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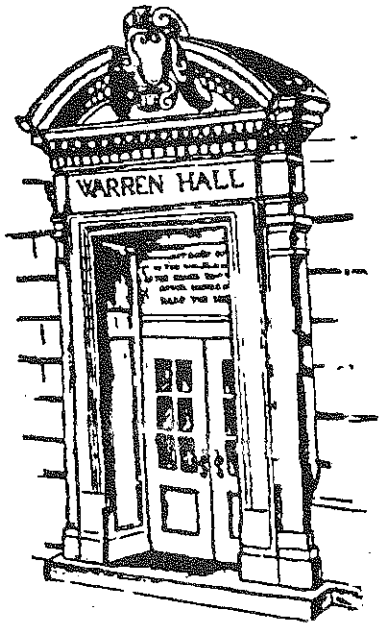

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"Guaranteed Manufactured without Child Labor"

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"Guaranteed Manufactured without Child Labor" *

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Abstract: Does labeling products "Child-Labor Free" provide a market-based solution to the incidence of child labor? This paper provides a simple model of North-South trade and explores the promise of social labeling in the context of its four oft-noted objectives: child labor employment, consumer information, welfare, and trade linkages. We highlight the market responses to social labeling when product market competition between the North and South is based on both comparative cost advantage, and the use of child labor as a hidden product attribute. Contrary to what may be expected, we find that upon closer scrutiny, social labeling can imply that: (I) consumers and Southern producers benefit, whereas children and Northern producers are worse off; (II) trade sanctions on unlabeled products deteriorates Southern terms of trade, but leaves the incidence of child labor strictly unaffected; (III) a threat to sanction import of unlabeled Southern products *discourages* the South from maintaining a credible social labeling program.

Keywords: Social Labeling; Child Labor; Enforcement; Trade Sanctions.
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1 Introduction

The debate over the choice of appropriate policies to curb child labor in developing countries has ranged from the inclusion of a "Social Clause" in the World Trade Organization (WTO) that attempts to solicit compliance with respect to a core set of minimum labor standards, to calls for legislation in developed countries banning the imports of goods made with child labor.[1] In this context, social labeling — the provision of information via product labels regarding the adoption of acceptable labor standards in the production process, such as whether child laborers are employed — has gained currency particularly as a voluntary and industry-based initiative to combat the problem of child labor. Social labeling has origins that can be traced back to the White Label in the U.S. as early as 1899,[2] and draws on the success of more recent "green" label initiatives that promotes environmentally friendly production methods by drawing consumer awareness via product labeling (Janet Hilowitz 1997).[3] Table 1 summarizes six prevalent social labeling programs already in existence worldwide.

Despite their relative infancy, these pioneering initiatives are invoking considerable attention, and the arguments for and against can be categorized respectively under four potential objectives of social labeling, (i) child labor employment; (ii) consumer information; (iii) welfare; and (iv) trade linkages:

First, the attractiveness of social labeling is derived from its market-based approach (Richard Freeman 1994, Janet Hilowitz 1997a, Pharis Harvey 1996) in enticing producers to impose self-restraints on the employment of children, with very little government support (RUGMARK and KALEEN) and in some cases, the absence of government support (CARE & FAIR, STEP, ABRINQ, DIP). In addition, levies collected from participating businesses constitute an alternative source of financial resources that can be channeled to encourage human capital acquisitions in production origins (Nancy Birdsall, 1998).

[1] In a recent article, Kaushik Basu (1999a) classifies these efforts into three categories: (i) *Intra-National* efforts are legislations enacted by developing countries to discourage child labor employment within domestic boundaries (examples include Nepal's *The Children's Act of 1992* that prohibits the employment of children below the age of thirteen); (ii) *Supra- National* efforts made by the ILO, WTO and UNICEF which encourages countries to enact intra-national legislations and (iii) *Extra-National* efforts made by developed countries to enact legislations that prohibits the import of goods from developing countries that are made with child labor.

[2] The White Label was sponsored and monitored by the National Consumers League, it guaranteed manufacturers' compliance with the maintanence of decent working conditions and the employment of no child labor. See Janet Hilowitz (1997a) for other early attempts at social labeling in the U.S.

[3] The first social labels that aimed directly at the mitigation of child labor employment in developing countries are "RUGMARK" and "CARE & FAIR". RUGMARK was established in 1994 to guarantee German and U.S consumers that hand-knotted carpets made in India and Nepal were child-labor free.

Table 1

	Year	Producer Countries	Consumer Markets	Aims at Removing Child Labor	Sponsorship	Receives Government Support	On-site Monitoring	Collect Levies
RUGMARK	1994	India and Nepal	Germany and U.S.	Yes	Private Foundation (Germany)	Germany	Yes	Yes
KALEEN	1996	India	Germany	Yes	National Government (India)	Yes	No	Yes
CARE & FAIR	1994	India and Nepal	Germany	No	Retail Association	No	No	Yes
STEP	1995	India Nepal and Pakistan	Switzerland	Gradually	NGOs	No	Some	Yes
ABRINQ	1995	Brazil	Brazil	Yes	Private Foundation	No	Yes	Yes
DIP	1995	Kenya India	Switzerland	Yes	Private	No	Yes	Yes

Source: Janet Hilowitz, (1997): Labeling Child Labour Products; ILO.

Second, the informational role of social labeling takes advantage of the increase in public awareness in developed and developing economies about child labor usage, and facilitates production of child labor free product by allowing producers to internalize consumers' willingness to pay (Kaushik Basu 1999a and b, T. N. Srinivasan 1996 and 1998, Keith Maskus 1997).

From the perspective of developing countries, however, of central concern is the difficulty inherent in maintaining the reliability of the information that social labels convey (Kaushik Basu 1999b), and the monitoring problem associated with the enforcement of labeling criteria. These criteria range from the complete elimination of child labor usage in the production process enforced through random inspection by independent agencies in some cases (RUGMARK, KALEEN, ABRINQ, DIP), to the adoption of company codes of conduct that aims at improving work conditions with self-monitoring (CARE & FAIR, STEP).

Indeed, to the casual observer, what seems to be puzzling is that sponsorship of social labeling initiatives largely originates from major consumer markets, rather than

developing economies who are presumed to gain both via a reduction in child labor employment and an increase in producer revenue for labeled products[4]. Meanwhile, the only exception with national government sponsorship (KALEEN) does not subject producers to on-site monitoring and inspections. This is particularly relevant in light of the observations made by Keith Maskus (1997), Robert Stern (1996) and Kaushik Basu (1999b), that absent monitoring, the very incentives that are aimed at facilitating the choice of production technique in favor of adult employment can in fact induce producers to practice false labeling.

Third, blanket application of social labeling programs that are credibly enforced may not translate to an improvement in the welfare of children. In particular, the mere removal of child labor from the work place may benefit adult labor employers at the expense of children, along with the attendant risk of pushing children in developing countries from poverty to destitution (Nancy Birdsall 1998 and Kaushik Basu 1999b). This is in keeping with the growing literature on the supply-side determinants of child labor, and the potential problems associated with a host of policies that deem the eradication of child labor as an end in itself (Kaushik Basu 1999a, K. Basu and Pham Hoang Van 1998, Jean-Marie Baland and James Robinson 1999, Christian Goorteart and Ravi Kanbur 1995).

Fourth, explicit labeling renders unlabeled products particularly vulnerable to allegations of unfair trade practice, and provides a lever for interest groups in developed countries to advocate restrictions on market access. The most prominent and controversial bill has been the *Child Labor Deterrence Act* in the United States which seeks to eliminate child labor in the developing countries by prohibiting the imports of goods known to be so produced.[5]

Despite all these attention, economic analysis has yet to keep pace with policy recommendations regarding the effectiveness of social labeling. As a first objective of this paper, we provide a simple North-South model that synthesizes the insights of Srinivsan (1996), Maskus (1997), Hilowitz (1997a and b) and Basu (1999a and b) in terms of the four objectives of social labeling. We do so by identifying four groups of stakeholders

[4]In section 3, we present a formal argument which supports this conjecture.

[5]In its current version, the Harkin's bill proposes that legislation should be enacted to protect adult worker's wages in the developed countries against unfair competition from lower priced imports made with child labor. It is argued that the loss of export markets would then act as an incentive for developing countries to enact and enforce stricter laws against child labor employment. The debate over whether the underlying motivation of trade sanctions are driven by a desire to protect domestic import competing interests, or the welfare of children, is ongoing. See, for instance Alan Krueger (1997) for findings in support of the latter.

and examining the linkages that social labeling opens up between them: (i) consumers in the North whose preferences are characterized by a desire to boycott employers of child labor; (ii) producers in the South whose choice of production techniques depends on the trade-off between cost-savings and revenue losses associated with employing child labor, (iii) producers in the North who compete with Southern producers for market share and (iv) Southern households who account for the derived demand and opportunity cost of sending their children to work.

The basic analysis makes plain the fact that social labeling should be more appropriately presented as a corrective policy that targets the lack of complete information for *consumers* who cannot otherwise reveal their preferences regarding the employment of child labor in the production process. Likewise, the choice of monitoring intensity in the context of social labeling (as opposed to the enforcement of *acceptable* labor standards) should be viewed as a corrective policy that resolves the moral hazard problem associated with the incentive to apply false labels. Thus, whether the byproduct of such a consumer and producer oriented corrective policy can produce welfare benefits for child laborers depends critically on whether labor market considerations render equilibrium child labor employment *excessive*. Therefore, in keeping with second-best argumentation of policy reforms (Christian Grootaert and Ravi Kanbur 1995, Jagdish Bhagwati 1995), our analysis underscores the potential for the good intentions of social labeling to produce outcomes that go against not just the welfare of children, but also the developing country in question.

In addition, as the basic analysis unfolds, we provide formal arguments that point to circumstances under which the following claims are *false*:

- Insistence originating from consumer markets that social labels be applied and monitored constitute a means to eliminate the unfair *competitive edge* for Southern producers by conferring damages to producers in the South and benefits to producers in the North.

- Trade barriers against the import of unlabeled products facilitate (i) the employment objective of social labeling by lowering the incidence of child labor and (ii) the welfare objective of social labeling by increasing the rewards for adult labor employers.

- The anticipation of trade sanctions against unlabeled products biases the incentive of Southern governments in favor of initiating a credible social labeling program.

2 A Model of Social Labeling

There are two countries, the North and the South. We envisage an asymmetric production structure, wherein the export sector of the South produces an output that employs child labor, whereas the corresponding import competing sector in the North only employs adult laborers. The basic analysis takes four groups of individuals as building blocks: Northern consumers, producers in the South and the North, and Southern households, who participate in the market for child labor depending on the derived demand and the opportunity cost of child labor.

2.1 Demand for Child Labor

Northern Consumers

The representative consumer in the North is characterized by his preferences and income. Each of the N Northern consumers allocates his disposable income E between a numeraire commodity, d^y, which does not accommodate child labor employment, and a commodity d_i^x; $i = a, k$. Let d_i^x, suitably subscripted, denote the quantity of commodity d^x that is produced with adult labor (d_a^x) or with child labor (d_k^x).

The utility function of a representative consumer is given by:

$$U(d_a^x, d_k^x, d^y) = \alpha \log D(d_a^x, d_k^x) + (1-\alpha) \log d^y.$$

$\alpha > 0$ $(1-\alpha)$ denotes the weight allotted to the consumption of commodity d^x (d^y). In addition, $D(d_a^x, d_k^x)$ is a sub-utility index[6], with $D(d_a^x, d_k^x) = a_a d_a^x + a_k d_k^x$. The parameters a_i embody the preference rankings of consumers between products that are produced by adult and child labor, with $a_a/a_k \equiv a > 1$. The interpretation of such preference rankings can be quite general, and represent consumers' desire to penalize exporting firms who employ child laborers, or to reward firms that choose to only employ adult laborers (T. N. Srinivsan 1998, Keith Maskus 1997) by stipulating that the marginal rate of substitution for child labor free products is strictly greater than one[7]. Also let p_ℓ (p_u) be the price of a labeled (an unlabeled) product originating in the South, and denoting Northern variables by corresponding upper case letters, let P be the uniform price on Northern production

[6]See Dixit and Stiglitz (1977) for a discussion of the use of similar utility indexes when product differentiation is of central concern.

[7]Kaushik Basu (1999a) points out that policy recommendations based solely on consumer attitudes may confuse the incidence of child labor with child welfare. In this light, we account for the potential bias in consumer-based policy judgements by examining the impact of social labeling respectively on the well-being of children, of producers in the North and South, along with that of consumers.

of the same commodity d^X. Note that d^X is produced only with adult labor in the North.

The Limits of Labeling as a Screening Device

It is important to emphasize at the very outset that product labels may not convey the actual input choices of producers, particularly when the enforcement of product standards is costly and monitoring of labels is imperfect at best. In particular, we focus on the case with rational consumers who incorporate the possibility of false labeling in their consumption decision calculus by noting that labeled products are not synonymous with goods that are produced only by adult laborers.

Accordingly, let λ be the probability that a labeled Southern product is produced by adult labor. By standard arguments (Dixit and Stiglitz 1977), the utility maximizing solution of the consumer's decision problem is given by an expenditure share α $(1-\alpha)$, that consumer devotes to the consumption of commodity d^x (d^y), demand functions $d_i^x(p_\ell, p_u)$ $i = \ell, u$ for Southern imports, and a demand function for Northern production of the same commodity, d^X.[8] In particular, demand is positive for both labeled and unlabeled products if and only if

$$\frac{p_\ell}{p_u} = \lambda a + (1-\lambda) \leq a; \quad \frac{P}{p_u} = a.$$

Or equivalently,

$$\lambda(a-1) = \frac{p_\ell}{p_u} - 1 \leq \frac{P}{p_u} - 1 = a - 1, \tag{1}$$

whenever $\lambda \leq 1$. As should be expected, the presence of false labeling decreases the premium that consumers are willing to pay for labeled goods.

In addition, if labeled and unlabeled products co-exist, (i) the price of labeled products exceeds that of unlabeled products if and only if $\lambda > 0$, and (ii) the relative price premium (p_ℓ/p_u) precisely reflects consumers' relative willingness to pay for (the marginal rate of substitution (a) between) child labor free products if and only if false labeling

[8] More specifically, these demand schedules are given by:

$$d_a^x(p_\ell, p_u, P) = \begin{cases} \frac{\alpha E}{p_\ell} & \text{if } \frac{a_\lambda}{p_\ell} > \frac{a_k}{p_u}; \text{ and } \frac{a_\lambda}{p_\ell} > \frac{a_a}{P}; \\ 0 & \text{if } \frac{a_k}{p_u} > \frac{a_\lambda}{p_\ell}; \text{ or; } \frac{a_a}{P} > \frac{a_\ell}{p_\ell}; \end{cases} ; \; d_u^x(p_\ell, p_u, P) = \begin{cases} \frac{\alpha E}{p_u}, & \text{if } \frac{a_\lambda}{p_\ell} < \frac{a_k}{p_u}; \text{ and } \frac{a_a}{P} < \frac{a_a}{p_u}; \\ 0 & \text{if } \frac{a_\lambda}{p_\ell} > \frac{a_k}{p_u}; \text{ or } \frac{a_a}{P} > \frac{a_k}{p_u}. \end{cases}$$

where $a_\lambda \equiv \lambda a_a + (1-\lambda)a_k$ Likewise, the demand schedule for Northern production of x is given by

$$d^X(p_\ell, p_u, P) = \begin{cases} \frac{\alpha E}{P}, & \text{if } \frac{a_\lambda}{p_\ell} < \frac{a_a}{P}; \text{ and } \frac{a_k}{p_u} < \frac{a_a}{P}; \\ 0 & \text{if } \frac{a_\lambda}{p_\ell} > \frac{a_a}{P}; \text{ or } \frac{a_a}{P} < \frac{a_k}{p_u}. \end{cases}$$

does not prevail, with $\lambda = 1$.

In stark contrast, a uniform price p^o (P^o) applies to all Southern (Northern) producers in the absence of social labeling. The two prices p^o and P^o need not coincide, however, since consumers can still account for the pooling of producers in the South with heterogeneous input choices, by resorting to the country-of-origin of a product. To see this, note that if $\gamma < 1$ represents the fraction of Southern exports produced using only adult labor, and only adult laborers are employed in the North, demand for output x in both the South and the North are positive if and only if

$$\frac{\gamma a_a + (1-\gamma)a_k}{p^o} = \frac{a_a}{P^o},$$

or equivalently,

$$\frac{P^o}{p^o} = \frac{a}{1+\gamma(a-1)} > 1. \tag{2}$$

Thus, a proportionate price premium prevails even in the absence of labeling, with the country-of-origin of a product serving as a signal of the input choice of the average Southern producer.

Production in the North and South

Two sectors y and x constitute the production side of the North and the South. Production of the composite numeraire y in the South takes as input of production, adult laborers ℓ_y, with $y = \omega \ell_y$. With upper case symbols denoting Northern variables, output of the numeraire good in the North is given by $Y = \Omega L_y$. Since ω and Ω respectively denote the average and marginal productivity of labor in the two countries, the economy-wide rewards to the n adult laborers is given by ω in the South, and Ω for the N number of adult laborers in the North.

A large number of producers m (M), are engaged in the production of commodity x (X) in the South (North). To focus on the choice of technique on the part of producers, the production functions of good x respectively using child and adult laborers are given by:

$$x_k = min\{\kappa, \frac{\ell_k}{b_k}\}; \;\; x_a = min\{\kappa, \frac{\ell_a}{b}\},$$

where κ (K) denotes capital input accessible to each of the m Southern (Northern) producers. ℓ_i, $i = a, k$, respectively denotes the number of adult and child laborers engaged in the production of commodity x, whereas b and b_k capture the productivity of adult and child laborers. In particular, we assume that firms have differential access to cost

saving technologies, with $\mu(b)$ characterizing the cumulative distribution of the m firms in the range $[b^-, b^+]$. The cumulative distribution $\mu(\cdot)$ is taken to be continuously differentiable over $[b^-, b^+]$ with a strictly positive density function $\mu' > 0$. In addition, each child labor produces only a fraction of the output of an adult, with $b_k > b^+$. Let the wage income of a child laborer be denoted as w_k, and τ denotes the per unit levy applied to all participating labeling firms.

The decision problem of Southern producers constitute a two-stage problem: (I) whether or not to employ child labor and (II) whether or not to participate in the social labeling scheme. We begin with the second stage.

For an adult labor employer, participation in the social labeling scheme implies unit output revenue: $p_\ell - \tau$, and p_u otherwise. Henceforth, we shall refer to equation (3) below as the participation constraint, with the interpretation that adult labor employers benefit from signaling their type, given τ, via labeling if and only if:

$$p_\ell - p_u \geq \tau. \tag{3}$$

Meanwhile, a child labor employer benefits from (falsely) signaling their choice of inputs if and only if :

$$(1-\phi)p_\ell + \phi p_u - \tau \geq p_u \Leftrightarrow p_\ell - p_u \geq \frac{\tau}{(1-\phi)}. \tag{4}$$

The false labeling constraint in equation (4) above gives the maximal price premium on labeled products that can be maintained without inducing more producers to practice false labeling.[9]

Figure 1 summarizes these observations. In particular, if the participation constraint is violated, social labeling is a matter of irrelevance to producers ($x_\ell = 0$), a uniform price p^o applies to all producers. Meanwhile, strictly positive supplies of both labeled and unlabeled products prevail whenever the price premium falls within the range $[\tau, \frac{\tau}{1-\phi}]$. Clearly, as $\phi \to 1$, any social labeling scheme that satisfies the participation constraint belongs to this range. Meanwhile, the false labeling constraint and the participation constraint coincide whenever $\phi = 0$. Finally, *everyone labels* whenever the price premium for labeled products exceeds $\tau/(1-\phi)$, and whether or not child laborers are employed.

Turning now to the first stage problem, producers derive higher profits by participating in a labeling scheme and employing adult labor if and only if

$$(p_\ell - \omega b - \tau)\kappa \quad \geq \quad (p_u - w_k b_k)\kappa$$

[9]In light of Hilowitz (1997b), equation (4) implies that employers whose false labeling practices are discovered are simply delicensed.

$$\Leftrightarrow p_\ell - p_u - \tau \;\geq\; \omega b - w_k b_k.$$

Thus, the price premium attached to labeled products ($p_\ell - p_u$), along with the wage cost savings that the employment of child labor entails ($\omega b - w_k b_k$), dictate the self-selection among producers into employers of child and adult labor. In particular, define

$$b^*(p_\ell, p_u, w_k) \equiv \frac{p_\ell - p_u + w_k b_k - \tau}{\omega}. \tag{5}$$

Thus, Southern producers with $b > b^*$ are better off employing child labor. As should be expected, at any given price premium, relatively cost inefficient producers are favorably selected in the group of child labor employers.

The definition of b^* in equation (5) implies an aggregate (derived) demand curve for child labor ℓ_k^d, with $\ell_k^d = (1 - \mu(b^*))b_k \kappa m$. In particular, ℓ_k^d is inversely (positively) related to the supply price of child labor (adult labor), and is strictly decreasing in the price premium attached to labeled goods. Clearly, the absence of social labeling is but a special case of equation (5), wherein $p_\ell - p_u - \tau = 0$, and the marginal producer in the South is characterized by $b^o \equiv w_k^o b_k / \omega$.

To determine whether a given social labeling scheme induces participation and / or false labeling, along with the equilibrium wage rate of child laborers (w_k^* and w_k^o), we now turn to a description of the child labor market and output market equilibrium.

2.2 Supply of Child Labor

There are a large number n_k of potential child laborers available for work in sector x. We take the supply of child labor to sector x from each the n_k children as determined by an opportunity cost schedule $R(\theta)h(\ell_k)$, with $R'(\cdot) > 0$. $\theta \in [\theta^-, \theta^+]$ is taken to be a function of a vector of exogenous factors specific to each child. These may include the subsistence income of the household (Basu and Van 1998), the number of children in the household (ILO 1996b), the effective borrowing interest rate to finance education (Ulrike Grote, Arnab Basu and Diana Weinhold 1998, Baland and Robinson 1999, Priya Ranjan 1999), or the expected returns to education (Hideo Akabayashi and George Pscharopoulos, 1999). We also allow for the possibility that private and social marginal benefits of child labor diverge (Grootaert and Kanbur 1995). Accordingly, let the scale factor $h(\cdot)$ be strictly positive, with $h'(\cdot) \leq (>) 0$, representing scale economies of human capital accumulation (congestion diseconomies associated with the next best alternative of child labor employment in sector x).

Taking as given the stock of child laborers in sector x, a child is better of working in the x sector if and only if

$$\theta \leq \bar{\theta}(w_k, \ell_k) \equiv \{\theta | R(\theta)h(\ell_k) = w_k.\}$$

In addition, if the distribution of θ among the n children is given by the cumulative distribution function $\nu(\theta)$, aggregate supply of child labor in sector x is simply $\ell_k^s(w_k) = n_k\nu(\bar{\theta})$. We restrict ourselves to the case where the scale effect associated with human capital accumulation is not too large, with $\partial\ell_k^s/\partial w_k > 0$ or equivalently, the own-price supply schedule of child labor is positively sloped.[10]

Turning now to the North, we assume that the incidence of child labor is a non-issue for Northern households. Purely from the viewpoint of the supply side of the market for child labor, such asymmetries between the labor markets of the North and the South apply whenever the North is characterized by, (i) returns to human capital that are sufficiently high, (ii) a smaller number of family members in a typical household, (iii) credit markets that are better equipped to accommodate human capital undertaking of the poor or (iv) households that enjoy income higher than the subsistence level. Accordingly, aggregate Northern supply of child labor-free products is given by KM.

3 Social Labeling as a Market-based Solution to Child Labor

Key to the potential of social labeling in reducing the demand pull for child labor is the product market response in terms of the size of the equilibrium price gap $p_\ell - p_u$. In addition, equilibrium child labor employment can be determined once the reservation wage of the marginal child laborer is known. We approach these questions by imposing two market clearance equations to complete the model. In particular, total consumer expenditure on the output of the x sectors of both the North and the South combined, is equal to aggregate revenue received by producers if

$$\begin{aligned} aEN &= [p_\ell^* \frac{\mu(b^*)}{\lambda^*} + p_u^*(1 - \frac{\mu(b^*)}{\lambda^*})]\kappa m + P^*KM \\ &= p_u^* \left([1 + \mu(b^*)\frac{p_\ell - p_u}{\lambda^* p_u}]\kappa m + aKM \right) \\ &= p_u^* \left([1 + \mu(b^*)(a-1)]\kappa m + aKM \right) \end{aligned}$$

where the third equality follows since consumers equate the marginal rate of substitution with relative prices (equation (1)), and an asterisk represents equilibrium values. Thus,

[10] More specifically, this requires that $|h'|$ be small enough so that $\partial(\ell_k^s - n_k\nu(\bar{\theta}))/\partial\ell_k^s = hR' + n_k\nu' Rh' > 0$.

making use of equation (1),

$$p_\ell^* - p_u^* = \lambda^*(a-1)\alpha EN\left([1+\mu(b^*)(a-1)]\kappa m + aKM\right)^{-1}. \tag{6}$$

As should be expected, the higher the fraction of true labels (λ^*), the higher will be the equilibrium price premium attached to labeled Southern imports.

Figure 2 highlights the consequences of false labeling in terms of the equilibrium price premium and child labor employment. The EE schedule represents producer response to the price premium in equation (5). Starting from $p_\ell - p_u - \tau = 0$, b^o coincides with the marginal employer in the absence of labeling. The D^iD^i $(i = o, 1, 2)$ schedules in Figure 2 depict the negative relationship between the $p_\ell^* - p_u^*$ and $\mu(b^*)$ in equation (6), taking as given consumer's expectation that $\lambda = 1$. In addition, D^oD^o, D^1D^1 and D^2D^2 represent successively (i) higher shares of consumer income devoted to x (α); (ii) higher levels of consumer's willingness to pay (a) and (iii) lower levels of total x sector output worldwide (κm and KM).

Thus, D^oD^o demonstrates the case where the equilibrium price premium as given by the intersection of D^oD^o and EE does not justify the levy imposed on labeling τ ($p_\ell - p_u < \tau$). As such, equilibrium child labor employment is given by $(1-\mu(b^o))\kappa m$. Curve D^1D^1, on the other hand, is consistent with rational expectation and labeled products are synonymous with goods that are made solely with adult labor. As such, b_1^* represents the marginal employer in the South who is just indifferent between hiring adult and child labor. Finally, curve D^2D^2 intersects EE at a point which violates rational expectation as the number of firms with false labels is strictly positive. It follows, therefore, that the fraction of true labels in the pool of Southern exports must be lower than 1 and the D^2D^2 shifts to the left until the false labeling constraint is just binding ($D^\lambda D^\lambda$), and the marginal employer of adult laborers is characterized by $b = b_2^*$.

Figure 2 yields two observations that prove to be useful in the sequel. To begin with, note that whenever the participation constraint is satisfied, for all $\phi \geq 0$, social labeling always decreases equilibrium employment of child labor $b^* \geq b^o$.[11] In addition, when the false labeling constraint is binding, child labor employment $(1-\mu(b^*))\kappa m$ is determined by the intersection of the false labeling constraint and the EE curve. As such, the endogenous link between demand side considerations (the D^iD^i curves) and the equilibrium child labor employed is severed. Meanwhile, an increase in the monitoring intensity (ϕ) shifts the false labeling constraint upwards. It follows that equilibrium child

[11] In the absence of monitoring, labeled firms are rewarded with a price premium that is just equal the levy imposed on labeled products. As such, the unit revenue of labeled and unlabeled firms is identical. Simply put, labeling in the complete absence of monitoring has no bearing on child labor employment.

labor employment, along with the price premium attached to labeled products, increase simultaneously.

Finally, the market clearing wage for child labor w_k^* can be determined via

$$[1 - \mu(b^*)]\kappa m b_k - \ell_k^s(w_k^*) = 0. \tag{7}$$

In what follows, we summarize a number of key observations regarding the effectiveness of social labeling based on the four objectives discussed in section 1. Formal proofs of these results can be found in the Appendix.

3.1 Welfare of Consumers

Social labeling reveals information that are previously unknown to consumers. Indeed, the indirect utility of Northern consumers subsequent to labeling can be expressed as: [12]

$$\begin{aligned} U^* &= -\alpha(\log p_u^* - \log a_k) + \log E + \log \alpha^\alpha (1-\alpha)^{1-\alpha} \\ &= \alpha \log \frac{(1 + \mu(b^*)(a-1))\kappa m + KM}{\alpha EN} + C \end{aligned}$$

where $C = \alpha \log a_k + \log E + \log \alpha^\alpha (1-\alpha)^{1-\alpha}$ and the second equality follows from product market clearing. Thus, consumers' welfare is strictly decreasing in the proportion of Southern producers using child labor $1 - \mu(b^*)$ whenever $a > 1$.

In comparison, if consumers must resort to a product's country-of-origin as a signal of the existence of pooling of child and adult labor employers among Southern employers, the welfare of consumers in the North in the absence of labeling is given simply by:[13]

$$U^o = \alpha \log \frac{(1 + \mu(b^o)(a-1))\kappa m + aKM}{\alpha EN} + C. \tag{8}$$

Clearly, $U^o < U^*$ if and only if $\mu(b^o) < \mu(b^*)$. Taking into account the two observations made corresponding to Figure 2, we have

[12] To see this, note that the equality of the marginal rate of substitution and relative prices implies $a_\lambda / p_\ell = a_k / p_u$. Thus, $D^x(d_a^x, d_k^x, d^X) = a_\lambda \alpha E / p_\ell^* = a_k \alpha E / p_u^* == a_a \alpha E / P^*$. In other words, consumers are strictly indifferent between purchasing a labeled or unlabeled product, originating from either the North or the South.

[13] To see this, note that product market clearance require $\alpha EN = p^o \kappa m + P^o KM$, or

$$\alpha EN = p^o \left(\kappa m + (\frac{1}{a} + (1 - \mu(b^o)(1 - \frac{1}{a}))^{-1} KM \right) \Leftrightarrow p^o = \frac{\alpha EN}{\kappa m + (1 + \mu(b^o)(a-1))^{-1} aKM}.$$

Equation (8) follows from substituting p^o into the utility function of Northern households.

Proposition 1 *(i). Social labeling confers benefits to Northern consumers if and only if the participation constraint is satisfied.*
(ii) If the false labeling constraint is binding, an increase in monitoring intensity unambiguously increases the welfare of Northern consumers.

3.2 Welfare of Producers

Precisely by allowing consumers to differentiate between producers with respect to their choice of inputs, social labeling can also be shown to create revenue consequences on producers of the South and the North that go in opposite directions. In proposition 2, we summarize the revenue consequences of social labeling (gross of tax revenue imposed on labeled products). In particular, it can be readily confirmed that

Proposition 2

$$P^o > P^*, \quad and \ p^o > p_u^*$$

if and only if the participation constraint is satisfied. In addition,

$$p_\ell^* > p^o$$

if and only if the fraction of true labels λ^* is no less than $\mu(b^o)$.

By separating (although imperfectly) producers in terms of their choice of inputs, Southern adult labor employers are rewarded via the higher willingness to pay on the part of consumers ($p_\ell^* > p^o$), so long as the fraction of child labor free products in the pool of labeled Southern exports is no less than that which applies in the absence of labeling.[14] Meanwhile, the inability to free ride on the uniform price that consumers are willing to pay for Southern products imply that employers who continue to employ child labor receive a strictly lower price $p^o > p_u^*$. Perhaps more interestingly, beginning from a regime where country-of-origin labels represents the only source of information available to consumers regarding the choice of inputs by producers, social labeling confers negative revenue consequences on Northern producers, as Northern producers no longer constitute the only source of products made only by adult workers.

To make the case of the positive consequences of social labeling on producer revenues in the South even stronger, it can be readily verified that total producer revenue G in the South is given by

[14]Note that in general, λ^* may be greater than or less than $\mu(b^o)$. In the proof of proposition 2, we show that $\lambda^* > \mu(b^o)$ holds whenever the unit output levy τ is sufficient large so as to deter false labeling in the absence of perfect monitoring.

$$G^o = \alpha EN\kappa m\left(\kappa m + \frac{aKM}{1+\mu(b^o)(a-1)}\right)^{-1}, \quad G^* = \alpha EN\kappa m\left(\kappa m + \frac{aKM}{1+\mu(b^*)(a-1)}\right)^{-1}.$$

Thus, producer revenue rises unambiguously subsequent to social labeling in the South if and only if $b^* > b^o$. The intuition is straightforward. Whereas social labeling has negative revenue consequences on child labor employers, this is but a first round effect. The transition from a pure pooling to a semi-separating regime via labeling biases Southern producers' incentives against the use of child labor. As such, the *average* willingness to pay for Southern products unambiguously rises.

Summarizing these arguments, we have

Proposition 3 *(i) Social labeling (strictly) increases the unit revenue of Southern exports, and (strictly) decreases the unit revenue of Northern producers, if and only if the participation constraint is satisfied and* $\phi \geq (>)0$.
(ii) If the false labeling constraint is binding, an increase in monitoring intensity increases the unit revenue of Southern exports, and decreases the unit revenue of Northern output x.

Propositions 1 and 2 reiterate our emphasis in section 1, that a social labeling program targets information imperfection on the consumption side, and corrects for the moral hazard problem on the production side. In the next section, we consider how these corrective policies may spillover to affect the welfare of children in the South.

3.3 Incidence of Child Labor

Referring to Figure 2 once more, social labeling strictly decreases the incidence of child labor whenever the participation constraint is satisfied. Simply put, an increase in the price premium $p_\ell^* - p_u^*$ discourages Southern producers from employing child labor. However, the presence of false labels in the pool of Southern labeled products implies that employers of adult laborers cannot reap the full benefits of social labeling as the proportionate price premium of labeled products is strictly decreasing in $1 - \lambda^*$ (equation (6)). Thus, the promise of social labeling in securing children away from the work place is subject to the intensity of monitoring, with $\partial \ell_k^*/\partial\phi < 0$ whenever the false labeling constraint is binding.

Proposition 4 *(i) Social labeling (strictly) reduces the incidence of child labor in sector* x *if and only if the participation constraint is satisfied.*
(ii) If the false labeling constraint is binding, an increase in monitoring intensity decreases the incidence of child labor in sector x.

3.4 Welfare of Children

Moving beyond the employment objective of social labeling per se, the full income of children in the South G_k^* is given by

$$G_k^* = n_k w_k^* \nu(\bar{\theta}) + n_k \int_{\bar{\theta}}^{\theta^+} R(\theta) h(\ell_k^*) d\nu(\theta).$$

where the first term represents the wage income of child laborers and the second term is the joint reservation income of children who do not work. In particular,

$$\frac{\partial G_k^*}{\partial b^*} = n_k \nu(\bar{\theta}) \frac{\partial w_k^*}{\partial b^*} + n_k \left(\int_{\bar{\theta}}^{\theta^+} R(\theta) d\nu(\theta) \right) h'(\ell_k^*) \frac{\partial \ell_k^*}{\partial b^*}$$

Thus, demand-induced decreases in producers' incentives to employ child labor have two effects on the full income of children in the South: First, and as should be expected, demand shifts that favor adult labor usage puts downward pressure on the wage income of existing child laborers if and only if the supply schedule of child labor is upward sloping. Meanwhile, if human capital accumulation exhibit scale economies, social labeling provides a market mechanism which narrows the gap between the market wage w_k^* and the marginal social cost of child labor $Rh + Rh'(\ell_k^*) = w_k^* + Rh'(\ell_k^*)\ell_k^* < w_k^*$. Thus, the full income of children in the South increases by precisely by the amount $n_k \int_{\bar{\theta}}^{\theta^+} R(\theta) d\nu(\theta) h'(\ell_k^*)(\partial \ell_k^* / \partial b^*) > 0$, as ℓ_k^* is inversely related to the share of adult employers $\mu(b^*)$. We have,

Proposition 5 *If the participation constraint is satisfied, a necessary (though not sufficient) condition for social labeling to improve the welfare of children is that the social opportunity cost of child labor be strictly greater than the private opportunity cost of child labor.*

Put differently, with congestion diseconomies associated with the next best alternative to child labor, the application of social labeling in sector x can only imply that children are doubly worse off.

3.5 Trade Sanctions

Social labeling also opens up a host of possibilities regarding the choice of trade policies that the North may undertake in the face of unlabeled Southern imports, particularly since these are goods that compete with Northern producers who follow the practice of hiring only adult laborers. In this light, consider an import tax t_u levied on unlabeled imports. The market clearing equation (6) above should be accordingly rewritten as:

$$\alpha E(t)N \;=\; (p_u^* + t_u)\{[1 + \mu(b^*)(a-1)]\kappa m + aKM\},$$

where $E(t) = E + t_u(1 - \mu(b^*))\kappa m/N$ represents the disposable income of Northern consumers upon accounting for tariff revenue. In the appendix, we show that

Proposition 6 *If the false labeling constraint is not binding, a move away from free trade by levying an import tax on unlabeled Southern imports leads to*
(i) a reduction in the incidence of child labor;
(ii) a decline in the price unlabeled products;
(iii) a decline in the price of labeled products, originating either from the South or the North, if the elasticity of supply of unlabeled products $-dlog(1-\mu(b^*))/dlog(p_\ell - p_u)$ is greater than $1/a$.
(iv) Under the same supply elasticity restriction, an import tariff t_u increases the welfare of Northern consumers.

The first item of the above proposition should not be too surprising, particularly since a discriminatory trade sanction functions by lowering the willingness of Northern consumers to pay for unlabeled goods.[15]

Meanwhile, an import tariff also implies a corresponding bias in producers' incentives away from child labor employment, and the aggregate supply of labeled products increases. It follows that producers of labeled *and* unlabeled products, regardless of their country-of-origin, suffer from revenue losses, when the positive supply response of labeled products with respect to the change in price premium is sufficiently large. Finally, with declining prices and a decrease in the total supply of products made by child labor, Northern consumers are unambiguously better off.

These conclusions should be contrasted with the case where the monitoring intensity is sufficiently small, with

Proposition 7 *If the false labeling constraint is binding, a move away from free trade by levying an import tax on unlabeled Southern imports at constant ϕ*
(i) leaves the incidence of child labor unchanged;
(ii) leads to a decline in the price of both labeled and unlabeled products for Southern

[15] To see this, note that labeled and unlabeled goods coexist if and only if

$$\frac{p_u}{p_\ell} < \frac{a_k}{a_a} = \frac{p_u + t_u}{p_\ell}.$$

producers. Meanwhile, the price of the Northern output increases unambiguously. (iii) improves the welfare of Northern consumers.

As a first round price impact of trade sanctions, child labor employers are faced with an increase in the price premium for labeled products, at the same probability of detection by monitoring agencies. In Figure 3, a similar increase in import tariff is illustrated by a shift of the DD curve upwards at constant λ. As should be apparent by now, a point like A violates rational expectations, since more Southern firms have the incentives to apply false labels. Thus, quite contrary to the original intent of trade sanctions against unlabeled products, an increase in t_u only results in a further increase in the share of false labels in the pool of Southern labeled imports, and equilibrium child labor employment is strictly unaffected as the D^tD^t curve shifts all the way back to DD, or until the false labeling constraint just binds.

Meanwhile, with rising incidence of false labeling among Southern imports, consumers accordingly adapt their expectations λ, and adjusts their willingness to pay for Southern labeled imports downwards. It follows, therefore, that even though the price premium on labeled products remains unaltered ($p_\ell^* - p_u^* = \tau/(1-\phi)$), an import tariff succeeds in lowering both p_ℓ and p_u by identical amounts. Consequently, a trade sanction on unlabeled goods has an adverse effect on both adult and child labor employers in the South. In stark contrast to the regime with perfect monitoring, however, trade sanctions that raise the fraction of false labels in the South confer revenue benefits to the North, as consumers resort to demand Northern child labor free products, and P^* rises unambiguously.

Finally, although there is no change in child labor employment, consumers nevertheless enjoy an improvement in welfare associated with the income gain via the collection of tariff revenue, at the expense of Southern producers.

4 Gains from Social Labeling

Having discussed the relative gains and losses associated with social labeling, a question still remains as to whether the joint welfare of each of the individual constituents of the South, including child laborers, adult workers, and producers of both the x and y sectors, stand to gain from social labeling. Consider, therefore the welfare of the South,

$$V^* = [p_\ell^* \frac{\mu(b^*)}{\lambda^*} + p_u^*(1 - \frac{\mu(b^*)}{\lambda^*})]\kappa m - [\int_{\bar{\theta}}^{\theta^+} \omega b d\mu(b) + w_k b_k (1 - \mu(b^*)]\kappa m + \omega \ell + G_k^*$$

$$= [\alpha E(t) - P^*KM - t_u(1 - \frac{\mu(b^*)}{\lambda^*})\kappa m] + \omega\ell_y^* + n_k \int_{\bar{\theta}}^{\theta^+} R(\theta)h(\ell_k)d\nu(\theta). \quad (9)$$

The first term in equation (9) denotes the total revenue of the x sector, representing the joint income of producers and workers (adult and child labor alike) in the x sector. G_k^*, to recall, is the full income of children. The second equality in equation (9) follows directly from product market clearance. Note that we do not include any resource cost that the South may incur in monitoring producers. Our purpose here is to determine whether the South may benefit from a labeling scheme even when it is not responsible for the monitoring costs involved (Table 1). We have,

$$\frac{\partial V^*}{\partial \phi}|_{\phi=0} = -KM\frac{\partial P^*}{\partial \phi} + t_u k m \frac{\partial \mu(b^*)/\lambda^*}{\partial \phi} + n_k[\int_{\bar{\theta}}^{\theta^+} R(\theta)d\nu(\theta)]h'(\ell_k^*)\frac{\partial \ell_k^*}{\partial \phi}. \quad (10)$$

Thus, in addition to the desire to improve export revenue (or equivalently, to decrease the market share of Northern producers, P^*KM), and to narrow the gap between social and private returns to human capital accumulation, the incentives of the South to maintain a credible social labeling scheme depends on factors that are indigenous to the South, along with trade policies originating from the North. In particular, since $\partial l_k^*/\partial\phi < 0$ from Proposition 4, the right-hand side of equation (13) is strictly decreasing in $\int_{\bar{\theta}}^{\theta^+} R(\theta)d\nu$. Recall that θ depends on a vector of supply side determinants of child labor, so that an increase in θ is tantamount to an increase in the reservation wage required to induce each household to send its child to work. It follows, therefore, that in the presence of scale economies of human capital accumulation, economies with (i) low expected rewards to human capital accumulation, (ii) large average family size, (iii) high borrowing rates of interest, and (iv) low expected returns to human capital, have relatively little to gain from labeling schemes.

In addition, the right-hand side of equation (10) is strictly *decreasing* in t_u if and only if $(\mu(b^*)/\lambda^*)\kappa m$ – total Southern supply of labeled products, regardless of whether child laborers are employed - *decreases* with monitoring. In other words, high import barriers on unlabeled products can in fact discourage the South to maintain a credible social labeling program. To see the intuition behind this rather surprising incentive consequence of trade sanctions, note that whenever false labeling prevails, Southern employers can avoid being subject to an import tariff via one of two means: (i) substituting adult laborers for child laborers; or (ii) applying false labels. In other words, economies where a majority of firms do not have access to cost saving technologies – $\mu(\cdot)$ is skewed with a fat right tail - are further discouraged from social labeling precisely because of a threat of trade sanctions, provided that at any given rate of import tariff, the number of adult labor employers $\mu(b^*)m$ increases at a much slower pace than the decline in false labeling.

Proposition 8 *The South optimally sets $\phi = 0$ if*
(i) social opportunity cost of child labor is no greater than the private opportunity cost of child labor,
(ii) the South monopolizes the world market for product x ($KM = 0$),
(iii) the return to human capital is sufficiently small,
(iv) the tax on unlabeled import is sufficiently high and $\mu(b^*)/\lambda^*$ is decreasing in ϕ.

5 Conclusion

The purpose of this paper has been two-fold: to develop a theoretical model in order to formalize the arguments in the literature regarding the potential merits and problems associated with social labeling in a general equilibrium framework; and to argue that social labeling should be viewed as a potential aid to the welfare of children in poor countries only in so far as it may serve as a *second best* policy.

Based on our framework, we obtain a number of additional insights which emphasize that the employment objective of social labeling depends critically on the level of monitoring in place and that the information objective of social labeling can favor both consumers and Southern producers once labels provide the appropriate linkage between consumer preferences and producers' input choices. In contrast, as soon as one recognizes that producers in both countries compete not just in prices, but also in hidden product attributes such as the degree of child labor usage in the production process, shifting Southern producers to costlier production methods (adult labor employment) need not render Northern producers better-off. From the viewpoint of the welfare of the children, rather than viewing the incidence of child labor as an end in itself, of particular relevance seems to be the underlying characteristics of Southern labor markets that make child employment *excessive*. These include the need to secure subsistence, credit market imperfections, and the prospects of education. Finally, a more prudent look into the question of whether trade sanctions can indeed assist in promoting the welfare of children absent other alternatives, or whether the mere threat of trade sanctions is sufficient to provide incentives for the South to uphold a given version of labor standards, is called for. Indeed, discriminatory barriers to trade may in fact discourage the South from initiating the monitoring required to maintain a credible social labeling program.

Appendix

Proof of Propositions 1 and 4: Making use of equation (7), and denote $p_\ell^* - p_u^* \equiv \Delta p^*$, $\ell_k^s/\partial w_k \equiv \ell_{kw}^s$, we have

$$\omega \frac{\partial b^*}{\partial(\Delta p^* - \tau)} = \frac{\partial(\Delta p^* - \tau + w_k^* b_k)}{\partial(\Delta p^* - \tau)} = \frac{\ell_{kw}^s}{\ell_{kw}^s + \mu' \kappa m b_k^2/\omega} > 0. \tag{11}$$

It follows that b^* is uniquely determined by $\Delta p^* - \tau$. Specifically, since the satisfaction of the participation constraint implies that $\Delta p^* - \tau > 0$, and b^* is strictly increase in $\Delta p^* - \tau$ from equation (11) above, we have $b^* > b^o$. Subsituting this into the indirect utility function of Northern consumer yields the desired result.

To show that consumers welfare improve with the degree of monitoring, observe from the definition of U^* that this is equivalent to an positive relationship between b^* and ϕ. To see this, note that if the false labeling constrained is just binding, we have, in addition, that $\Delta p^* = \tau/(1-\phi)$. Substituting this into equation (7), we have

$$(1 - \mu(\frac{\frac{\phi\tau}{1-\phi} + w_k^* b_k}{\omega}))b_k \kappa m = \ell_k^s(w_k^*),$$

It follows that equilibrium child labor employment is uniquely determined by monitoring intensity, with $\partial w_k^*/\partial\phi < 0$ whenever ℓ_k^s is upward sloping. Equivalently, $\ell_k^*(w_k^*)$, and hence $(1 - \mu(b^*))$ is strictly decreasing in ϕ.

Proof of Proposition 2: Denote $B^* \equiv 1 + \mu(b^*)(a-1)$, $B^o \equiv 1 + \mu(b^o)(a-1)$ and $B^\lambda \equiv 1 + \lambda^*(a-1)$, we have, from product market clearance and footnote (10),

$$\frac{P^o}{P^*} = \frac{B^*\kappa m + aKM}{B^o\kappa m + aKM} > 1, \quad \frac{p^o}{p_u^*} = B^o \frac{B^*\kappa m + aKM}{B^o\kappa m + aKM} > 1$$

In addition,

$$\begin{aligned} \frac{p^o}{p_\ell^*} &= \frac{B^o}{B^\lambda} \frac{B^*\kappa m + aKM}{B^o\kappa m + aKM} = \frac{B^*\kappa m + aKM}{B^\lambda \kappa m + (B^\lambda aKM/B^o)} \\ &< \frac{B^*\kappa m + aKM}{B^\lambda \kappa m + aKM} < 1. \end{aligned}$$

where the first inequality holds whenever $\lambda^* > \mu(b^o)$, and the second inequality follows whenever total supply of unlabeled products is positive $(1 - \mu(b^*)/\lambda^*) > 0$.

Proof of Proposition 3: Observe from product market clearing that

$$P^o = \alpha a E N (B^o \kappa m + aKM)^{-1}, \quad P^* = \alpha a E N (B^* \kappa m + aKM)^{-1}$$

The expression for G^o and G^* can be readily obtained by observation that $G^o = \alpha EN - P^o KM$ and likewise, $G^* = \alpha EN - P^* KM$.

Proof of Proposition 6: If the participation constraint is satisfied, and all Southern products bears true labels, we have

$$\begin{aligned} p_u^* + t_u &= \frac{\alpha(E + t_u(1 - \mu(b^*)\kappa m))}{(1 + \mu(b^*)(a-1))\kappa m + aKM} \equiv G(\Delta p^*, t_u) \\ \Leftrightarrow \Delta p^* &= p_\ell^* - p_u^* = (a-1)G(\Delta p^*, t_u) + t_u, \end{aligned} \tag{12}$$

with $G_1 < 0$ and $1 > G_2 > 0$. By routine manipulation, $G_1 + G_2 < 0$ if and only if the elasticity of supply of unlabeled products with respect to Δp, $\eta \equiv -dlog(1 - \mu(\Delta p^* + w_k b_k))/dlog\Delta p^*$, holding w_k constant, is strictly greater than $1/a$.

Equation (11) above implicitly defines the equilibrium price premium on labeled goods Δp in terms of the size of the import tax t_u. In particular,

$$\frac{\partial \Delta p}{\partial t_u} = \frac{(a-1)G_2 + 1}{1 - (a-1)G_1} > 0, \quad \frac{\partial p_u^*}{\partial t_u} = \frac{G_2 - 1 + aG_1}{1 - (a-1)G_1} < 0, \quad \frac{\partial p_\ell^*}{\partial t_u} = a\frac{G_1 + G_2}{1 - (a-1)G_1} < 0.$$

Thus, an import tax widens the price gap and decreases the price of unlabeled goods. In addition, if the elasticity of supply η of unlabeled products is sufficiently large, the price of labeled products is similarly decreasing in t_u. Subsituting these results in the indirect utility function of consumers, it can be readily verified that consumers' welfare is increased by deviating from a free trade.

Proof of Proposition 7: From equation (5), aggregate supply of unlabeled products can be written as

$$(1 - \frac{\mu(b^*)}{\lambda^*})\kappa m = (1 - \frac{\mu(b^*)(a-1)(p_u^* + t_u)}{(\tau/(1-\phi)) - t_u}).$$

Denote tariff revenue $t_u(1 - \mu(b^*)/\lambda^*)\kappa m = T(p_u^*, t_u)$. It can be readily verified that starting with $t_u = 0$,

$$T_1 < 0; \quad (1 + \mu(b^*)(a-1))\kappa m + aKM > T_2(p_u^*, 0) > 0.$$

From product market clearance, and the false labeling constraint,

$$\begin{aligned} p_u^* + t_u &= \frac{\alpha(E + T(p_u^*, t_u))}{(1 + \mu(b^*)(a-1))\kappa m + aKM} \Leftrightarrow P^* = a\frac{\alpha(E + T(p_u^*, t_u))}{(1 + \mu(b^*)(a-1))\kappa m + aKM} \\ \Delta p^* &= \Phi. \end{aligned} \tag{13}$$

From equation (13), equilibrium price premium is invariant to t_u, as such, an import tax has no influence on b^*, or equivalently, the incidence of child labor. In addition,

$$\frac{\partial p_u^*}{\partial t_u} = \frac{\Gamma - \alpha T_2}{\alpha T_1 - \Gamma} < 0, \quad \frac{\partial p_\ell^*}{\partial t_u} = \frac{\partial (p_u^* + \tau/(1-\phi))}{\partial t_u} = \frac{\partial p_u^*}{\partial t_u} < 0, \quad \frac{\partial P^*}{\partial t_u} = a\alpha \frac{T_1 - T_2}{\alpha T_1 - \Gamma} > 0.$$

where $\Gamma \equiv (1 + \mu(b^*)(a-1)\kappa m + aKM > T_2$. Thus, an import tax on decreases the price of all Southern products, while it increases that of the North.

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Figure 1. *Participation and False-Labeling Constraints*

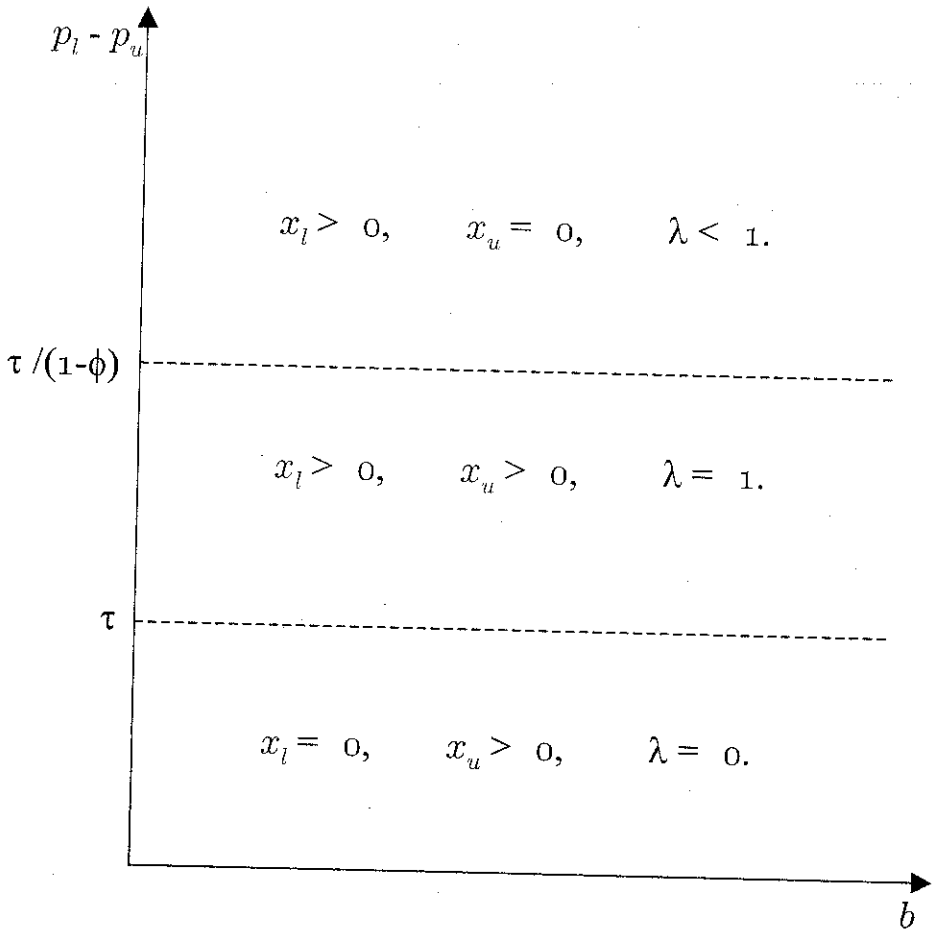


Figure 2. Equilibrium Price Premium and Child Labor Demand

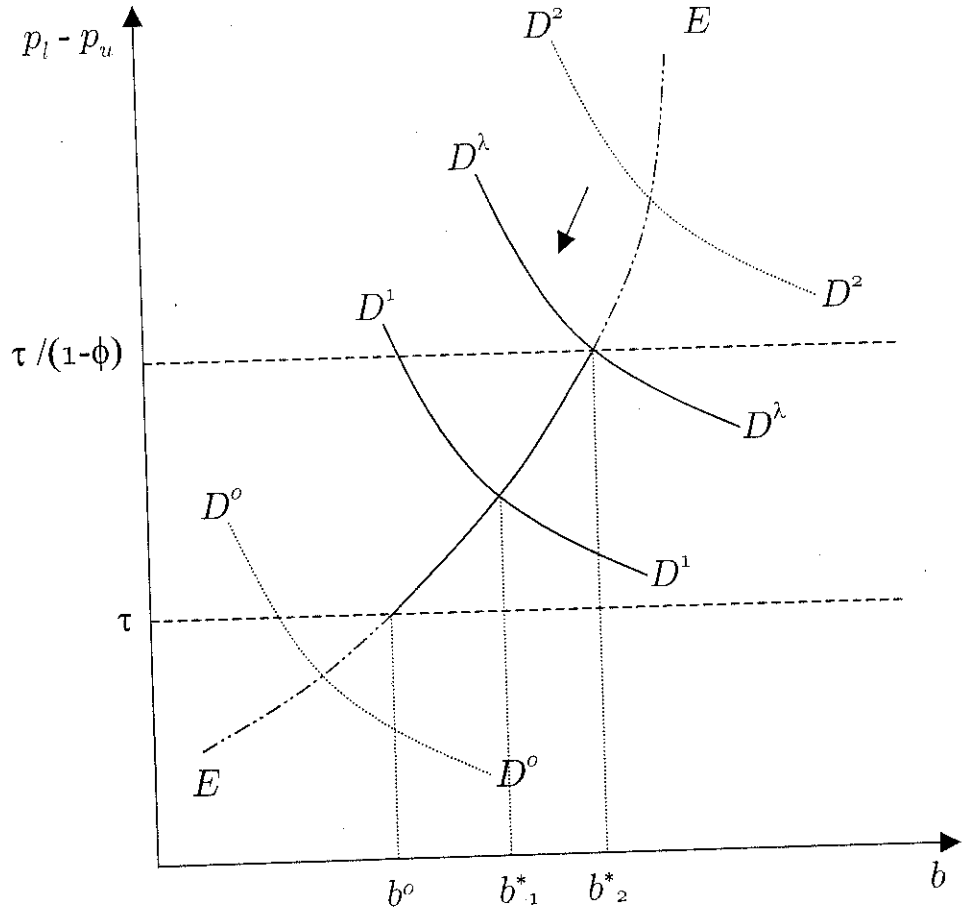
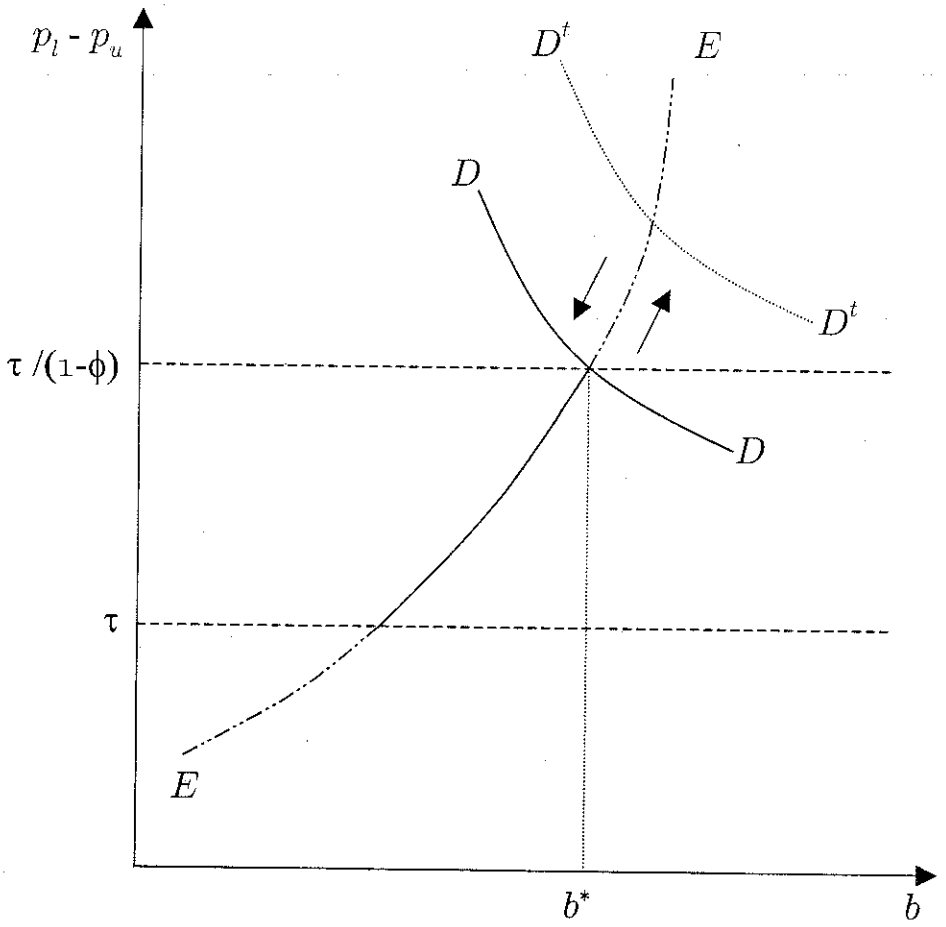


Figure 3. Trade Sanctions with No Impact on the Incidence of Child Labor



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