ORIGINAL PAPER

Consumer boycott, household heterogeneity, and child labor

Michele Di Maio · Giorgio Fabbri

Abstract Consumer boycott campaigns against goods that are produced using child labor are becoming increasingly popular. Yet there is still no consensus on which are the effects of such type of activism on child labor in developing countries. In fact, if some agreement is to be found in the recent economic literature, it is that the boycott does not reduce child labor. We contribute to this discussion presenting a simple model which shows that there are conditions under which a consumer boycott reduces child labor. We consider a small country two-factor economy populated by heterogeneous households. The boycott affects both the adult and the child labor markets. We show that the effects are heterogeneous and depend on household characteristics and on the income distribution. We derive the conditions under which the consumer boycott reduces child labor not only for nonpoor households but also for some of the households whose' income is—before the boycott—under the subsistence level.

M. Di Maio · G. Fabbri (✉)
Department of Economic Studies, University of Naples *Parthenope*, Naples, Italy
e-mail: giorgio.fabbri@uniparthenope.it

🖄 Springer

1 Introduction

In June 1996, *Life Magazine* published a story on Pakistani children stitching Nike's soccer balls.[1] That gave the start to what is considered the first world-wide boycott campaign against a multinational company because of its use of child labor.[2] Since then, several other consumer boycott campaigns have been organized worldwide and its number has been increasing with the consumers' awareness of the conditions of working children in developing countries.[3]

Child labor is still a dramatic phenomenon in several developing countries. Governments and NGOs have adopted different measures and strategies in trying to eradicate it. At the national level, these measures include child labor prohibition laws,[4] compulsory education laws, and food-for-education programs. At the international level, these are—in addition to consumes boycotts campaigns—the imposition of core labor standards, the provision of trade sanctions,[5] the ban on child labor-tainted goods, and the creation of social labeling programs.[6]

Recently, the effects of these measures against child labor have started to be analyzed from a theoretical point of view. While the objective of all these measures is to reduce child labor, they sometimes turn out to be in contrast with each other (Doepke and Zilibotti 2005) and may even end up doing more bad than good. Indeed, if children are working because of poverty, they may end up getting hurt by the very sanctions meant to help them (Basu and Van 1998; Edmonds 2003; Dessy and Pallage 2005). The negative effect on child's status of measures against child labor seems to extend also to labeling programs and consumer boycotts. Baland and Duprez (2009) show that a labeling program against child labor-tainted goods could reduce the overall country welfare. Basu and Zarghamee (2009) demonstrate that a consumer boycott would increase rather than decrease child labor.

These last results are somehow disturbing because they indicate that measures against child labor based on consumers' preferences end up to have (unintended) negative effects on children. Moreover, these results seem to be

---

[1]Schanberg S.H. (1996) "On the playgrounds of America, Every Kid's Goal is to Score: In Pakistan, Where children stitch soccer balls for Six Cents an hour, the goals is to Survive.", Life Magazine, pp. 38–48.

[2]For an account of the story and effects of the boycott, see Naseem (2009).

[3]Interestingly, there is no empirical evidence that globalization per se increases child labor. In fact, the prevailing view in the literature is that globalization has no effect or it may even reduce child labor (Cigno et al. 2002; Cigno 2003; Neumayer and DeSoysa 2005). Yet Cigno et al. (2002) suggest that globalization may increase child labor in very poor countries just because the skill structure of these economies makes them unable to gain from the opportunities provided by increasing trade integration.

[4]Political economy models of child labor laws are Dessy and Knowles (2008) and Doepke and Zilibotti (2005, 2010).

[5]See for instance Jafarey and Lahiri (2002), Gupta (2002), and Grossmann and Michaelis (2007).

[6]Hilowitz (1997) describes the characteristics and effects of social labeling programs in developing countries.

in contrast with the available empirical evidence on labeling and consumer boycott campaigns. While systematic empirical evidence is still missing, several case studies suggest that these measures have contributed to reduce child labor (see for instance Ravi (2001) and Seidman (2007)) and that their effects on child's status are in fact heterogeneous (see Chakrabarty and Grote 2009).

The objective of this paper is to theoretically reexamine the effect of a consumer boycott on child labor and to provide a model able to account for the empirical evidence of the heterogeneous impact of this measure on child's status. To this end, we present a model characterized by household heterogeneity and by the presence of more than one factor of production. We show that a consumer boycott campaign reduces child labor not only for rich households but also for poor households to the extent to which the latter is positively affected by the boycott-induced changes that took place in the adult labor market.

Three are the novel elements of our model. First, our model allows the change in the child wage to have—depending on household income—either an income effect or a substitution effect on child labor. In the former case, an increase in the child wage reduces the child labor supply. In the latter case, the higher the child wage the higher child labor. This makes our model more general than previous contributions in which only the income effect (Basu and Zarghamee 2009) or only the substitution effect (see, e.g., Dessy and Pallage 2005; Doepke and Zilibotti 2005) is considered. The reason for considering both the effects that a change in the child wage may have on child's status is that poverty is only one of the possible causes of child labor. In fact, although child labor is likely to be positively correlated with household poverty, other socioeconomic factors may play a role: access to school, intergenerational expectations, type of parents' job, inequality, and employment opportunities (Edmonds 2008). In particular, recent research has focused on the effect of labor market opportunities on the probability of child labor (see for instance Edmonds et al. 2009). Empirical evidence from developing countries seems to suggest that the substitution effect dominates the income effect.[7] The fact that poverty is not the only cause of child labor is crucial when one considers that all measures against child labor tend to decrease child wage. Indeed, our model emphasizes that the effect of a reduction in child wage on child labor really depends on why children work and on the local labor market conditions. The second novel element of the model is that we consider a heterogeneous population. Only few previous contributions have considered the role of household heterogeneity in evaluating measures against child labor,

---

[7]Barros et al. (1994) find that child labor in Brazil is higher in high-income cities with thriving labor markets than in cities with higher poverty rates. Duryea and Arends-Kuenning (2003) show that an increase in the labor market opportunities has a significant positive effect on child labor in Brazil. Wahba (2006) finds that in Egypt child wages are negatively correlated with child labor. Finally, Kruger (2007) documents an increase in child labor and a decline in schooling in coffee-growing regions of Brazil during a temporary boom in coffee exports.

yet never in relation to consumer boycott.[8] Instead, we show that this is an important element to be considered in the analysis because the effects of a boycott depend on the household income distribution. Moreover, this also creates a potential conflict of interest between the different households in the domestic economy. The analysis of the political economy of the boycott allows us to identify the economic conditions that make the boycott more likely to be successful. The third novelty of the model is the presence of a two-factor production function. This feature of the model makes it more general than previous ones and allows consumer boycott to affect child labor and household income distribution through mechanisms which are absent when only one factor of production is considered. Moreover, this makes us able to explore the role of the degree of international capital mobility in determining the effect of the boycott on child labor. To the best of our knowledge, this is new to the literature.

The model shows that for all households with an income above the subsistence level, the consumer boycott always reduces child labor. This is not surprising since the result follows from the substitution effect being larger than the income effect for nonpoor households. Still, it is important because it shows a possible positive effect of the consumer boycott which is hidden when one considers only the—important but not exhaustive—case of child labor caused by poverty. Yet the main result of the model is to derive the conditions under which the consumer boycott reduces child labor also for poor households, i.e., that before the boycott has an income below the subsistence level. Crucially, this result depends on the fact that a two-factor production function and a heterogeneous population are considered. To the best of our knowledge, this is the first paper that, in analyzing the effect of consumer boycott on child labor, takes into consideration these two elements. Our results show that they are both crucial in assessing the overall effect of the boycott as a measure aiming at reducing child labor.

The paper is organized as follows: In the next section, we present the basic of the model. In Section 3, we derive our main result, we present some comparative static exercises, and we discuss a special case of our model. Next, we present a thorough discussion of the role of international capital mobility and household heterogeneity for our result. Section 4 concludes.

---

[8]Dessy (2000) and Doepke (2004) introduce heterogeneity through differences in human capital at the household level, but they only consider a bimodal distribution. Krueger and Donohue (2005) models heterogeneity in a dynamic model through an uninsurable labor income shock. The relation between income distribution and child labor is considered in Swinnerton and Rogers (1999) where the role of the capital ownership is studied in a luxury-axiom context. Dessy and Vencatachellum (2003) find a positive relation of child labor incidence and the log of the Gini index of inequality. Swinnerton and Rogers (1999) show that the impact of economy-wide inequality on child labor is, in general, ambiguous.

2 The model

2.1 Households

Consider a heterogeneous population $\mathcal{I}$ of L households. Each household i has two members: a mother and a child. Households are different as for their endowment of efficiency units f_i, with $i \in \mathcal{I}$.[9] The mother i supplies work inelastically, and her wage w_i^A is proportional to f_i, that is $w_i^A = f_i w^A$ where w^A is the (per efficiency unit) mother wage. Without any loss of generality, we assume that the average endowment of efficiency unit is 1. It follows that, with $\overline{w^A}$ defined as the average adult wage, we have $w^A = \overline{w^A}$. Every child is endowed with $\gamma < 1$ efficiency units and earns the (full time) child wage w^C.

Following Basu and Van (1998), we assume that the mother is altruistic[10] and chooses the child effort e_i in order to maximize the following utility function (for the household i):

$$U(c_i, e_i) := \begin{cases} (c_i - s)(1 - e_i) & c > s \\ (c_i - s) & c \leq s \end{cases} \tag{1}$$

where c_i is the household total consumption, $e_i \in [0, 1]$ is the child's effort (i.e., the amount of working time), and $s > 0$ is a fixed threshold which represents the consumption subsistence level. Total household consumption is

$$c_i = w_i^A + e_i w^C. \tag{2}$$

The optimal child's effort is given by $e_i = e(w_i^A, w^C) = \text{argmax}_{e \in [0,1]} U(w_i^A + e w^C, e)$ then

$$e(w_i^A, w^C) = \begin{cases} 0 & \text{if } w_i^A \geq w^C + s \\ \dfrac{-w_i^A + s + w^C}{2w^C} & \text{if } w_i^A \in (s - w^C, s + w^C) \\ 1 & \text{if } w_i^A \leq s - w^C. \end{cases} \tag{3}$$

This implies that for intermediate income households

$$\frac{\partial e(w_i^A, w^C)}{\partial w^C} = \frac{w_i^A - s}{2(w^C)^2} \tag{4}$$

where $w_i^A \in (w^C - s, w^c + s)$ (zero otherwise). Since w_i^A is the level of consumption of household i in the absence of child labor, we can divide the set

---

[9]For instance, these differences may be due to different endowments of human capital as in Benabou (1996).

[10]In our analysis, we exclude both the case in which the household's interest diverges from the child's best interest and the case in which the household is not as well informed as the foreign consumers about the child's best interest. Note that, in both these cases, the consumer boycott is always beneficial to the child.

of households in two categories: the *poor* who face a struggle to survive (i.e., $w_i^A < s$) and the *not-so-poor* ($w_i^A > s$). Finally, we can state the following:

Proposition 2.1 *An exogenous increase in the child wage reduces the child labor supply for the poor households (those having $w_i^A < s$), while it increases it for the not-so-poor households (with $w_i^A > s$).*

It follows that the utility function (1) is able to account for both the substitution effect (positive relation between child wage and child labor supply) and the income effect (negative relation between child wage and child labor supply) and differentiates the household's response to a change in the child wage according to the level of the mother wage. The situation is described more in detail by Fig. 1 showing the relation between the mother wage, the child wage, and the child's effort (i.e., the amount of working time). The mother and the child wages are expressed as a function of s on the horizontal axis while the child effort e is reported on the vertical one. From Eq. 3, it follows that when the mother wage is higher (lower) than $s + w^C$ ($s - w^C$), the child never (always) works. The flat areas where $e = 0$ and $e = 1$ represent these cases. For adult wages between these two extremes, child labor increases instead as adult wage decreases. Fix now is the mother wage w_i^A. If it is higher than s, a reduction in the child wage decreases the child labor supply: the substitution effect is stronger than the income effect. Because the child of this household does not work for reaching subsistence, a decrease in the opportunity cost of not working induces him to increase the time spent in his best alternative activity and to reduce child labor. On the contrary, if the mother wage is less than s (these are the households struggling to survive), a reduction in the child wage increases the child labor supply. In this case, the
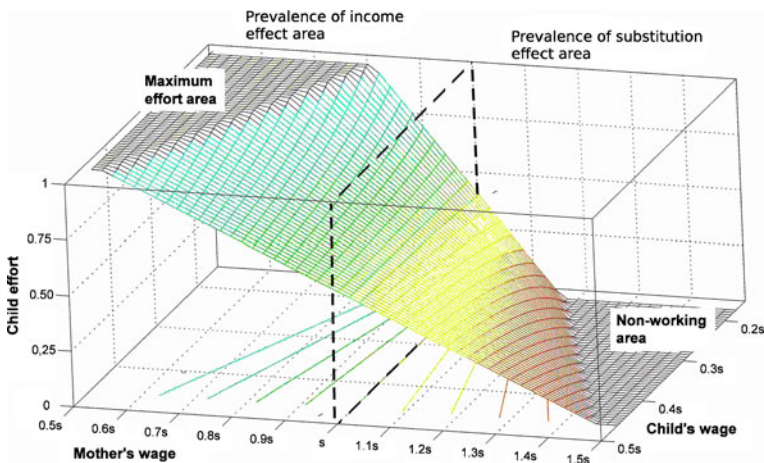
Fig. 1 Child effort as a function of the adult and child wage

income effect prevails with the effect being stronger for the poorer households. Finally, observe that the effort $e(w_i^A, w^C)$ is always decreasing in w_i^A (for constant w^C), as an increase in adult wage entails only a positive income effect that leads to a rise in the marginal utility of child leisure.

Summarizing, there is a group of households whose income is much lower than the subsistence level s (*extremely poor*, i.e., $w_i^A < s - w^C$) whose children always work with maximum effort, a group whose income is much higher than the subsistence level s (*rich*, i.e., $w_i^A > s + w^C$) whose children never work, and a group of intermediate income households, i.e., $w_i^A \in [s - w^C, s + w^C]$, whose child effort decision depends on the level of the wages. Note that this group comprises both poor households (the mother wage is below the subsistence wage) and not-so-poor households (the mother wage is higher than the subsistence level). This intermediate group is more interesting since the function $e(w_i^A, w^C)$ is locally constant if we choose $w_i^A \notin [s - w^C, s + w^C]$. In the following, we consider an economy in which the income distribution is such that all w_i^A are contained in the interval $[s - w^C, s + w^C]$.

The total supply of child labor is define now as

$$E\left(\{w_i^A\}_{i \in \mathcal{I}}, w^C\right) := \sum_{i \in \mathcal{I}} e(w_i^A, w^C). \tag{5}$$

We have the following aggregation result:

Lemma 2.1 *For all sets of household income levels $\{w_i^A\}_{i \in \mathcal{I}}$ with $w_i^A \in [s - w^C, s + w^C]$ for all $i \in \mathcal{I}$, the aggregate supply of child labor $E\left(\{w_i^A\}_{i \in \mathcal{I}}, w^C\right)$ is given by*

$$E\left(\{w_i^A\}_{i \in \mathcal{I}}, w^C\right) = Le(\overline{w^A}, w^C) \tag{6}$$

where $\overline{w^A} := \frac{1}{L} \sum_{i \in \mathcal{I}} w_i^A$.

Proof See the Mathematical Appendix A in Supplementary material. □

Lemma 2.1 states a useful result for our following analysis: all intermediate income households (i.e., for which children work but not full time) can be described by a representative household whose income is the average household income.

2.2 Consumer boycott

Firms supply a homogeneous good that can be produced with or without employing children. In modeling consumer boycott, we follow Basu and Zarghamee (2009). This good is consumed by consumers in another country. Basu and Zarghamee (2009) show that, in the context of a standard utility maximization problem, an increase in consumers' preference for the child-free

good reduces the price of the child-tainted good.[11] Called p, the price of the good free of child labor then, when a consumer boycott starts, the price of the good produced using child labor becomes αp, where $\alpha \in [0, 1)$. In this setting, an increase in consumers' preference for the child-free good is described by a reduction in α, the parameter that represents the intensity of the boycott of the product containing child labor (the lower the α is, the stronger is the boycott intensity). Without any loss of generality, we assume the price p to be equal to 1.

2.3 Production

The economy is populated by J firms. Every firm j has an access to the same Cobb–Douglas production function defined as follows:

$$Y_j = \theta l_j^\beta K_j^{1-\beta} \tag{7}$$

where l_j is the labor (in efficiency units) employed in firm j, $\beta \in [0, 1]$, K_j is the amount of capital used in the production by firm j, and θ is a positive constant. Labor and capital are perfectly mobile across firms.

As in Basu and Zarghamee (2009), we assume the boycott to be directed toward all the firms employing children independently of the amount of child labor they use. It is easy to prove that for any positive level of the boycott (i.e., for $\alpha < 1$) a separation lemma holds: a firm only employs children or only adults.[12]

The adult firms maximize $Al_A^\beta K_A^{1-\beta} - w^A l_A - R K_A$ (where R is the rental rate of the capital, K_A and l_A are the capital and adult labor used in the adult firms, respectively) while the child firms maximize

$$\alpha \theta (l_C \gamma)^\beta K_C^{1-\beta} - w^C l_C - R K_C \tag{8}$$

where K_C is the capital employed in the child firms and $K = K_C + K_A$, the total amount of capital in economy, is assumed to be fixed and provided by foreign investors.[13]

Under perfect competition, the per unit adult wage is

$$w^A = \theta \beta K_A^{1-\beta} l_A^{\beta-1} \tag{9}$$

and the per capita (full time) child wage is $w^C = \alpha \beta \theta \gamma^\beta K_C^{1-\beta} l_C^{\beta-1}$. The equilibrium capital rental rate R satisfies

$$\theta (1 - \beta) l_A^\beta K_A^{-\beta} = R = \theta \alpha (1 - \beta) K_C^{-\beta} (\gamma l_C)^\beta. \tag{10}$$

Using the previous relations, we have that at the equilibrium $w^C = \gamma \alpha^{1/\beta} w^A$. The adult labor demand is given by $\left(\frac{w^A}{\theta \beta K_A^{1-\beta}} \right)^{1/(\beta-1)}$, and child labor demand

---

[11]Note that these consumers do not belong to $\mathcal{I}$, and thus their preferences are not described by Eq. 1.

[12]See the Appendix B in Supplementary material for a Proof.

[13]In Section 3.3, we discuss how the results of the model change when we relax these assumptions.

is given by $\left(\frac{w^C}{\theta\alpha\beta\gamma^\beta K_C^{1-\beta}}\right)^{1/(\beta-1)}$. Because adult labor is inelastically supplied and the average value of f_i is 1, the equilibrium in adult labor market is given by

$$L = \left(\frac{w^A}{\theta\beta}\right)^{1/(\beta-1)} K_A, \qquad (11)$$

Using Lemma 2.1, the equilibrium in the child labor market is described by

$$E\left(\{w^A f_i\}_{i\in\mathcal{I}}, \gamma\alpha^{1/\beta}w^A\right) = Le(w^A, w^C) = \frac{1}{\gamma\alpha^{1/\beta}}\left(\frac{w^A}{\theta\beta}\right)^{1/(\beta-1)} K_C. \qquad (12)$$

3 The effect of a consumer boycott on child labor

3.1 Consumer boycott and wages

We begin describing the effect of a consumer boycott on child and adult wages. In the following analysis, we will limit our analysis to the nontrivial case in which after the boycott all households still belong to intermediate income group, that is $w_i^A \in [s - w^C, s + w^C]$ for all i. A technical sufficient condition on the intensity of the boycott α ensuring this is provided in Appendix B in Supplementary material.

Consider an initial equilibrium $(\{w_i^A\}, w^C, \{e_i\})$ for $\alpha = 1$. The relation between the intensity of the boycott and child wage is described in the following:

Proposition 3.1 *The consumer boycott reduces child wage.*

Proof See the Mathematical Appendix A in Supplementary material. □

Proposition 3.1 shows that in our model, similar to what most of previous models also predict, a boycott—or an increase in its intensity—reduces child wage. As in Basu and Zarghamee (2009), the reason is that the reduction in the price for the child-tainted good reduces the wage that firms employing children can pay to remain competitive.

But, in our model, the consumer boycott has also another effect as described in the following:

Proposition 3.2 *The consumer boycott increases adult wages.*

Proof See the Mathematical Appendix A in Supplementary material. □

The intuition behind this result is the following: The profitability of firms employing child labor decreases with the intensity of the boycott (see Eq. 8) making the rental rate of capital employed in those firms to decrease (see Eq. 10). Under the assumption that the total amount of capital is constant in the economy, the increase in the intensity of the boycott implies that the

capital moves from the child firms to the adult firms making K_A to increase. Since the adult labor supply L is constant, the increase in amount of capital in the adult firms makes adult wages to increase (see Eq. 9) with the intensity of the boycott.

3.2 The effect of the boycott on child labor

We now consider the effect of a consumer boycott on child labor. The main result of the paper is stated in the following proposition:

Proposition 3.3 *There exists $\underline{w} < s$ such that all the children belonging to households with $w_i^A > \underline{w}$ reduce their effort e_i after the boycott, where $\underline{w} = \lambda s$ with*

$$\lambda = \left(\frac{\beta s + w^A + \beta \gamma w^A}{\beta s + w^A + \gamma w^A} \right) < 1. \tag{13}$$

Proof See the Mathematical Appendix A in Supplementary material. □

In other words, Proposition 3.3 states that the introduction of a boycott makes some of the working children to work less. Two different types of children reduce their labor supply. The reduction in the child wage induces children of households whose income is above the subsistence level to decrease child labor because of the substitution effect. Most importantly, Proposition 3.3 ensures that also children from some of the households who are below the subsistence level s reduce child labor: these households are the ones that before the boycott had an income higher than λs. The intuition for this result is that, for the marginal household, the increase in income induced by the rise in the adult wage caused by the boycott is sufficient to make the household to reduce child labor. It follows that an important element to determine the aggregate effect of a consumer boycott on child labor is the level of heterogeneity across households. The larger the number of households which are around a sufficiently small neighborhood of the subsistence level, the stronger would be the reduction in child labor for a given level of α.

To illustrate with an example the effect of a boycott on child labor, we numerically solve our model in the case of a population whose household income is distributed with mean s.[14] Figure 2 depicts the household income distribution and the (blue) vertical line that identifies the winners and the looser from the boycott. The households on the right of the vertical line (λs) are the ones that decrease child labor due to the boycott. For those households, the increase in the household income due to the rise in the adult wage more than compensates the reduction of the household income due to the reduction in the child wage. The result from our experiment shows that the boycott has

---

[14]The ad hoc MATLAB code used for solving the model is available upon request from the authors.

Fig. 2 The effect of the increase in the boycott intensity on child labor: an example
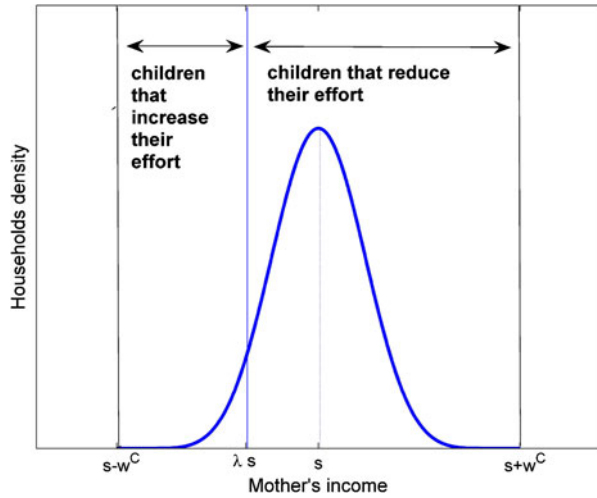
a large effect on child labor: a relatively small increase in the intensity of the boycott (5 %) reduces the amount of child labor for a large number of households.

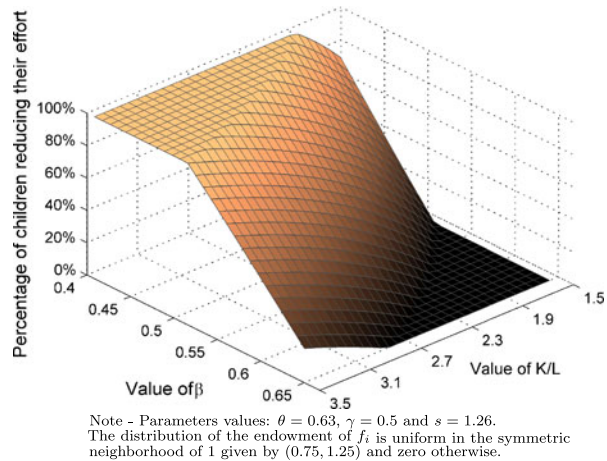### 3.2.1 Comparative static results

We now discuss how changes in the model's parameters related to the production function affect our main result. These static comparative exercises are interesting because they provide novel insights on the relation between child labor and the production side of the economy which could not be derived in previous models where only one factor of production was considered.

Figure 3 shows how the effect of the boycott on child effort changes as a function of the country-level capital/labor relative endowment (K/L) and of the share of labor and capital in total income (β) in Eq. 7. Numerical results indicate that the larger the K/L, the larger the child labor reduction induced by the boycott. The reason is that, *ceteris paribus*, the more abundant the country's capital is, the larger is the increase in the adult wages caused by the boycott. At the same time, the smaller the β, i.e., smaller the labor income share,[15] the stronger the effect of the boycott on child labor.[16] Finally,

---

[15]Note that in developing countries the labor income share is often smaller than the capital income share. Empirical evidence also shows that the capital income share in developing countries is larger than in developed ones (Gollin 2002).

[16]When $\beta = 1$, the production side of our model becomes identical to the one in Basu and Zarghamee (2009). In this case, as in their model, the boycott has no effect on adult wages and thus the mechanism we emphasized in our analysis simply disappears.

Fig. 3 Percentage of children reducing working hours for a 5 % reduction in α as a function of the parameters K/L and β

Note - Parameters values: $\theta = 0.63$, $\gamma = 0.5$ and $s = 1.26$. The distribution of the endowment of f_i is uniform in the symmetric neighborhood of 1 given by $(0.75, 1.25)$ and zero otherwise.

our results indicate that the larger the technological content in production (measured by θ in Eq. 7), the more likely that the boycott reduces child labor. While we do not explicitly analyze such element in the present model, this result suggests that inducing technological change could be a good pair with consumer boycott.

3.2.2 One special case: a homogeneous population

We now restrict our attention to a special but quite interesting case. As in Basu and Zarghamee (2009), we now consider a population in which each household is endowed with the same number of efficiency units and whose income is below the subsistence level. It follows that all households are identical and all children work. Under these conditions, we can derive two interesting results. The first is a corollary of Proposition 3.3, and it is stated in the following:

Corollary 3.1 *Consider a homogeneous population for which the adult wage w^A is below the subsistence level, but it is greater than λs (where $\lambda < 1$ is defined in Eq. 13). In this case, every increase in the boycott intensity reduces the effort of every child.*

Corollary 3.1 guarantees that, in the case of a not-too-poor homogeneous population, a boycott induces each household to decrease the supply of child labor. The second result is the following:

Proposition 3.4 *If the per capita capital in the economy is enough, then a sufficiently high level of the boycott eliminates child labor in the economy. More*

precisely, if the condition $\frac{K}{L} \geq \left(\frac{\theta\beta}{s}\right)^{\frac{1}{1-\beta}}$ is satisfied, then the value of the boycott intensity for which child labor becomes zero is given by $\alpha_L = \left(\frac{1-\frac{s}{\theta\beta}(L/K)^{1-\beta}}{\gamma}\right)^{\beta} > 0$.

Proof See the Mathematical Appendix A in Supplementary material. □

This Proposition shows that in the homogeneous case it is possible to analytically derive the value of the boycott intensity α_L which eradicates child labor: when $\alpha = \alpha_L$ child labor disappears.

3.3 Discussion of the results

It is useful to compare our main result with the one in Basu and Zarghamee (2009). Their model predicts that a boycott reduces child labor only if $\alpha = 0$, i.e., if the price of the good produced with child labor is zero. Thus, while in both models the boycott may reduce child labor, the reason for it is very different. In their model, the boycott reduces child labor because it reduces child wage to the point in which the wage is too low to compensate for the child physical effort and the child stops working. Instead, in our model, the boycott reduces child's working hours when the increase in the household's income due to the induced rise in the adult wage more than compensates the reduction in the child wage. The existence of this mechanism in our model is due the presence of two factors of production. Indeed, it is the movement of capital towards the adult firms that causes the increase in the adult wages. To better appreciate the relevance of this different modeling choice, let us consider what happens in the case of a single factor of production. In this case, from Eq. 13, we have $\lambda = 1$. According to Proposition 3.3, this implies that the boycott would make *all* households below the subsistence level s to increase the supply of child labor. This result clearly shows that the effect of an increase in the intensity of the boycott on child labor crucially depends on the number of factors of production considered in the model.

There are two aspects concerning how we model a capital that is worth discussing: capital ownership and the degree of capital mobility. While in our model we assumed that capital is owned by a class of foreign investors, assuming that capital is owned by domestic capitalist would have made no difference as long they are rich enough not to have their children ever working (formally, these households belong to the area where $e = 0$ in Fig. 1). Then, since it is quite unlikely that workers from households whose income is around the subsistence level have capital ownership, our assumption—while making the model's mechanisms clearer and greatly simplifying the general equilibrium analysis—thus does not reduce the realism of the model and the robustness of the results. We discuss the important issue of capital mobility in the next section.

3.3.1 The role of capital mobility

We have derived our main result under the simplify assumption that capital is constant in the domestic economy, i.e., there is no international capital mobility. In the following, we discuss how our results change when we relax this assumption.[17]

The perfect capital mobility case When international capital mobility is perfect, the domestic rental rate of the capital always equals the (exogenously given) international one R^*. It follows that Eq. 10 is replaced by

$$\theta(1-\beta)l_A^\beta K_A^{-\beta} = R^* = \theta\alpha(1-\beta)K_C^{-\beta}(\gamma l_C)^\beta.$$

Since the adult labor supply is inelastic and equal to L, we have

$$K_A^* := \left(\frac{R^*}{\theta(1-\beta)L^\beta}\right)^{-1/\beta}$$

where we indicate the variables for the case of perfect capital mobility with the superscript $(*)$. From Eq. 9, it follows that $w^{A,*} = \theta\beta L^{\beta-1}(K_A^*)^{1-\beta}$. Note that—differently from the case discussed in Section 3.1—the amount of capital employed in the adult sector does not depend on the intensity of the boycott nor it does the (per efficiency unit) adult wage. On the contrary, both the child wage and the capital invested in child firms depend on α. The child wage is $w^{C,*}(\alpha) = \gamma\alpha^{1/\beta}w^{A,*}$ and, from Eqs. 12 and 6, we have

$$K_C^*(\alpha) = LH_1\left[H_2 + \frac{1}{2}\alpha^{1/\beta}\right].$$

where $H_1 := \left[\gamma\left(\frac{w^{A,*}}{\theta\beta}\right)^{\frac{1}{1-\beta}}\right]$ and $H_2 := \left(-\frac{1}{2\gamma} + \frac{s}{2\gamma w^{A,*}}\right)$. It follows that, as in the case of no-capital mobility, the higher the intensity of the boycott, the smaller the amount of capital invested in child firms and the smaller child wage. Total capital is given by the sum of the capital invested in the two sectors. It is now endogenous and it depends on α:

$$K^*(\alpha) = K_A^* + K_C^*(\alpha) = K_A^* + LH_1\left[H_2 + \frac{1}{2}\alpha^{1/\beta}\right]. \tag{14}$$

Under perfect international capital mobility, the boycott has no effect on adult firms. In fact, the perfect capital mobility assumption cancels any general equilibrium effects: the equilibrium does not depend anymore on any interaction among households' choices, boycott-induced differences in capital returns in the two sectors, nor on the aggregate income distribution (i.e., on the f_i of the other families). To evaluate the effect of the boycott on child labor, then it is sufficient to consider Fig. 1 and Proposition 2.1: the children

---

[17]We thank an anonymous referee for pointing us to the importance of discussing this alternative scenario.

of the poor households (i.e., $w_i^A < s$) increase their effort (and they increase it more if they are poorer) while the children of the not-so-poor households (i.e., $w_i^A > s$) decrease their effort. The net aggregate effect of the boycott on child labor is given by the sum of these two opposite effects considering the actual income distribution for the whole population.

The imperfect capital mobility case Consider the case in which capital mobility is not perfect, for instance, because of some international mobility cost. In this situation, capital returns are the same in the child and adult domestic sectors but they are different from the international one. To illustrate this case, we assume that mobility costs are linear: moving an amount K of capital abroad costs cK for some positive constant c. Assume that before the boycott (i.e., $\alpha = 1$) the domestic rental rate R is equal to the (exogenously given) international rental rate R^*. The total amount of capital in the economy K^b is given by $K^*(1)$ defined in Eq. 14, where the superscript (^{b}) means "beginning." When the boycott begins (i.e., α decreases), the rate of return on capital invested in child firms decreases and capital tends to leave the sector. Denote with $R(\alpha)$, the domestic rental is a function of the boycott intensity α. Given the presence of mobility costs, imperfect international capital mobility can be characterized by an equilibrium wedge between the domestic and the international rate of return. As long as $R(\alpha) \geq R^* - c$, everything works exactly as in the zero capital-mobility case: no capital flows abroad so $K(\alpha) = K(1)$, the capital flues from the child labor sector to the adult sector so $K_A(\alpha)$ increases and $K_C(\alpha)$ decreases, and consequently the adults' wages increase as in Proposition 3.2 and children' wages drop as found in Proposition 3.1.

As the boycott intensity increases, it will finally reach the value α^T for which $R(\alpha^T) = R^* - c$. This happens (see Eq. 10) when, due to the movement from the child to the adult sector, K_A reaches the threshold

$$K_A^T = L \left(\frac{R^* - c}{\theta(1 - \beta)} \right)^{-1/\beta}$$

and the adult wage becomes (see Eq. 11)

$$w^{A,T} = \theta\beta \left(\frac{R^* - c}{\theta(1 - \beta)} \right)^{(\beta-1)/\beta}.$$

Starting from this point on, the system changes its behavior. For further reductions in the value of α, everything works as in the full mobility case with a rental rate fixed at the level $R^* - c$: the adult average wage remains at the level $w^{A,T}$ while the child wage continues to drop. In fact, when the rental rate reaches the level $R(\alpha^T) = R^* - c$, the capital starts to move abroad: $K(\alpha)$ decreases ensuring $R(\alpha) = R^* - c$ for all $\alpha < \alpha^T$. On the other hand, the capital employed in the adult sector remains K_A^T.

The total amount of capital in the economy after the boycott is defined as K^f. As we have seen, in the no-mobility case, $K^f = K^b$, while under perfect mobility, $K^f = K^*(\alpha)$. From the description above, we can see that under

imperfect capital mobility[18] $K^*(\alpha) \leq K^f \leq K^b$ the final domestic rental rate R^f is below the international level R^* but higher than the initial level $R^* - c$. In symbols, we have $R^* - c \leq R^f \leq R^* = R^b$. Moreover, the boycott increases capital and wages in the adult sector (in symbols $K_A^f > K_A^b$ and $w^{A,f} > w^{A,b}$) and reduces the child wage. It follows that the situation is, from the qualitative point of view, similar to the no-mobility case. In particular, the effect of boycott on child labor is still described by Proposition 3.3: there exists a threshold $\underline{w} < s$ such that all households with income greater than $\underline{w}$ reduce child labor. The only difference is the value of the threshold $\underline{w}$. It can be noticed that the imperfect capital mobility case includes as special ones the no-mobility (when c tends to R^*) and the perfect capital mobility ($c = 0$) cases. When capital mobility is perfect, $\underline{w} = s$, while when there is no capital mobility, $\underline{w} = \lambda s$. In the case of imperfect capital mobility, $\lambda s \leq \underline{w} \leq s$.

   To summarize, the higher the value of the mobility costs c, the more the imperfect mobility case behaves as the zero-mobility case. It follows that the lower the degree of capital mobility, the smaller $\underline{w}$ and thus the larger the reduction in child labor induced by the boycott.

3.4 Household heterogeneity and the boycott: some further discussions

In this section, we discuss how the type and degree of household heterogeneity determines the effects and the political economy of the boycott. We first show how the share of affected households changes with the intensity of the boycott and study how this effect depends on household income distribution.

   We begin studying the effect of increases in the intensity of the boycott. Unfortunately, the numerous nonlinearities of the problem made derivation of closed form results not possible. Thus, we turn to a numerical solution of the model and we report the results of our exercise in Fig. 4. Consider the left panel: the continuous line (blue) graph reproduces the same economy as the one represented in Fig. 2. The only difference between the two graphs is that on the horizontal axis we now report the child's effort.[19] The dotted (red) graph represents the household income distribution resulting from the 5 % reduction in α (the parameter measuring boycott intensity). As in Fig. 2, the area to the left (right) of the vertical line indicates the set of households which increase (reduce) child labor for a given reduction in α. Noting that the dotted (red) vertical line is the result of a 5 % reduction in α when its value is 0.95 and that it is found to the left of the continuous (blue) one, it follows that an increase in the boycott level increases the share of households whose child reduces his labor supply. This result is stated in the following:

Proposition 3.5 *The share of children reducing their labor supply increases with the intensity of the boycott.*

---

[18]The first inequality is strict if $c > 0$, the second is strict if α is smaller than the threshold α^T.

[19]Note that given w^C the effort of the child is a linear function of the mother's wage w_b^A.
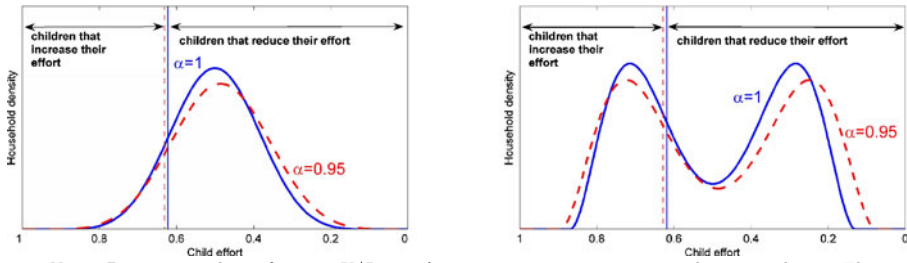
Note - Parameter values: $\beta = 0.5$, $K/L = 1$, $\theta = 0.63$, $s = 1.26$ $\gamma = 0.5$, initial α is equal to 1. The average of the f_i distribution is 1. Parameters values were chosen to ensure that the average adult wage is s. The resulting λ is $\frac{7}{8}$.

Fig. 4 The effect of increasing boycott intensity for different child effort distribution

Proof See the Mathematical Appendix A in Supplementary material. □

We next shows that the effect of a consumer boycott depends on the income distribution of the population. To do this, we compare the left and the right panels where the latter depicts an income distribution that is characterized by a higher level of inequality, whatever the index used to measure it, with respect to the former. Two things should be noticed. First, the effect of the boycott changes along the distribution. For small levels of child effort, a reduction in α reduces child labor while the opposite happens for high level of child effort. Interestingly, the two opposite effects do not net out. Indeed, Fig. 4 shows that the boycott reduces the hours worked more than it increases them. Second, it shows that the higher the income inequality, the stronger the impact of a boycott. Indeed, the comparison between the blue (continuous line) and the red (dotted line) graphs in each panel indicates that the effect is larger in the right panel. Since the boycott has (independently from the actual income distribution) always a positive effect on the right tail of the distribution and a negative one on the left tail, it follows that when income inequality is higher these effects are magnified. In particular, the boycott seems to reinforce the situation of income inequality as the one depicted in the right panel of Fig. 4. Note, however, that also in this case the total reduction in child effort is larger than the total increase.[20] Nonetheless, one has to consider that, while the boycott may reduce child labor for the majority of the population, it always has an adverse effect on the poorer households too. The understanding of the economic context is a necessary precondition to evaluate the possible effects of any boycott campaign.

[20]The right-wing movement of the right tail is larger than the left-wing movement of the left tail of the distribution.

3.4.1 Some political economy considerations

Our analysis shows that the boycott has a heterogeneous effect on domestic households: some households gain while some other loose. This raises some interesting question concerning the political economy of a child boycott campaign.[21] To analyze the political support/opposition from domestic households to the boycott, one should consider how the intensity of the boycott modifies household welfare. While all mothers have an incentive to support the boycott because it increases their wage, this is not obvious from the household welfare perspective.[22] As before, we limit our analysis to the households whom children are working but not full time.[23]

Household welfare depends (see Eq. 1) negatively on child effort and positively on household income (the sum of the mother and the child wage). As we have seen, all the children of the households having $f_i > f_C := \lambda \frac{s}{w^A}$ (where λ is defined in Eq. 13) reduce their effort following a boycott while the others increase it (Proposition 3.3). As for the impact of the boycott on household income, there are three effects to consider: the boycott increases the mother wage, it decreases the child wage, and it varies the amount of child labor supply. The first effect increases household income, the second reduces it, while the third has an ambiguous effect (the boycott increases the income in households with $f_i < f_C$ and decreases it in those having $f_i > f_C$). The effect of the boycott on household income is summarized in the following:

Proposition 3.6 *There exists a threshold $f_I > f_C$ such that for all households having $f_i > f_I$ the boycott increases household income. Starting from a non-boycott state (i.e., $\alpha = 1$), the value for f_I is*

$$f_I := \frac{\lambda}{(1-\beta)} \left(\beta \frac{s}{w^A} + 1 + \gamma \right).$$

Considering the two components of household welfare (child effort and household income), we can then identify three cases. For households with a low f_i, the boycott reduces household welfare because it reduces household income and increases child effort. For households with a high level of f_i, the boycott has instead a positive effect on welfare since it increases household

---

[21] We thank a referee for suggesting us to explore this aspect of the model.

[22] Note that in Doepke and Zilibotti (2010) employers and poor families are against a legislation banning child labor. Unskilled workers (who are the only type of workers competing with child labor) having their own children going to school are the only group in favor of it.

[23] In the other cases, the results are straightforward. Since the boycott reduces child wage and increases mother wage, extremely poor households (whom children would always work anyway) are always against the boycott while very rich households (whom children would never work anyway) are always in favor of the boycott.
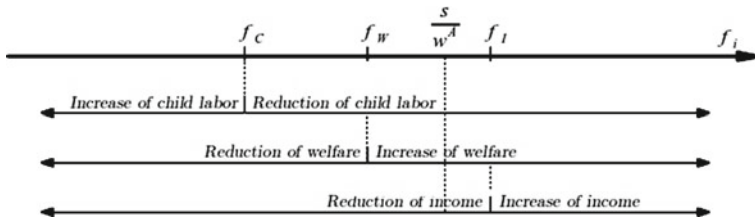
Fig. 5 The effects of the boycott on child labor supply, income, and welfare

income and reduces child effort. Finally, for households with f_i between f_C and f_I, the effect of the boycott is described by the following:

Proposition 3.7 *There exists a threshold f_W (greater than f_C and smaller than f_I) such that for all households having $f_i > f_W$ the boycott increases household welfare. The value for f_W is*

$$f_W := \frac{\beta s^2 + w^A s + 2\beta s \gamma w^A + \gamma (w^A)^2 + \gamma^2 (w^A)^2}{-\beta \gamma (w^A)^2 + 2\gamma (w^A)^2 + \beta w^A s + (w^A)^2}.$$

The Proposition indicates that the welfare of all households with $f_i > f_W$ will increase after the boycott. The number of domestic households that will support a (foreign) consumer boycott campaign against child-tainted goods is higher (i.e., f_W is lower); the higher the capital/labor endowment ratio (K/L), the higher the TFP (i.e, the technology level) of the country (θ) and the lower the subsistence level s. These results indicate that the boycott is more likely to be politically supported the less the country is characterized by extreme poverty.

The results are summarized in Fig. 5 where the thresholds f_C, f_W, and f_I are represented together with the poverty threshold $\frac{s}{w^A}$. The respective positions of f_C, f_W, and f_I are described in Propositions 3.6 and 3.7. The poverty threshold $\frac{s}{w^A}$ is always higher than f_C as proven in Proposition 3.3. Varying the parameters of the models, it can be higher or lower than f_W and f_I (we drew it between f_W and f_I in the picture).

4 Conclusions

Good intentions do not necessarily pave the road to hell. As a case in point, we derive the conditions under which a consumer boycott reduces child labor.

The relation between consumer boycott and child labor is complex and depends on a number of elements. In this paper, we provided a simple model able to consider the different simultaneous mechanisms at work. Three are the main elements that differentiate our model from previous ones: (1) it allows for the possibility that poverty is not the only cause of child labor and thus that both the income and the substitution effects are at play, (2) it considers a

heterogeneous population characterized by a nonuniform income distribution, and (3) it employs a two-factor production function.

The combination of these elements provided a number of interesting results. The presence of two factors of production is per se sufficient to have situations in which the boycott reduces child labor without necessarily damaging all poor households. Moreover, household heterogeneity turns out to be a crucial element in the determination of how the boycott affects the households' choice. This is not surprising since households may greatly differ as for the reason they have their child working. In particular, our model predicts that, if child labor is not due to poverty, the consumer boycott always induces children to reduce their labor supply. Yet, even if children are working because of poverty, boycott can still create the conditions for them to reduce the time spent away from school.[24] Interestingly, this effect depends on international capital mobility. We have shown that the higher the international capital mobility, the smaller the positive effect of the boycott on adult wages and thus on household incomes. Nonetheless, as long as capital mobility is not perfect, the boycott makes some of the poor households—in addition to the nonpoor ones—to reduce child labor.

The model shows that the boycott is expected to be more effective in reducing child labor in regions (countries) where children work because of the lack of better opportunities rather than for the need to escape extreme poverty. There is an interesting consequence of this result concerning boycott campaigns targeting products manufactured in developing countries for multinational enterprises companies (MNCs).[25] As long as MNCs do not locate in the poorest regions of the destination country where the best combination in terms of economic, social, educational, and security conditions is offered, boycott campaigns are likely to reduce child labor also for poor households.

While the model is quite general, it obviously also has some limitations. In our view, two are the most important. First, it is a one-period model and thus it abstracts from the influence that credit imperfection may have on how consumer boycott impacts on child labor.[26] Second, being a small country model, it cannot account for possible trade balance effects of the boycott.[27] Future research will be devoted to extend the model in order to consider the long-run effects of consumer boycott on aggregate growth and how different levels of trade openness may impact on the relation between consumer boycott and child labor.

---

[24]Interestingly, our results are in accordance with the empirical evidence presented in Chakrabarty and Grote (2009) on the effect of social labeling in the carpet industry in India and Nepal. They found that the labeling status of the households leads to a decrease in child labor. However, the statistical significance of the labeling coefficient is different in the below and above-subsistence regressions: while in the latter it is significant, in the former it is not.

[25]These are the most numerous campaigns because, especially in developing countries, MNCs are more easily monitored by activists than small or micro domestic firms.

[26]Dynamic models studying the effect of measures against child labor are, among others, Jafarey and Lahiri (2002) and Krueger and Donohue (2005).

[27]For an analysis of this aspect, see Basu et al. (2006).

References

Baland J, Duprez C (2009) Are labels effective against child labor? J Public Econ 93:1125–1130

Barros R, Mendonca R, Velazco T (1994) Is poverty the main cause of child work in urban Brazil? Texto para Discussao, Instituto de Pesquisa Economica Aplicada, Rio de Janerio, no. 351

Basu K, Van H (1998) The economics of child labor. Am Econ Rev 88:412–427

Basu K, Zarghamee H (2009) Is product boycott a good idea for controlling child labor? A theoretical investigation. J Dev Econ 88(2):217–220

Basu A, Chau N, Grote U (2006) Guaranteed manufactured without child labor: the economics of consumer boycotts, social labeling and trade sanctions. Rev Dev Econ 10:466–491

Benabou R (1996) Heterogeneity, stratification, and growth: macroeconomic implications of community structure and school finance. Am Econ Rev 86(3):584–609

Chakrabarty S, Grote U (2009) Child labor in carpet weaving: impact of social labeling in India and Nepal. World Dev 37(10):1683–1693

Cigno A (2003) Globalisation can help reduce child labour. Cesifo Econ Stud 49(3):515–526

Cigno A, Rosati FC, Guarcello L (2002) Does globalization increase child labor? World Dev 30(9):1579–1589

Dessy S (2000) A defense of compulsory measures against child labor. J Dev Econ 62:261–275

Dessy S, Knowles J (2008) Why is child labor illegal? Eur Econ Rev 52(7):1275–1311

Dessy S, Pallage S (2005) A theory of the worst form of child labour. Econ J 115:68–87

Dessy S, Vencatachellum D (2003) Explaining cross-country differences in policy response to child labour. Can J Econ 36(1):1–20

Doepke M (2004) Accounting for fertility decline during the transition to growth. J Econ Growth 9(3):347–383

Doepke M, Zilibotti F (2005) The macroeconomics of child labor regulation. Am Econ Rev 95:1492–1524

Doepke M, Zilibotti F (2010) Do international labor standards contribute to the persistence of the child-labor problem? J Econ Growth 15(1):1–31

Duryea S, Arends-Kuenning M (2003) School attendance, child labor and local labor market fluctuations in urban Brazil. World Dev 31(7):1165–1178

Edmonds E (2003) Should we boycott child labour? Ethics Econ 1:1–8

Edmonds E (2008) Child labour. In Schultz TP, Strauss J (eds) Handbook of development economics, pp 3607–3709

Edmonds E Pavnick N Topalova P (2009) Child labor and schooling in a globalizing world: evidence from urban India. J Eur Econ Assoc - Papers and Proceedings 7(2–3):498–507

Gollin D (2002) Getting income shares right. J Polit Econ 110(2):458–474

Grossmann H. and Michaelis J (2007) Trade sanctions and the incidence of child labor. Rev Dev Econ 11(1):49–62

Gupta M (2002) Trade sanctions, adult unemployment and the supply of child labour: a theoretical analysis. Dev Policy Rev 20(3):317–332

Hilowitz J (1997) Social labelling to combat child labour. Some considerations. Int Labour Rev 135:215–232

Jafarey S, Lahiri S (2002) Will trade sanctions reduce child labour? the role of credit markets. J Dev Econ 68:137–156

Krueger D, Donohue J (2005) On the distributional consequences of child labor legislation. Int Econ Rev 46:785–815

Kruger D (2007) Coffee production effects on child labor and schooling in rural Brazil. J Dev Econ 82(2):448–463

Naseem I (2009) Globalization and its impact on child labor in soccer ball industry in Pakistan. Dialogue 4(1):110–139

Neumayer E, DeSoysa I (2005) Trade openness, foreign direct investment and child labour. World Dev 33(1):43–63

Ravi A (2001) Combating child labour with labels: case of Rugmark. Econ Polit Wkly 36(13):1141–1147

Schanberg SH (1996) On the playgrounds of America every kid's goal is to score: in Pakistan, where children stitch soccer balls for six cents an hour, the goals is to survive. Life Magazine (June):38–48

Seidman G (2007) Social labelling to combat child labour. Some considerations. Russell Sage Foundation/ASA Rose Series, New York

Swinnerton KA, Rogers CA (1999) Inequality, productivity and child labor: theory and evidence. Department of Economics Working Paper, Georgetown University

Wahba J (2006) The influence of market wages and parental history on child labour and schooling in Egypt. J Popul Econ 19:823–852