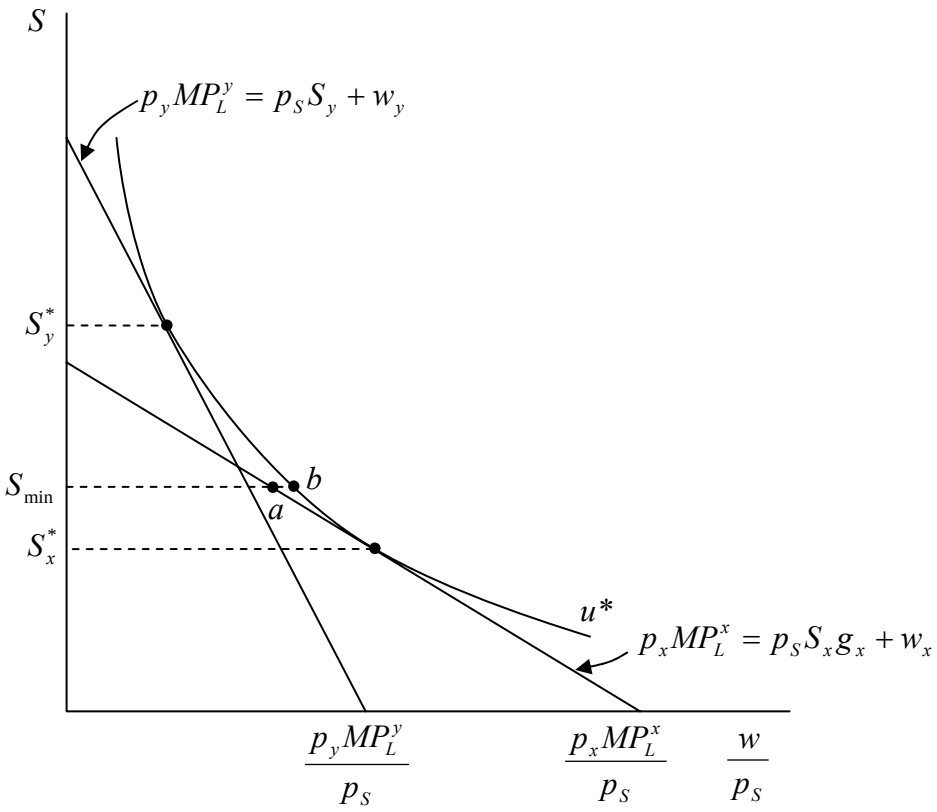

Figure 6
The Trade-off between Wages and Safety for Firms and Workers in Two Sectors

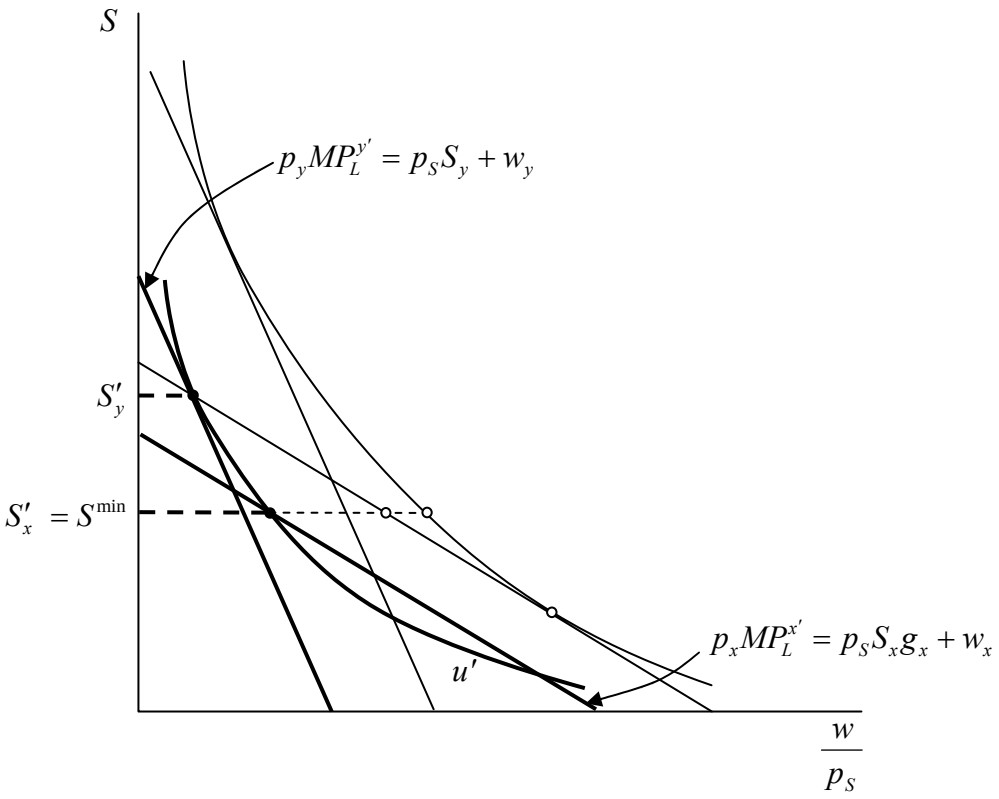

Figure 7
Effects of a Minimum Safety Requirement

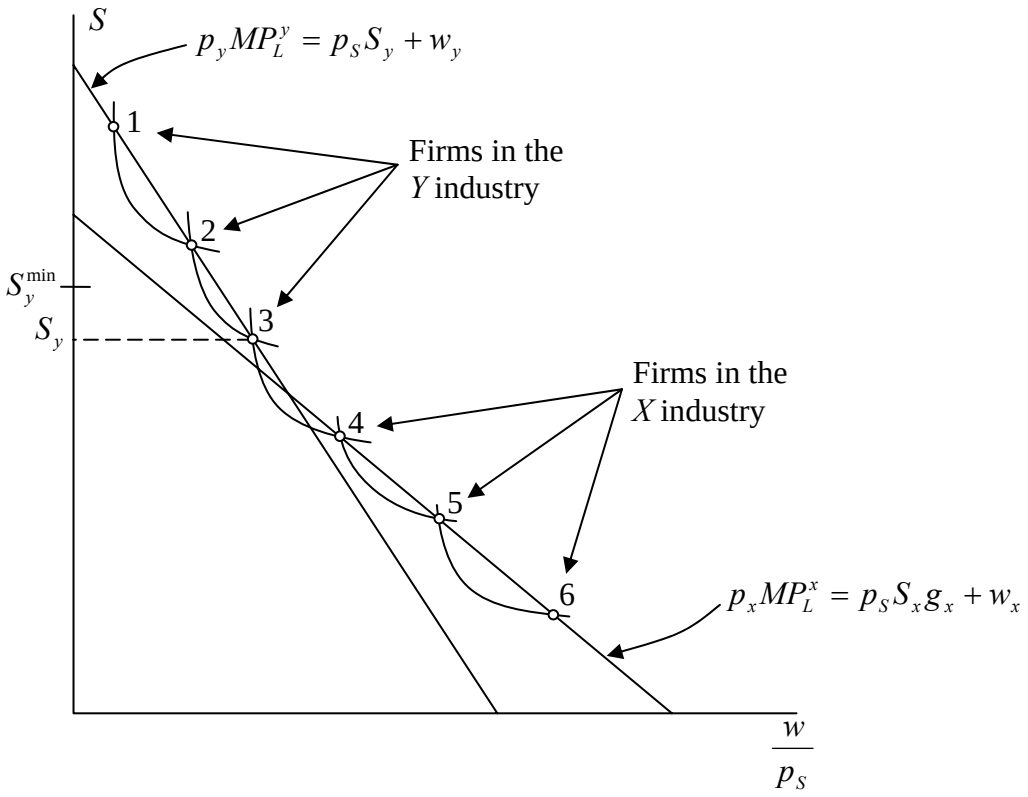

Figure 8
Two Industries with Heterogeneous Worker Preferences

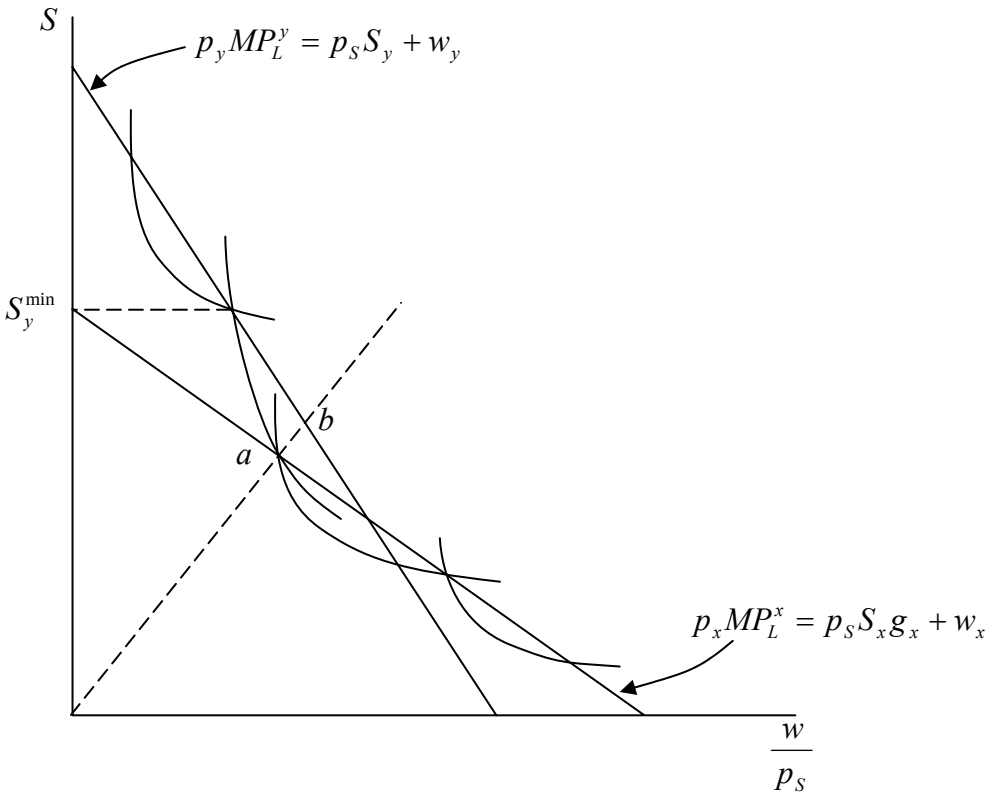

Figure 9
Minimum Safety Standard with Heterogeneous Worker Preferences