

Trade and Labor Standards: A Review of the Theory and New Empirical Evidence*

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Abstract

Despite its exclusion from the Doha agenda, the issue of trade and labor standards remains an intensely discussed subject among economists, policymakers, international agencies and nongovernmental organizations. In the past few years, both World Trade Organization (WTO) and International Labor Organization (ILO) member states have agreed that labor standards should not be used for protectionist purposes and that ignorance of, and deliberate violations of core labor standards to achieve comparative advantage, should be avoided. Member states of these two organizations have also made clear commitments to the adherence of core labor standards (as evidenced, for example, by the Singapore Ministerial Declaration of 1996 or the ILO Declaration on Fundamental Principles and Rights at Work of 1998). Since the WTO Singapore Ministerial declaration, the International Labor Organization (ILO) has been very active, and it recently published a voluminous report on the “Social Dimensions of Globalization” that reaffirms its promotional approach to labor standards, regularly reporting on commitments made by countries and supporting them through technical cooperation. During the fourth round of WTO talks in Doha in 2001, ministers stated that “We reaffirm our declaration made at Singapore Ministerial Conference regarding internationally recognised core labour standards. We take note of work under way in the International Labour Organisation (ILO) on the social dimension of globalisation”. Such statements do not rule out the possibility that the WTO will be called upon in the future to link social issues to trade agreements, which in our view, would open an unnecessary window (after environmental standards) for more non-trade issues such as human rights or social development. In fact, at the regional level, many preferential-trade agreements already include social clauses. In this paper, we review the theoretical and empirical literature examining the issue of trade and labor standards. In the first part of the paper, we survey the theoretical literature on trade and labor standards and extract the main analytical arguments from that literature. In the second part of the paper, we use new data on labor standards to examine 1) the conventional wisdom that countries with lower standards obtain (unfair) advantages in trade and 2) the relationship between openness

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and labor standards. Our estimates are based on cross country regressions for developing countries and builds on the work done by Dehejia and Samy (2004), and Rodriguez and Samy (2003). While much of the literature tends to emphasize the labor cost effects of standards, non-labor cost effects in the form of stability and improvements in trade competitiveness cannot be automatically ruled out, and hence the relationship between labor standards and trade may not be as clear as one would hope. Our estimates provide rather weak evidence in favor of the conventional wisdom and we find no evidence that trade openness has led to a worsening of labor standards (represented by child labor).

Keywords: international trade, labor standards, child labor

JEL: F13, F14, F15

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1. Introduction

Should labor standards be imposed in international trade? This issue, despite not being a new one¹, has been at the forefront of trade negotiations in recent years. Economists, policy makers and governments especially, but also the public at large, through labor unions and humanitarian organizations, have demonstrated a keen interest in this question because of concerns arising out of the increasing globalization of the world economy. The debate over the inclusion of labor standards in international trade is a reflection of how to improve the lot of the poor in developing countries. Labor interests in high-standard or developed countries, and humanitarian organizations view the adoption of core labor standards as a necessary condition for improving labor standards. But members of this group are not clear on how the likely increase in production costs due to improved standards will be shared. For example, in a closed economy, firms will have a tendency to shift the increase in costs on to the consumers through higher prices. However, in a world characterized by free trade and where prices are determined on international markets, the firm (or its workers) will have to bear the cost of the labor standards. Developing or low-standard countries argue that the imposition of labor standards is disguised protectionism as it will rob them of their competitive advantage, which is largely based on labor costs.

As a result, labor groups in high-standard countries think that low-standard countries have an unfair source of comparative advantage (the so-called conventional wisdom), and they fear that there will be a race to the bottom of standards as trade flows represented by imports from low-standard countries intensify. It should therefore come

¹ Leary (1996) mentions that as early as the mid-nineteenth century, industrialists were already preoccupied by the fact that domestic laws against child labor or in favor of a minimum working week would put their industries at a competitive disadvantage.

as no surprise that both the United States and France, because of strong domestic lobbies, attempted (without success) to put labor standards on the agenda during GATT talks, as well as during WTO conferences in Singapore and Seattle in 1996 and 1999 respectively. The European Union also brought this issue at the WTO conference in Doha in 2001, and it was rejected by the developing countries. In fact, in Doha, the WTO was asked to take note of work under way at the ILO on the social dimensions of globalization, and the WTO itself indicated that it would hold talks about labor standards. Regarding the 'race to the bottom' of standards across countries, one can argue against this possibility at a theoretical level by pointing out that even though labor standards may be distortionary, they can also enhance efficiency². Hence, there exist incentives for countries to increase rather than reduce the level of their standards. For instance, unionization, a broad form of a labor standard, has both positive and negative effects on the labor market. Because of this, and for political economy reasons³, one should not expect countries to be dragged into a 'race to the bottom' of standards.

For some years now, both WTO and ILO member states have committed themselves to the observance of core labor standards⁴ (as reflected in the WTO Singapore Ministerial Declaration of 1996 and the ILO Declaration on Fundamental Principles and Rights at Work of 1998). They have also agreed that labor standards should not be used for protectionist intents and that ignorance of, and deliberate violations of core labor

² It is equally possible that in a game theory setting, an absence of cooperation will lead to a prisoner's dilemma equilibrium where each country lowers its standard to gain a competitive advantage over its rivals.

³ Indeed, in well functioning democracies, labor standards legislation just like any other legislation, should represent what the majority of the public desires. It could also be determined by narrowly based lobbies, but by and large the majority of the public favors fairly tight standards so that there exists some political pressure for them.

⁴ Core labor standards are supported internationally, and this shows that they are applicable regardless of a country's level of economic development. They do not set a particular level of working conditions, wages or health and safety standards to be applied internationally, and are not meant to change the comparative advantage of any country.

standards to achieve comparative advantage, should be avoided. The focus on core labor standards (represented by eight ILO conventions defining four fundamental rights at work, namely: the elimination of all forms of forced or compulsory labor – Conventions 29 and 105; the effective abolition of child labor, with priority to the worst forms – Conventions 138 and 182; equal opportunity and non-discrimination in employment – Conventions 100 and 111; and freedom of association and the right to collective bargaining – Conventions 87 and 98) was recently brought to attention at the Declaration of the 1995 Copenhagen Summit on Social Development, whose main objective was to put human beings at the center of development. These basic rights were also brought forward previously in the Universal Declaration of Human Rights in 1948 and in the Convention on the Rights of the Child in 1989⁵. Several authors (see for example Portes (1990), Fields (1995), and Aggarwal (1995)) have discussed the issue of what should constitute a labor standard and we do not pursue this debate further here. Instead, labor standards will be loosely defined as a set of enforceable rules and regulations governing workers' rights, and the focus in this paper is on the impact of these standards on trade, theoretically and empirically.

The rest of the paper proceeds as follows. Section 2 discusses the theoretical literature on trade and labor standards. We provide a rationale for labor standards from a purely domestic perspective and then examine the implications when countries open up to trade. In Section 3, we review the empirical literature on trade and labor standards, and use the latest available data to whether the conventional wisdom that low labor standards influence trade performance holds. We also verify whether openness to trade has

⁵ Even though we are sensitive to the 'human rights' argument for a set of core standards, the focus in this paper is mostly on competitiveness (that is, economic) issues and their implications for comparative advantage.

positively impacted labor standards, focusing on child labor in particular. Section 4 concludes the paper.

2. Trade and Labor Standards: Theoretical Literature⁶

In this section we first examine the case for labor standards starting with labor market models as in Martin and Maskus (2001), independent of international trade. The rationale for a labor standard, z , in these models, is that it provides utility to consumers, is costly to the firm, and improves worker productivity (see also Dehejia and Samy (2004) for a similar approach in an open-economy setting). One example of such a standard is when workers are offered a safer environment to work. We then examine the case for labor standards when the country engages in trade and extract the main analytical arguments for the empirical analysis in section 3.

2.1 *Rationale for Labor Standards*

Why do we observe different types of labor standards across countries? As in Martin and Maskus (2001), one can answer this question by considering a competitive labor market. In the event that a market failure exists, the government can intervene and impose a labor standard to correct it⁷. In a perfectly competitive market, a large number of small firms and workers take the wage as given and decide how many hours of labor they will demand and supply respectively. On the supply side, a particular worker's choice set is made up of the labor-leisure tradeoff as well as other job characteristics (labor standards) all of which affect her utility maximizing decision. In particular, the

⁶ This sub-section draws heavily on Singh (2002) and Dehejia and Samy (2004).

⁷ It is of course possible that government intervention will take place even in the absence of a market failure. For example, minimum wages or standards can be imposed on equity grounds even when one faces a competitive equilibrium.

worker's time (T) is allocated between labor (L) and leisure (l) such that $l + L = T$. A particular firm, given input and output prices, maximizes profits and decides on its input allocation, and this yields the labor demand curve. The worker's utility is a function of a vector of goods (X), leisure (l) and the labor standard (z):

$$U = U(X, l, z)$$

The utility function is assumed to be well-behaved (continuous, monotonic and quasiconcave) and where $U^l(X), U^l(l), U^l(z) > 0$ and $U^{ll}(X), U^{ll}(l), U^{ll}(z) < 0$. In this particular formulation, the standard adds to the worker's utility just like any of other good or leisure. This is a slight modification from Dehejia and Samy (2004), where the labor-leisure tradeoff is not explicitly modeled but where the focus is on examining the implications of a labor standard on traded goods for an open economy. In the present case, as long as the labor standard is exogenous, the worker's maximization problem is thus

$$\begin{aligned} \max_{X, l} U(X, l, z) \\ \text{s.t. } pX = wL = w(T-l) \end{aligned} \tag{1}$$

where T is time, w is wage, p is a vector of prices. The constraints faced by the worker are the wage rate (w) and the total time (T). The budget constraint in this case says that the value of goods consumed by the consumer must be equal to her labor income⁸. As in labor-leisure choice models, the worker chooses how many hours she will work (and hence l given that T is fixed) at the given wage and how she will spend her income on consumption goods, but the labor standard is assumed to be exogenous. This yields the

⁸ A fixed amount of non-labor income could be added to the budget constraint without changing the general results. In the present case, it is assumed to be zero.

familiar demand functions for goods and the labor supply function. The worker's preferences can also be described by an indirect utility function, $V_i = V_i(w, p, T, z)$ where V represents the maximum utility obtained by worker i , given p and T . In an open economy setting, the indirect utility will be a function of the same arguments but with prices being given by the terms of trade (see for example, Dehejia and Samy (2004) for a formal exposition using Cobb-Douglas preferences).

The perfectly competitive firm faces the familiar profit-maximization problem

$$\max_{L, K} \pi = TR - TC = PQ - wL - rK \quad (2)$$

$$\text{s.t. } Q = F(L, K, z)$$

where P is the output price, w and r are the wage and rental rates, and $F(K, L, z)$ is the production function. This profit maximization problem yields the demand functions for labor and capital. To summarize the situation thus far, utility maximization by the consumer gives us her labor supply curve; profit maximization by the firm gives us its labor demand curve. If we know the number of workers and firms in the economy, we can aggregate the demand and supply curves, obtain the market demand and supply curves and the equilibrium wage rate⁹. The basic competitive model presented above allows the exogenous labor standard, z , to affect both the worker's utility and the firm's output. However, as argued at the beginning of this section, labor standards may enhance efficiency, that is, have a positive impact on labor and capital productivity. For example, providing safety glasses or a better work environment to workers may improve their productivity even if it is an additional cost to the firm providing them (and this is an

⁹ In a perfectly competitive situation, the zero-profit condition due to free entry and exit determines the number of firms, and together with equilibrium in the labor market determines the wage rate.

element that we take into account in the empirical analysis conducted in section 3). What this means in our case is that it is more likely that the firm will also choose the level of standard based on cost and productivity effects of the standard than allowing the standard to be exogenously determined.

Assume then that the firm also decides on how much of the standard it will provide, so that its profit maximization problem now becomes

$$\begin{aligned} \max \pi &= PQ - wL - rK - c(z, L, K) \\ &L, K, z \end{aligned} \quad (3)$$

$$\text{s.t. } Q = F(K, L, z) \text{ and } z > 0.$$

The cost function $c(z, L, K)$ for the standard is increasing in its arguments and needs to be factored in, compared to the previous situation, and we assume that a positive level of the standard is desirable. Given that the standard is treated as any other input (labor or capital) by the firm, its determination is given by the condition that marginal benefit of extra output equals the marginal cost of the labor standard. If the firm ignores the fact that the standard z enters the worker's utility function, the socially optimal level of the standard will not be attained. If as in Dehejia and Samy (2004), we modify the worker's utility maximization problem given by equation (1) so that workers can choose the level of the standard that they desire (since the latter provides them with increased utility), the worker's maximization problem then becomes

$$\begin{aligned} \max U &(X, l, z) \\ &X, l, z \end{aligned} \quad (4)$$

$$\text{s.t. } wL = pX + p_z z$$

where p_z is the price of the standard, the latter being supplied competitively on the market and all the other terms are as before. The budget constraint in this case says that the

value of goods and labor standard consumed by the worker must be equal to her income. In other words, if firms are likely to provide less than the socially desirable level of standard, workers can buy more of the standard in competitive markets. The optimal level of the standard is thus attainable if the standard can be purchased by the utility maximizing consumer. In practice, the option of buying a standard on competitive markets may not be available, especially in poor developing countries. It is safer to assume that firms will offer workers a wage-standard, (w,z) , combination, as in the theory of compensating differentials, developed by Adam Smith¹⁰. There is a feasible set of combinations (w,z) that the firm is willing to offer for any given profit level, a so-called iso-profit curve. Workers take jobs by choosing among different (w,z) bundles and choose the bundle that maximizes their total utility; they have different indifference curves reflecting different (w,z) combinations. The tangency of a worker's indifference curve with the firm's iso-profit curve gives us the equilibrium (w,z) combination. If firms and workers are each homogenous, there is only one iso-profit curve pinned down by the zero profit condition from free entry and exit. With the mobility of workers across firms, the workers' utility is maximized subject to the zero profit condition, yielding the unique optimal (w,z) combination with no compensating differential. The wage that workers receive reflects the amount of the standard provided, the cost of the standard and worker tastes. Once we relax the assumption of worker and/or firm heterogeneity, different outcomes are possible but the general result that jobs with better standards pay lower wages still holds. For instance, when both workers and firms are heterogeneous, there is an efficient matching of workers with firms that can give them the best (w,z)

¹⁰ See the Chapter on Compensating Wage Differentials in *Labor Market Economics* by Benjamin et al (2002) for a detailed exposition.

combination. Once again, the market works efficiently. More importantly, a worker who wants higher wages in exchange for poorer conditions may not necessarily find a firm that is willing to meet her demands. The allocation of resources is thus Pareto-optimal. Also, imposing minimum levels of standards may make workers worse off in this model.

One problem with the labor standard, z , that we have skirted thus far, is the fact that it may in many cases be a public good (Casella, 1996), and hence be subject to the common free-rider problem. For example, if clean air is to be provided to workers in a factory, the optimal level of clean air is obtained by equating the marginal gains (to workers and the firm) to the marginal cost of providing clean air; workers want more of the standard because it increases their utility, firms want more because it can improve their productivity. Both workers and the firm have an incentive to free ride on each other (and workers may free ride among themselves), and to the extent that they do not cooperate, the standard is underprovided compared to the socially efficient level. A benevolent social planner could technically impose labor standards to overcome the free-rider problem (which is in effect a collective action problem) but other processes also exist such as unions bargaining collectively over wages and working conditions. In the case of compensating differentials, firms will choose a wage-standard combination that maximizes the total utility of its employees so that the latter do not move to other firms, and competition solves the public good nature of labor standards. Finally, note that one could also consider models that depart from perfectly competitive conditions or where information is asymmetric to provide a rationale for labor standards. In the case of incomplete information, inefficient market outcomes need to be corrected in the form of mandated standards enforced by the government. For example, the theory of

compensating differentials with asymmetric information (where workers cannot distinguish firm-types) predicts that firms will not invest in the standard and will provide the least common denominator level of the standard.

Given what we have discussed in this section, it should not come as a surprise that labor standards should vary across countries (since worker preferences and labor market conditions are likely to differ). Beyond what can be considered as basic human rights, labor standards will ultimately reflect a society's preferences and level of development. However, calls for the international harmonization of standards abound, and need to be analyzed. Now that we have motivated why standards exist, let us consider what happens to them when countries trade with one another.

2.2 Trade and Labor Standards

Theoretical work linking international trade with labor standards revolves largely around models whose foundations lie in the classical or neoclassical trade theories, with the usual assumptions of perfect competition in goods and factor markets and identical technologies across countries. Early studies, for instance by Johnson (1969) and Brecher (1974a and 1974b), considered minimum wages and their welfare implications but did not consider other internationally accepted labor standards such as the number of hours worked, the freedom from forced labor or unionization. Alam (1992), on the other hand, was one of the first to provide a more general framework for the economic analysis of the impact of labor standards, at constant goods prices, on a country's comparative advantage.

Most of Alam's analysis is conducted using a two-country, two-commodity, two-factor model, and he examines the effects of different labor standards such as unionization, the prohibition of forced labor, enforcement of a minimum age for employment of children, occupational health and safety standards, limit on working hours, and minimum wages. Much of his discussion centers around impacts on labor productivity, the size of the labor force, and on the cost of capital and/or labor. In particular, his work focuses on minimum wages and occupational safety and health (OSH). Two types of minimum wages, namely a sector-specific minimum wage and a generalized minimum wage, are considered. In the case of a sector-specific wage, which is imposed in the export sector, comparative advantage will be worsened regardless of the capital intensity of the sector. However, a generalized minimum wage will worsen comparative advantage only if the latter lies in the labor-intensive industry.

Alam also considered two different ways of modeling OSH standards, namely as diverting resources to produce a non-traded good, or as an implicit tax of factor usage. As in the case of a sector-specific minimum wage, a sector-specific OSH standard will worsen a country's comparative advantage if it is imposed in the export industry. A generalized OSH standard can have both a neutral and non-neutral effect on comparative advantage. In fact, in the non-neutral case, comparative advantage is improved under certain specific conditions. Alam concludes that the impact of labor standards on comparative advantage is non-neutral in most cases even though some of his results are counterintuitive in the sense that the impact of labor standards is sometimes neutral or non-neutral in the wrong direction.

Brown *et al.* (1996) focus on the welfare and other effects of standards and whether it is in a country's interest to implement common international standards. Most of their analysis is graphical and relies heavily on the Heckscher-Ohlin trade model. The imposition of a labor standard is modeled as a policy that takes resources away from production and Brown *et al.* first use a partial equilibrium model to examine how standards will affect countries when the latter act individually or co-ordinate on a common standard. The interaction of world demand and supply determine the world price in this perfectly competitive model, and because there are many small countries, the world price is taken as given by all.

A labor standard in their model does two things: it adds a social cost to the private costs of individual firms, while at the same time eliminating the cost to society that suppliers would otherwise not take into account. As a result, the effect of the standard is to shift the supply curve to the left, leading to more imports since the world price does not change. Even though suppliers lose in this case, society or the country as a whole gains, since the cost of the standard is also the optimal way of solving the social problem. The conclusion of this exercise is that, if one ignores terms-of-trade effects, then a country will choose a certain level of labor standards independently of the level that exists abroad, based on its general economic interest. In case countries agreed internationally on a common standard, they will choose a high or low labor standard depending on their net trade position, namely whether they are net importers or exporters of goods which are affected the most by labor standards.

This result is due to a terms-of-trade effect and hence, Brown *et al.* also consider general equilibrium analysis by using different variants of the standard two-good two-

factor Heckscher-Ohlin-Samuelson model in order to analyze the effects of standards on the terms of trade. They first consider a specialized economy where a labor standard is modeled as a non-traded good and diverts resources from the production of the tradable good. When a labor standard is imposed, less of the tradable is produced (and hence exported), and the country loses welfare because overall consumption is lower. If the country were large, then its terms of trade would also improve since the world price of the tradable good would rise relative to the imported good. In this type of setting, the standard is in effect reducing the supply of exports to the world market. The country that imposes the standard benefits but also imposes a cost on its trading partner. Since each country can impose a labor standard at home to improve its terms of trade, they would prefer to act alone rather than co-ordinate their actions. As a result, there exists an incentive for each country to set a higher level of the standard than is necessary to correct any existing market failure.

In the case where countries produce two traded goods using two factors of production (the Heckscher-Ohlin model), the way a standard will affect output and trade will depend on the factor intensity of the standard, namely the capital/labor ratio diverted from production when the standard is imposed, compared to the capital/labor ratios of the tradable goods. In this case, however, the terms-of-trade effect can be positive or negative for the country that imposes the standard. For example, if the standard has a capital/labor ratio equal to the country's overall capital/labor ratio, this will cause a fall in the country's trade and lead to an improvement in its terms of trade. If the standard has a higher capital/labor ratio than the world capital/labor ratio, the price of the capital-intensive good will rise on the world market and the capital-abundant country will gain.

What is more important in the Heckscher-Ohlin case is the capital/labor ratio of the standard compared to the capital/labor ratio of world production, and not which country imposes the labor standard. If countries tried to co-ordinate their actions, a labor abundant country would get an extra terms-of-trade benefit from a labor-intensive standard and will thus tend to overprovide it. A capital abundant country will lose and tend to underprovide the standard. Brown *et al.* also analyze a standard that affects only one sector of the economy. For example, suppose a labor standard is imposed in the labor-intensive (export) sector. In this case, the standard raises the cost of production in the industry where it is imposed, the output of the industry falls, the country trades less and this leads to an improvement in its terms of trade. The partner country, on the other hand, trades more, and this also improves the home country's terms of trade. Once again, the gains from the standard are dependent on which country exports the good that is affected by the standard, and not the country that imposes it.

As in Brown *et al.* (1996), therefore, let us consider the following Heckscher-Ohlin framework with two goods (X , Y), two factors of production (labor and capital), and two countries (Developing and Developed), with the usual assumptions of identical technologies, constant returns to scale, homogeneous and identical preferences, and without market distortions in order to provide the background for the empirical analysis conducted in section 4 of the paper. In such a model, trade is driven by differences in relative factor endowments. Suppose that the Developing country is labor abundant and that each country produces both goods by using both factors. Suppose also that good X is labor intensive. Suppose also that Developing and Developed trade with each other and

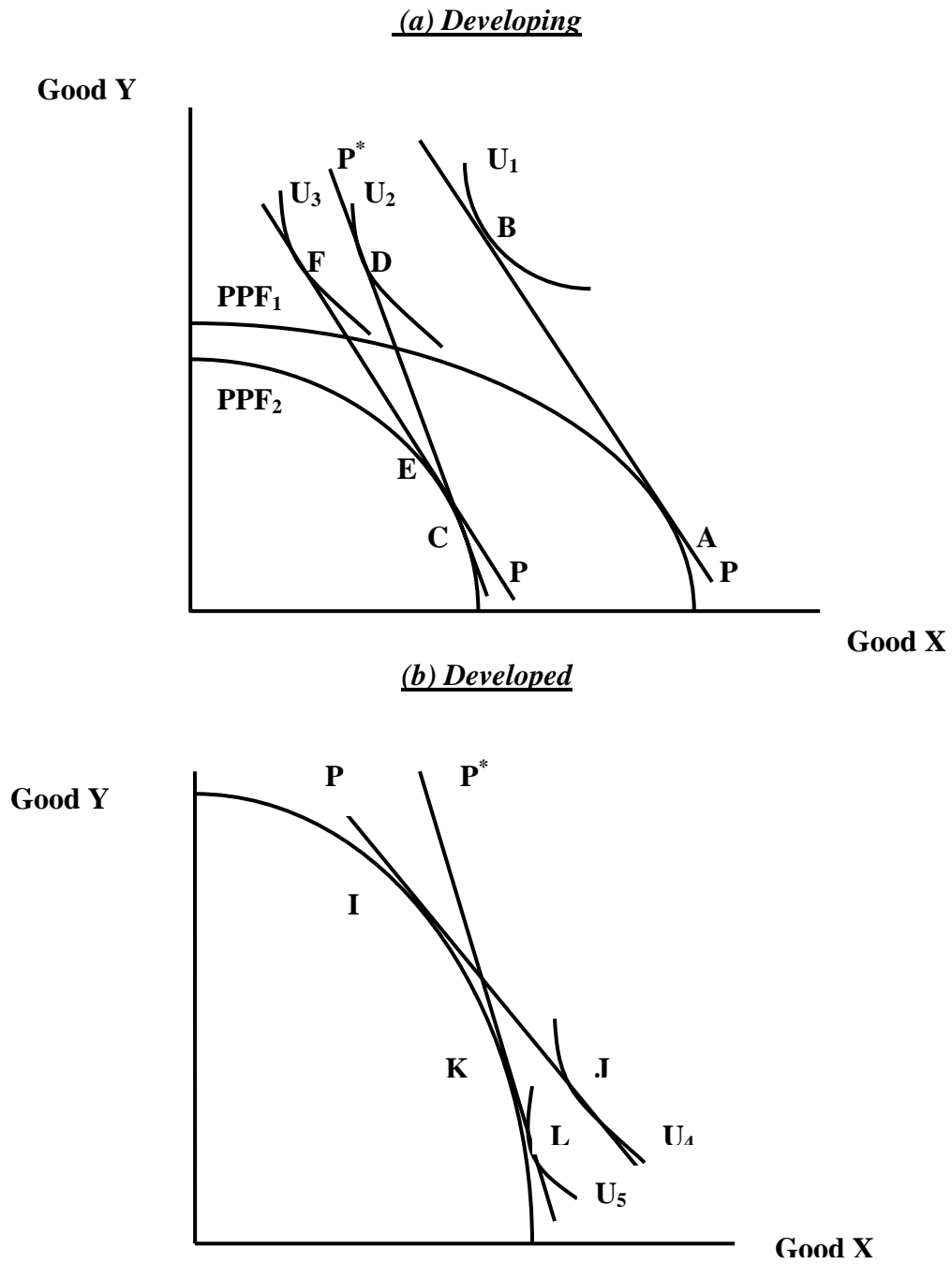
maintain distinct labor practices initially (based on their own domestic preferences). The situation is illustrated graphically in Figure 1 for both countries.

The production possibility frontiers (PPF_1 and PPF_2) show the maximum amount of both goods that each country can produce if it uses its resources efficiently. The two countries trade at an equilibrium price ratio P (given by the slopes of the lines tangent to PPF_1 and PPF_2) where $P (=P_X/P_Y)$ is the ratio of prices of good X to good Y . ‘Developing’ produces at A , exports good X and imports good Y , and consumes at point B , reaching utility level U_1 . ‘Developed’ produces at point I , exports good Y and imports good X , and consumes at point J , reaching utility level U_4 . This result obtains by virtue of the fact that Home is labor abundant and exports the labor intensive good X , in which it has a comparative advantage.

Suppose that ‘Developing’ is forced to adopt better labor standards (for example, providing a safer environment to its workers). Such a standard uses some labor and some capital and shifts the country’s PPF inward to PPF_2 . Assuming that the standard is labor intensive, there is a biased shift in the PPF against the good that uses labor intensively (in our case, good X) because of the Rybczynski effect. The production of good X decreases relative to good Y and this has a negative impact on the comparative advantage of ‘Developing’ in good X . The price of good X increases and this causes $P (=P_X/P_Y)$ to increase to P^* , which is in effect an improvement in the country’s terms of trade. ‘Developing’ now produces at point C , continues to export good X and import good Y , and consumes at point D , but with a lower utility level $U_2 (< U_1)$. If this was a small open economy which takes prices as given, as is the case of many developing countries,

the country would consume at point F and would be at an even lower utility level $U_3 (< U_2 < U_1)$.

Figure 1: Labor Standards in a Heckscher-Ohlin Framework



Given that this is a 2-country world and that ‘Developed’ exports good Y and imports good X , its terms of trade will deteriorate, making it worse off ($U_5 < U_4$). More of good X is produced as a result of an increase in its price, making it more profitable relative to good Y . An improvement in labor standards in ‘Developing’ leads ‘Developed’ to shift its resources away from good Y and towards good X . Both countries lose as a result of the standard being imposed (in terms of utility levels) and this result obtains because we do not allow the possibility that terms of trade gains in ‘Developing’ outweigh the welfare losses from reduced production. The labor standard itself is not included in the worker’s utility function as highlighted in section 2.1.

The different models in Brown *et al.*(1996) show that the effects of labor standards are dependent on the technology of production of goods and standards, and also on whether the standards are endogenous (in which case the existence of a market failure will not lead to a socially optimal level of the standard). If the market fails to yield the socially optimal level of the standard, intervention on the part of the government may not necessarily correct the failure. All these results, according to Brown *et al.*(1996) suggest that the international harmonization of labor cannot be supported since market failures are not similar across countries and cannot, therefore, be overcome by similar measures. Including labor standards into multilateral trade negotiations, the so-called social clause, should therefore be dealt with extreme caution.

In a recent paper, Dehejia and Samy (2004) have built on the work of Brown *et al.* (1996) to formally investigate the links between labor standards and comparative advantage through their effects on the terms of trade. Specifically, suppose two countries (I and II) produce two traded goods (‘ x ’ and ‘ y ’) and each good uses two factors of

production, labor (L) and capital (K). Perfect competition is assumed to prevail in commodity markets and in factor markets. Technology and preferences are identical in both countries and are assumed to be Cobb-Douglas in this model. Labor and capital are available in fixed amounts in each country, and each factor of production is perfectly mobile within the country but cannot be sent abroad. The two countries engage in trade and goods can be exported or imported at zero transport costs. As a result, differences in relative overall endowments drive comparative advantage in such a model.

For instance, suppose $(K/L)^I > (K/L)^{II}$, that is, country I is capital abundant relative to country II . Suppose also that good ‘ x ’ is capital intensive while good ‘ y ’ is labor intensive. Let the price of good ‘ x ’ be denoted by p_x and the price of good ‘ y ’ by p_y . In autarky, country I will then produce good ‘ x ’ at a relatively lower price. Autarky price ratios will be such that $(p_y/p_x)^{II} < (p_y/p_x)^I$ and international equilibrium will then imply that $(p_y/p_x)^I = (p_y/p_x)^{II}$. By the Heckscher-Ohlin theorem, good ‘ x ’ will be exported by the capital-abundant country (country I) and good ‘ y ’ will be exported by the labor-abundant country (country II). . In equilibrium, the terms of trade $p (=p_y/p_x)$ must be such as to clear the market for each good. In other words, world production must be equal to world consumption or the value of exports of a country must be equal to the value of its imports. By Walras’s law, clearance of the market for good ‘ x ’ implies clearance of the other and we are thus able to write down the following equation for the terms of trade:

$$p = \frac{Q_x^I - C_x^I}{Q_y^{II} - C_y^{II}} \quad (5)$$

where C ’s denote the consumption of goods ‘ x ’ and ‘ y ’, Q ’s refer to production levels and the superscripts refer to countries I and II . Given Cobb-Douglas production functions and preferences for goods ‘ x ’ and ‘ y ’, one can express the terms of trade in terms of

overall endowments, and technological and preference parameters¹¹. Suppose that a labor standard is imposed in country I only and uses a fraction of output ‘x’ which is produced, that is, it is withdrawing resources away from one of the tradable sectors. Hence if λ is the fraction of output ‘x’ which is used to finance the labor standard, only $(1 - \lambda)$ of output ‘x’ is available for trade. The fact that the labor standard is using some of the output of ‘x’ implicitly implies that it is using some amount of capital and some amount of labor¹². The terms of trade are now equal to

$$p = \frac{(1 - \lambda)Q_x^I - C_x^I}{Q_y^II - C_y^II} \quad (6)$$

It turns out that the labor standard will lead to an improvement or deterioration in the terms of trade depending on whether it is imposed in the import or export sector. Dehejia and Samy (2004) also consider the possibility that the same quantities of tradable goods ‘x’ and ‘y’ are produced and that a fraction of output ‘x’ for example is used to finance the standard. The impact on the terms of trade in this case depends on the capital-labor intensity of the tradeables. These results have interesting implications. First, countries that are large enough to influence their terms of trade may impose labor standards for terms of trade gains. Second, countries can also impose labor standards on their trading partners in order to lead to a deterioration in their terms of trade and an improvement in its own. Third, the absence of coordination implies that the world optimum will not be reached as countries will have an incentive to under- or over-provide standards for terms of trade gains.

¹¹ See Dehejia and Samy (2004) for a more detailed exposition.

¹² For example, occupational health and safety regulations may require both labor and capital investments.

While all the models surveyed above are useful to grasp a better understanding of the issues at stake, it is important to note that most of the existing theoretical work on trade and labor standards have relied almost exclusively on variants of the Heckscher-Ohlin trade model, which is deeply rooted in classical and neoclassical theory, with the usual assumptions of perfect competition in factor and product markets, and identical technologies across countries. Since the debate on trade and labor standards is usually posed in a North-South framework involving developed and developing countries, it is somewhat surprising that the theoretical works surveyed above have not made an effort to acknowledge the differing characteristics of developing countries.

Imagine, for instance, that instead of the standard neoclassical model, that the world is characterized by a North-South trade model, where firms in developed countries (the North) engage in research and development to develop new products, and then export the latter to developing countries (the South). Once successful, firms in the North earn monopoly profits from selling their products to the South. As these products become old, they are copied by Southern firms who devote resources to imitative research and development¹³. In such a case, the pattern of trade will be based not only on comparative advantage as determined by factor intensities and endowments, but also on innovation and imitation rates in the North and South respectively. This simple example shows that a lot can be gained by considering alternative models of trade¹⁴. In such a setting, increased trade due to globalization will most likely lead to increased copying of products, faster innovation from the North, and a narrowing of the pre-existing inequality in wages between the North and the South. Hence, to the extent that imitation can (or

¹³ This is the type of approach used in some North-South trade models.

¹⁴ This comment also applies to empirical studies that fail to take explicitly into account different technologies or differing rates of technological progress.

cannot) allow developing countries to narrow the wage gap with developed countries, it is quite possible that labor standards will (or will not) improve with increased trade (given that there is a strong positive correlation between labor standards and income).

Equally surprising is the lack of trade models that take into account imperfect competition where one is forced to operate into a second-best world. For example, in monopsonistic labor markets where firms can discriminate, the impact of discrimination on trade will depend on whether such a distortion is stronger in the export market or not. It is possible that exports will contract as a result of discrimination and reduce competition for labor-intensive goods. These types of situations need to be investigated further and empirical support for such models will be hard to come by unless there is an effort to collect data at the firm level.

The political economy nature of labor standards needs to be examined further. Labor standards are welfare improving as long as the benefits they provide to consumers and society outweigh the distortionary costs imposed on producers. Since standards can improve welfare, the question remains why there is such a reluctance to adopt them (in developing countries especially). It is quite possible that such a reluctance arises out of the conflict between labor and capital interest groups with different objectives and interests: labor groups want better standards while capital owners see standards as an additional cost. An important challenge for researchers will be to investigate the welfare implications of labor standards in political economy models, and identify the conditions which will guarantee that an optimal level of the labor standard is demanded and at the same time maximizes welfare.

The next section empirically examines whether labor standards can affect comparative advantage and hence have an impact on export performance, and also whether globalization (in terms of trade openness) has affected labor standards.

3. Trade and Labor Standards: Empirical Findings

In this section, we consider two issues from an empirical perspective: 1) the conventional wisdom that countries with lower standards obtain (unfair) advantages in trade (leading to a race to the bottom of standards across countries as the latter lower their standards to remain competitive) and 2) the relationship between trade openness and labor standards (with a particular focus on child labor which tends to permeate debates on trade and labor standards).

3.1 Existing Studies

Since the publication of the OECD (1996) report on trade, employment and labor standards, numerous studies have attempted to examine the empirical relationship between trade and labor standards¹⁵. Aggarwal (1995) investigates whether labor standards were being suppressed by developing countries so that they can reduce production costs and encourage exports. She thus examines the export patterns of ten developing countries to the United States and found no positive relationship between lower standards and better export growth rates. Rather, she notices a tendency for labor standards in developing countries to be higher in export-oriented sectors compared to less export-oriented and non-traded sectors. The qualitative OECD (1996) study finds no

¹⁵ A number of studies have also examined the interaction between labor standards and foreign direct investment (FDI) but our focus in this paper is on trade performance and trade openness. For example, Aggarwal (1995) finds that FDI from the United States is not concentrated in industries or countries with low labor standards; Rodrik (1996) confirms these findings.

evidence that countries with low labor standards (proxied by freedom of association and collective bargaining rights) can achieve better export performance, both in the aggregate and for labor intensive goods. The study, which is mainly based on plots, also finds that countries that have liberalized trade do not necessarily face a worsening of their labor standards.

Mah (1997) examines the relationship between core labor standards and export performance of (non-OECD) developing countries by regressing export shares of GDP on the ratification of core ILO conventions for a group of 45 developing countries. Overall, his results show that higher labor standards have a negative impact on export performance. Mah's analysis contains two major weaknesses. First, the ratification of core conventions, which is essentially a binary index, is the only indicator used to capture the labor standards variables. This is misleading for two reasons: firstly, ratification of conventions does not necessarily mean that standards are being enforced, and secondly, it is quite possible that countries that ratify conventions will do so because they have already attained the standards that are being asked of them in the first place (hence, the act of ratification becomes a purely symbolic gesture)¹⁶. The second problem with Mah's analysis has to do with the lack of control variables for other determinants of comparative advantage, which may lead to biased estimates. Hence, while labor standards may be an important factor, it is possible that other country characteristics that are missing in his analysis can be important determinants of the volume of trade.

Van Beers (1998) uses a measure of labor standards stringency from the OECD employment outlook (which takes into account employment protection rights, working

¹⁶ In fact, a closer look at the data will show for example that the United States has ratified only two of the core ILO conventions whereas Rwanda and Zimbabwe have ratified all eight of them.

time, minimum wages, fixed term contracts, and employees' representational rights - but not core labor standards) for 18 OECD countries to estimate a bilateral gravity equation. His analysis leads to a number of interesting findings: first, when aggregate exports is considered as a dependent variable, the measure of strictness of labor standards is not a significant factor in explaining bilateral trade flows; second, when trade flows are divided into labor-intensive and capital-intensive groups, the stringency of labor standards does not affect the exports of labor intensive goods; third, when trade flows are divided in terms of skill-intensity, stricter labor standards tend to reduce the exports of both labor and capital intensive goods produced with skilled labor. The results are counterintuitive since they seem to indicate that labor standards have a stronger impact on skilled labor. On the other hand, the debate on trade and labor standards is usually about the opposite case, namely that countries whose comparative advantage lies in the export of unskilled labor-intensive goods will lose from forced harmonization (or what Bhagwati has called straitjacketing) of standards that apply in high-skill abundant countries. Unfortunately, Van Beers does not provide an explanation for this, and given that his analysis is restricted to the OECD countries, it is hard to tell whether the results would hold for a larger sample of developing countries.

Rodrik (1996) and Dehejia and Samy (2004) do a much better job at controlling for other determinants of comparative advantage by including control variables for the labor and human capital endowments, and using cross-sectional data for developed and developing countries. The other improvement is the use of a wider range of indicators for labor standards other than simply ILO conventions ratified. The results of both of these papers confirm that factor endowments (in accordance with the Heckscher-Ohlin

Theorem) are important determinants of comparative advantage while the conventional wisdom does not seem to hold. Rodriguez and Samy (2003) and Dehejia and Samy (2004) are to our knowledge the only studies that have so far considered time series data to investigate the issue of trade and labor standards. However, due to data limitations, the time series analysis is carried out for Canada and the United States in the context of the NAFTA. Rodriguez and Samy (2003) apply time-series analysis with structural breaks to US data for the period 1950-1998 to estimate a model with endogenous breaks, and using various indicators for labor standards. Their results show that the conventional wisdom may or may not hold for the United States. Dehejia and Samy (2004) provide time-series results for Canada by estimating a vector autoregressive model, using a number of indicators for labor standards and also controlling for the usual determinants of comparative advantage. They obtain very weak evidence for the conventional wisdom.

Busse (2002) obtains mixed evidence regarding the effect of labor standards on comparative advantage; more precisely, the effect on comparative advantage depends on the type of standard and in the case of union rights or forced labor, for example, he finds evidence in favor of the conventional wisdom for labor intensive exports. The ratification of core ILO conventions is not significant in his analysis. Flanagan (2003) considers the issue of trade and labor standards using panel data. Even though this is a brave attempt at exploiting the advantages inherent in panel data, the problem is that the author focuses solely on core and non-core ILO conventions ratified as indicators of labor standards, which may or may not reflect the level of enforcement. In fact, Flanagan himself finds that ratification of ILO conventions is not a good predictor of actual labor standards. In a recent paper, Kucera and Sarna (2006), used a gravity trade model as in

Van Beers (1998) and find evidence in favor of the conventional wisdom for labor intensive exports but not total manufacturing exports. Their conclusion is that “possible negative effects through labor costs of stronger FACB rights and democracy are offset by other positive effects of stronger FACB rights and democracy” (p. 879).

3.2 New Empirical Evidence

Labor Standards and Export Performance

Following Dehejia and Samy (2004) we estimate the following equation in order to analyze the effects of labor standards on export performance

$$lexp_i = \alpha_0 + \alpha_1 popland_i + \alpha_2 human_i + \alpha_3 labstd_i + \varepsilon_i \quad (7)$$

where

lexp refers to the log of exports of manufactured goods as a percentage of gross domestic product; *popland* is the population to land ratio; *human* is the literacy rate in the population 15 years and older; *labstd* is any one of the indicators for the labor standard; subscript *i* refers to countries and ε is the disturbance term. The dependent variable is so chosen since concerns about labor standards in developing countries are commonly expressed with regards to manufacturing sectors and factories in developing countries. We also consider an alternative definition of the dependent variable, namely manufacturing exports as a percentage of merchandise exports (*lexp1*), which is a measure of comparative advantage in the manufacturing sector. The proxies for measures of comparative advantage, *popland* (proxy for labor endowment relative to land endowment) and *human* (proxy for human capital), are expected to be positively related to the dependent variable, and we want to check whether α_3 is significantly different from

zero; given that a standard may affect productivity and is also costly (as discussed in section 2), the effect on export performance remains unclear. It is important to note that there is no appropriate measure for physical capital stock as an additional control. Not only it is difficult to find such a measure but including per capita GDP as a proxy (as others have done) did not add much to the regression since the human capital variable is already picking up some of this effect; the significance of the labor standards, which is our main focus, did not change when per capita GDP was included.

We consider cross-sectional macro data for developing countries (excluding all OECD countries), and the variables are all averaged over the period 1990-2001, unless otherwise indicated. Other studies (for example, Mah (1997); Van Beers (1998); Dehejia and Samy (2004)) consider a specific year because of data limitations. If we were to again consider a specific year, we could well end up with more observations than we have; however, the findings could be specific to that particular year and hence we decided to present results that used data averaged over time when available. We are also constrained by the availability of data for more recent years but the time period considered covers the recent developments that have taken place regarding this issue (as discussed in the introduction). The different proxies for the labor standard variable are as follows. We construct an indicator for the number of core ILO conventions ratified, *cconv*, (using ratification information from ILOLEX, a database of international labor standards from the ILO). The main problem with this indicator is that it may not reflect the degree of enforcement of the standard.

We consider two proxies for hours worked namely the normal weekly hours of work (statutory working week) based on the labor regulations that are in effect in each

country (*hour1*) and actual hours worked in the manufacturing sector (*hour2*). We have more data on the former than the latter. The indicator of civil liberties (*civilb*) from Freedom House is also considered. The computation of this index (on a scale of 1 to 7, with small values indicating more rights) is based on questions such as presence of trade unions, the effectiveness of collective bargaining, and freedom from exploitation by employers or union leaders. We recognize that some of the questions used to calculate the civil liberties index have nothing to do with labor standards, such as questions regarding religious freedom and the rule of law. A proxy for child labor (denoted by *child*) is also considered and measured as working children aged 10-14 as a percentage of Age Group. Again, this proxy is not perfect since it ignores children under the age of 10 who work, not an unlikely possibility in developing countries.

We also have data for the violation of freedom of association and collective bargaining (FACB) rights. The measure of FACB rights violation is based on 37 evaluative criteria that address *de jure* and *de facto* problems with FACB and are constructed by coding violations of these rights (see Kucera (2004) and Kucera and Sarna, 2006). The evaluation criteria are based on rights defined by the ILO Conventions on freedom of association and collective bargaining and other related ILO documents, and was used to evaluate violation of FACB rights from various reports such as the *Annual Survey of Violations of Trade Union Rights*, the US State Department's *Country Reports on Human Rights Practices* and ILO Reports. This variable is denoted by *union1* and *union 2* (unweighted and weighted versions respectively)¹⁷ on a scale of 0 (best) to 10 (worst). Given the high correlation between the unweighted and weighted index, we

¹⁷ We thank David Kucera from the ILO (who constructed this variable) for sending us this data for the mid 1990s.

did not expect results to vary significantly using either measure, and this was confirmed in the empirical analysis. One possible shortcoming of this measure is that it could be non-random. For example, Latin American countries trade unions tend to file more complaints with the ILO (Neumayer and Soysa, 2006). In order to deal with this potential problem, regional dummies were included in the regressions but did not alter the results significantly.

All of these indicators have been used in previous studies but are not without their problems, as discussed above. Summary statistics and correlation matrices for the variables used to estimate equation (7) are provided in Appendix A. Table 1 below shows the results, after applying White's test for heteroscedasticity, when equation (7) is estimated for developing countries over the period 1990-2001. Column (1) shows the results for the benchmark model without the labor standards. The remaining columns show the results when each indicator is added to the benchmark model one at a time in order to assess their individual effects. The natural determinants of comparative advantage (represented by *popland* and *human*) are significant and of the right sign in most of the regressions. As for the proxies for labor standard, only *child* is significant with a negative sign, indicating that an increase in child labor is associated with a reduction in export performance, thus contradicting the conventional wisdom. The results reported above did not change when different combinations of labor standards were tried in the regressions. When the dependent variable was replaced by *lexp1*, the results remained the same, except for *civilb* which again contradicted the conventional wisdom. The results did not change when only low income developing countries (with a

GDP per capita of less than \$6000) were considered. Also, as discussed above, regional dummies, when included, did not change the results significantly.

Table 1: Estimated Coefficients for Equation (7) – Developing Countries (1990-2001)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
constant	2.26** (10.78)	2.46** (8.32)	2.48 (0.81)	1.36** (2.32)	1.89** (5.81)	3.32** (7.25)	2.34** (8.94)	2.36** (8.85)
<i>popland</i>	0.01** (1.85)	0.03** (4.61)	0.03** (5.03)	0.01 (1.41)	0.02** (8.41)	0.01 (1.23)	0.02** (6.83)	0.02** (6.88)
<i>human</i>	0.01** (4.02)	0.01** (3.51)	0.01** (4.56)	0.02** (4.88)	0.01** (4.32)	0.01** (3.37)	0.01** (3.83)	0.01** (3.87)
<i>cconv</i>	-	-0.04 (-1.05)	-	-	-	-	-	-
<i>log(hour1)</i>	-	-	-0.08 (-0.11)	-	-	-	-	-
<i>log(hour2)</i>	-	-	-	0.02 (0.15)	-	-	-	-
<i>civilb</i>	-	-	-	-	0.06 (1.24)	-	-	-
<i>child</i>	-	-	-	-	-	-0.02** (-2.66)	-	-
<i>union1</i>	-	-	-	-	-	-	-0.01 (-0.51)	-
<i>union2</i>	-	-	-	-	-	-	-	-0.01 (-0.54)
R ²	0.33	0.35	0.36	0.37	0.35	0.27	0.28	0.27
N	127	121	119	51	125	124	118	119
F-Stat	7.79	5.89	7.09	5.93	8.04	8.45	7.63	7.69

Note: Except where indicated otherwise, the figures in parentheses are the t-values. Standard errors are White-robust. *(**) indicates 10(5) percent level of significance.

Overall, therefore, the evidence is rather weak that countries with low labor standards obtain a comparative advantage in trade, confirming the evidence reported in previous studies discussed above. In fact, trade is determined primarily by the natural

determinants of comparative advantage, and in those cases where standards matter, they go against the commonsense conclusion that low standards provide (unfair) advantages in trade.

Labor Standards and Trade Openness: An Examination of Child Labor

The second issue that we address is whether globalization (measured by openness to trade) has had a positive or negative impact on labor standards. Countries that are more open to trade face more competitive pressures and critics of globalization are worried that this will translate in a race to the bottom as countries lower their standards to remain competitive. On the other hand, proponents of globalization argue that countries that are more integrated in the world economy are more likely to have higher standards because of higher income resulting from deeper integration, assuming these standards are like normal goods. At a theoretical level, many have pointed out that the level of labor standards is ultimately a domestic choice and is a reflection of a country's level of economic development, factor endowments and values (see for example, Bhagwati (1995)) and that trade should not be a major factor in that equation. However, to the extent that the level of income (and income distribution) are influenced by openness to trade, then labor standards may be affected as a result. For example, in Casella's (1996) model, labor standards respond to the level of income and trade may lead to a leveling up of labor standards. On the other hand, we have seen in the theoretical section of the current paper that standards can be used as an economic instrument to influence the terms of trade and that this may force countries in prisoner dilemma-type situations where they all lower standards to remain competitive.

For illustrative purposes only, Appendix B shows the correlation between trade openness (denoted by *trade*) and two of the labor standards (*child* and *civilb*). Outliers for the trade openness variable for countries such as Singapore were removed from the dataset so as not to bias the results and this reduced the sample by a few observations. Both graphs show a positive relationship between openness to trade and better standards for the sample of developing countries over the 1990-2001 period. Table 2 below shows the results for bivariate regressions of trade openness on labor standards (*child*, *civilb* and *union1*). The trade variable is significant in all cases, but in the case of *union1* supports the views of globalization skeptics¹⁸.

Table 2: Labor Standards and Trade Openness – Developing Countries (1990-2001)

	DV: <i>child</i>	DV: <i>civilb</i>	DV: <i>union1</i>
constant	27.22** (7.69)	5.47** (17.31)	2.28** (3.53)
<i>trade</i>	-0.19** (-4.47)	-0.02** (-4.77)	0.04** (4.47)
R ²	0.13	0.14	0.12
N	131	143	120
F-Stat	19.32	23.75	16.15

Note: Except where indicated otherwise, the figures in parentheses are the t-values. Standard errors are White-robust. *(**) indicates 10(5) percent level of significance.

For the rest of this section we will focus on the issue of child labor in order to check whether the correlation between trade openness and child labor remains when other determinants of child labor are controlled for. The abundant theoretical literature and empirical evidence regarding the benefits of open trade regimes on growth and poverty

¹⁸ These are obviously interesting findings that need to be investigated further, namely, taking into account other factors. We do this in the case of child labor only here.

reduction means that one should expect open economies to be characterized by lower levels of child labor. Since the seminal work by Becker (1964), numerous studies have also examined the determinants of child labor at the household level¹⁹. Our focus here is on the trade-labor linkage and not the determinants of child labor per se. However, in order to check whether trade openness is indeed an important determinant of child labor, one needs to control for other determinants of the latter. Much of the literature on child labor shows that poverty and the extent to which children are able to attend school are the main causal factors; poor families are more likely to send their children to work. Hence, any equation that tries to identify the determinants of child labor should control for a measure of level of development, such as GDP per capita in constant PPP\$ (represented here as *gdp*). We therefore estimate the following equation using ordinary least squares:

$$child_i = \alpha_0 + \alpha_1 gdp_i + \alpha_2 trade_i + \alpha_3 du1_i + \alpha_4 du2_i + \varepsilon_i \quad (8)$$

du1 and *du2* are regional dummy variables included for African and Asian countries to take into consideration historical and cultural factors, since child labor is more prevalent in these regions, and once again ε is the disturbance term. In a recent paper, Edmunds and Pavcnik (2006) have analyzed this issue extensively for 1995 data, and similar to Dehejia and Gatti, they include a quadratic term for income to account for the fact that a marginal increase in income will have different effects on child labor depending on the country's level of income. We consider this possibility in the empirical analysis, as well as other controls, but to be consistent with what we did earlier, our dataset covers the period 1990 to 2001 to guard against picking an unrepresentative year. Summary statistics for the main variables used to estimate equation (8) are provided in Appendix C.

¹⁹ For an excellent review of theory and policy regarding child labor, see Brown, Deardorff and Stern (2003) and the references therein.

One possible problem with equation (8) is the fact that endogeneity could bias the OLS estimates. It is possible for the level of child labor to influence the volume of trade by changing the quantity of labor available as well as the allocation of labor across sectors in a given economy. In such a case, instrumental variables (IV) estimation needs to be considered. It is important to point out that our choice of IV estimation as opposed to reduced forms (where the relationship between instruments themselves and child labor would allow one to assess more precisely the source of variation in trade used for identification) is a matter of following convention, and is not based on the results. The levels of development (*gdp*) could also be endogenous since child labor can have a negative impact on productivity and economic growth by reducing human capital accumulation. To deal with these possible problems, we instrument the level of development with its lagged value (averaged over the 1980s), which is a common procedure. The trade variable is instrumented using ‘population’ averaged over the period 1990 to 2001, and ‘distance’ to a main economic center represented in this case by the European Union (as used in gravity models of trade) and using lagged values of the trade variable. Again, this is a procedure that has been used elsewhere.

Table 3 below shows the results for equation (8) based on cross-sectional data averaged over 1990-2001, and after applying White's test for heteroskedasticity. In column (1), the logarithm of *gdp* and the trade variable are significant determinants of child labor with the expected signs. When the income variable is entered as a squared term in column (2), it is also significant as in Edmunds and Pavcnik (2006) and Dehejia and Gatti (2005). In column (3), we add additional controls from the literature, namely access to credit and education, proxied by the ratio of private credit issued by deposit

banks to GDP (denoted by *credit*) and secondary enrolment rates (denoted by *sec*) respectively. Dehejia and Gatti (2005) find that (lack of) access to credit is an important determinant of child labor: theoretically, when children work, family income increases, but future family incomes decrease since the human capital accumulation of children is implicitly reduced when they do not attend school. If households have access to credit (that is, borrow against future income), they can choose optimally between current and future income. The *credit* variable is widely used as a proxy for the level of development of financial markets and is the same one that is used by Dehejia and Gatti (2005); it is essentially a measure of private credit, and bypasses the role of the government. It turns out that this variable is not significant in our analysis, possibly because the time period considered is too short. Regarding education, the lack of access to schools or a lack of quality in education can lead parents to send their children to work. Hence, the control for education is expected to be negatively related to child labor. As seen in Table 3 below, *sec* is significant and with the right sign. When primary school enrolment rates are considered instead of *sec*, the results did not change significantly²⁰. The dummy variable for Africa is also highly significant while the one for Asia is not always and this may be due to the fact that although Asia has the largest number of child workers, in relative terms, Africa has the highest rate of child labor. When only low-income countries are considered (by restricting our sample to countries below a certain threshold for GDP per capita), the results are not significantly different from what is reported in the table.

²⁰ When average years of schooling were considered instead of *sec* and *pri* (since the latter are highly correlated with child labor, and could in fact be proxying for it), the result did not change substantially.

Table 3: Child Labor and Openness to Trade (Developing Countries 1990-2001) – OLS and IV Estimates

Explanatory Variables	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) IV-(1)
constant	88.37** (8.06)	274.74** (4.23)	246.47** (3.84)	243.61** (3.67)	71.51** (6.66)	112.25** (6.80)
<i>log(gdp)</i>	-9.02** (-7.04)	-55.41** (-3.61)	-49.88** (-3.25)	-44.52** (-2.71)	-5.68** (-4.11)	-11.84** (-6.00)
<i>trade</i>	-0.07** (-2.66)	-0.07** (-2.62)	-0.04 (-1.65)	-0.07** (-2.84)	-0.06** (-1.95)	-0.01 (-0.27)
<i>log(gdp)²</i>	-	2.86** (3.15)	2.77** (3.04)	2.20** (2.27)	-	-
<i>credit</i>	-	-	0.22 (0.05)	4.70 (0.92)	4.72 (0.82)	-
<i>sec</i>	-	-	-0.26** (-6.38)	-	-0.26** (-6.42)	-
<i>du1</i>	9.26** (3.70)	7.33** (2.95)	4.17* (1.70)	5.18** (2.05)	5.75** (2.27)	1.47** (0.27)
<i>du2</i>	-2.68 (-1.47)	-3.52** (-2.20)	-1.31 (-0.84)	-2.81* (-1.82)	-0.14 (-0.08)	-8.04** (-2.81)
R ²	0.69	0.72	0.81	0.79	0.79	0.64
N	121	121	89	102	96	101
F-Stat	65.49	59.66	48.99	49.35	67.64	-

Note: Except where indicated otherwise, the figures in parentheses are the t-values. Standard errors are White-robust. *(**) indicates 10(5) percent level of significance.

When IV estimation is considered in column (6) based on the specification in column (1), the trade variable is no longer significant, but it still does not support the argument that trade has led to an increase in child labor. We also conducted IV estimation for specifications using *sec* and *credit*, using lagged values for the education variable and origin of a country's legal system (used in Dehejia and Gatti (2005)) as

instruments for these variables. Once again, the trade variable lost its significance. Finally, in order to check the quality of instruments used in column (6), we regressed the residuals from equation (8) on the instrumental variables, and since none of the instruments are significant, we concluded that they are good instruments. There is thus no empirical evidence that openness to trade increases child labor. If anything, the results obtained above show that countries that open their economies to trade are more likely to reduce child labor.

4. Conclusion

This paper has reviewed the theoretical literature on trade, labor standards and comparative advantage, and provided new empirical evidence regarding the latter. The empirical evidence based on cross-sectional data for developing countries over the period 1990-2001 does not support the view that labor standards have affected comparative advantage and export performance. We have also examined the issue of trade openness and labor standards (focusing on child labor) and again using the latest available cross-sectional data for developing countries. The evidence seems to favor the view that openness to trade has led to an improvement, not a worsening of standards. The question that will continue to dominate this debate in the coming years is whether (and how) the idea of a social clause, which would incorporate core labor standards into future trade agreements, can be implemented. In a recent paper, Reddy and Barry (2006) argue that linkage can be made to work as long as it is “unimposed, transparent and rule-based, applied in a manner reflecting a country’s level of development, demands adequate international burden-sharing, and incorporates measures that ensure that appropriate

account is taken of different viewpoints within each country” (p. 2). Beyond the fact that the practicality of such an approach needs to be investigated further, their proposal has serious implications, not only for national sovereignty, but also for the gains from trade of developing countries in the event that linkage is hijacked by protectionist intents. The empirical evidence to date does not indicate that linkage should be a priority for action (and Reddy and Barry (2006), in fairness, also agree with this). We, however, believe that labor standards are ultimately a matter of domestic policy choice and that there remains a need for great caution when making policy pronouncements on the linkages between trade and labor standards.

Appendix A : Equation (7)

Correlation Matrix

	<i>lexp</i>	<i>popland</i>	<i>human</i>	<i>cconv</i>	<i>lhour1</i>	<i>lhour2</i>	<i>civilb</i>	<i>child</i>	<i>union1</i>
<i>lexp</i>	1.00								
<i>popland</i>	0.48	1.00							
<i>human</i>	0.49	-0.03	1.00						
<i>cconv</i>	-0.22	-0.17	-0.02	1.00					
<i>lhour1</i>	-0.48	-0.05	-0.49	0.17	1.00				
<i>lhour2</i>	-0.12	0.02	-0.20	0.06	0.42	1.00			
<i>civilb</i>	-0.29	0.11	-0.55	-0.31	0.30	0.27	1.00		
<i>child</i>	-0.42	-0.08	-0.71	-0.07	0.45	0.06	0.53	1.00	
<i>union1</i>	0.45	0.22	0.35	0.07	-0.48	-0.13	-0.52	-0.46	1.00

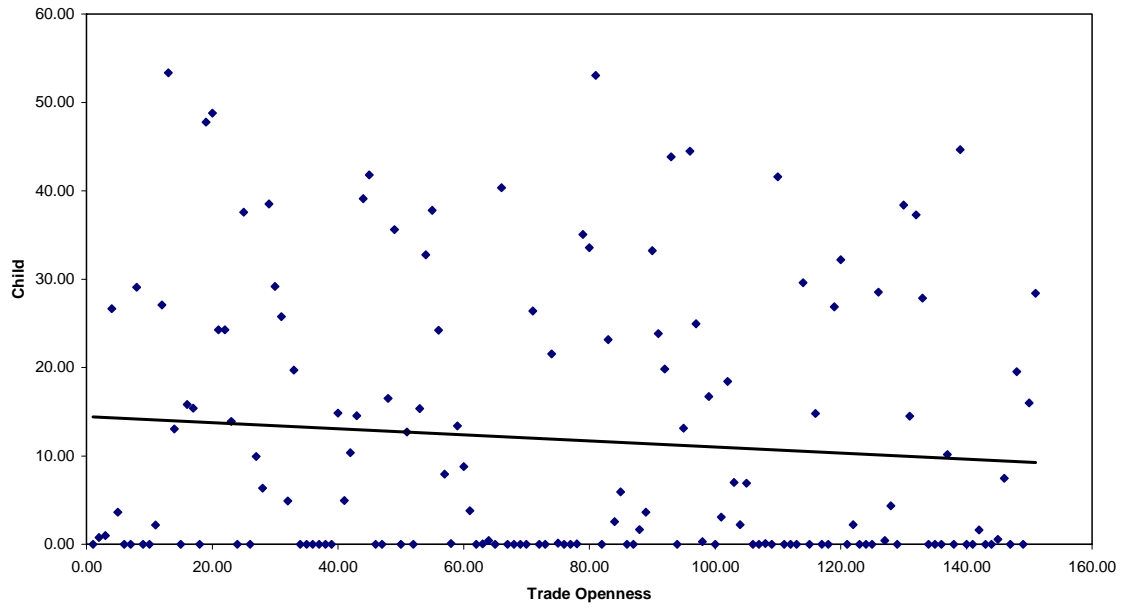
Note: UNION2 is almost perfectly correlated with UNION1 and is therefore not shown in the above table

Summary Statistics

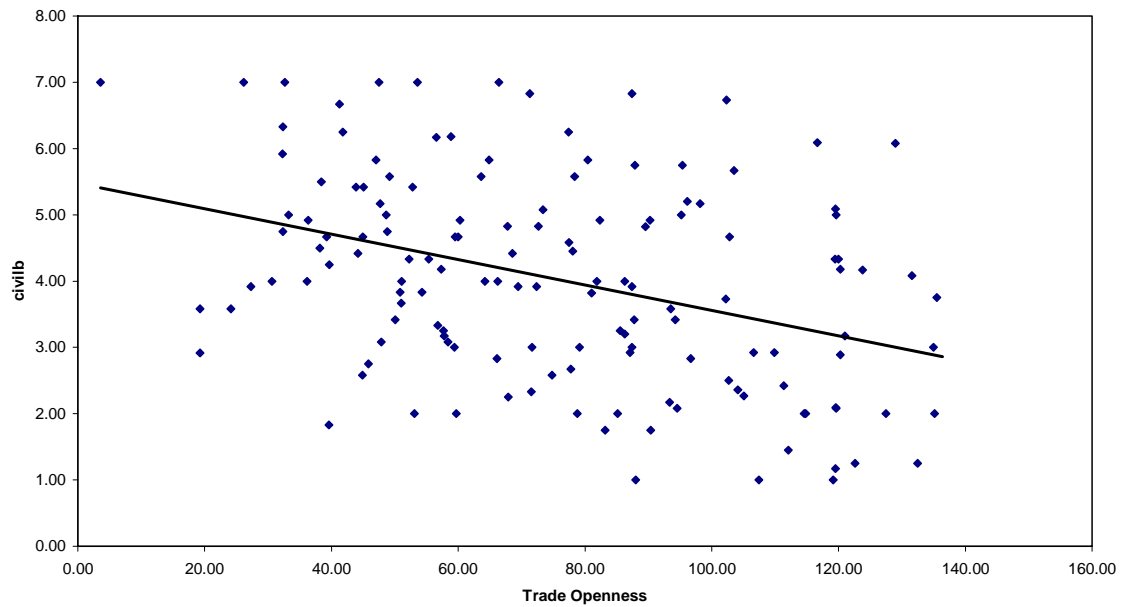
Variable	N	Mean	Median	Maximum	Minimum	STD
<i>lexp</i>	161	2.99	3.05	4.97	0.61	0.82
<i>popland</i>	162	3.16	0.58	203.13	0.00	17.25
<i>human</i>	128	74.59	81.57	99.80	13.85	22.13
<i>cconv</i>	143	4.62	5.00	7.17	0.00	1.84
<i>lhour1</i>	139	3.78	3.78	3.87	3.61	0.08
<i>lhour2</i>	58	3.75	3.76	5.53	2.05	0.36
<i>civilb</i>	152	4.06	4.00	7.00	1.00	1.53
<i>child</i>	142	12.81	5.44	53.35	0.00	15.02
<i>union1</i>	132	4.79	5.71	9.52	0.00	3.05
<i>union2</i>	133	5.01	5.49	9.55	0.00	2.97

Appendix B: Labor Standards and Openness

Child Labor and Trade Openness: Developing Countries (1990-2001)



Civil Liberties and Trade Openness: Developing Countries (1990-2001)



Appendix C: Equation (8)

Correlation Matrix

	<i>child</i>	<i>log(gdp)</i>	<i>credit</i>	<i>pri</i>	<i>sec</i>	<i>trade</i>
<i>child</i>	1.00					
<i>log(gdp)</i>	-0.76	1.00				
<i>credit</i>	-0.43	0.59	1.00			
<i>pri</i>	-0.71	0.59	0.34	1.00		
<i>sec</i>	-0.84	0.73	0.46	0.66	1.00	
<i>trade</i>	-0.36	0.32	0.30	0.18	0.39	1.00

Summary Statistics

	N	Mean	Median	Maximum	Minimum	STD
<i>child</i>	130.00	13.74	7.23	53.35	0.00	15.34
<i>log(gdp)</i>	121.00	8.00	7.96	10.01	6.13	0.91
<i>credit</i>	111.00	0.22	0.18	0.86	0.00	0.18
<i>pri</i>	118.00	0.22	0.18	106.17	24.89	19.33
<i>sec</i>	101.00	79.43	86.13	91.32	4.79	25.02
<i>trade</i>	130.00	46.60	47.37	136.37	3.59	29.56

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