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May 2011 Discussion Paper no. 2011-23
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Abstract

This note demonstrates that when developing countries remove barriers to migration and integrate their labour markets, children may be driven out of schools and into informal or paid employment in the comparatively rich countries. In industrialized countries, the same mechanism might force individuals or families to hold multiple jobs, into public welfare programs or into government-subsidized employment.

Keywords

Labour market, migration, integration, child labour, subsistence, minimum wage.

JEL Classification

J13, O15.
1. Introduction

The issue of child labour, its causes and potential remedies have received considerable attention in academia and features prominently in the policy papers of pertinent institutions such as the United Nations and the World Bank.\footnote{For a general survey covering the wide spectrum of issues related to child labour, see Edmonds (2008). A narrower account of theoretical and empirical work on the economics of child labour and related policies is provided by Basu (1999).} This note looks at how international labour market integration affects child labour. The proposed framework for the analysis is a two-country version of the 'basic model' proposed in the seminal paper by Basu and Van (1998) which has been quite influential in the academic discussion of the economics of child labour and of related policies.

2. The model and the closed-economy equilibrium

The backbone of the Basu and Van model is provided by two axioms:

*The Luxury Axiom:* A family will send children to work only if the family's income would drop below subsistence levels otherwise.

Worker families derive income from work alone. They do not save and, hence, do not possess any wealth. Returns to capital may be thought to go to a 'capitalist class' or to foreign nationals who own the entire capital stock.

*The Substitution Axiom:* From the perspective of firms, adult labour and child labour are substitutes.

There are two countries 1 and 2. Both countries are poor in the sense that the risk of labour incomes to fall below subsistence levels is always on the radar, if not necessarily a reality. Each country comprises $N_j$ families, and each family comprises $n_j \geq 2$ members, including one adult and one child who is eligible for work. Other family members are either too old and fragile or too young for paid work. Subsistence consumption per capita $s_j$ may differ between countries. Adults and children either work or they don't.

In each country there are $m_j$ identical firms, which we aggregate to obtain a measure of 1, producing $x_j$ units of a single consumption good. The demand for labour in each country is derived from the two production functions
(1) \[ x_i = T_i f(A_i + \alpha_i C_i) \]

where \( f(\cdot) \) is country \( i \)'s well-behaved production function, \( A \) and \( C \) denote the aggregate number of employed adults and children, respectively, and \( \alpha \leq 1 \) is a parameter that measures the productivity of children relative to adults. If the number of firms is sufficiently large to make them wage takers and children's wages mirror their productivity relative to adults, firms maximize profits given by

(2) \[ \pi_i = T_i f(A_i + \alpha_i C_i) - w_i (A_i + \alpha_i C_i) \]

which yields an adult wage rate of \( w_i = T_i f'(\cdot) \). The wage rate for children reflects their productivity deficit and is \( w_{c,i} = \alpha_i T_i f'(\cdot) = \alpha_i w_i \).

Given the number and composition of families, and since the adult wage rate must not fall below \( n_i s_i \), which is the subsistence income required by the family, the supply of effective labour \( S_i \) is

(3) \[ S_i(w_i) = \begin{cases} N_i & \text{if } w_i \geq n_i s_i \\ (1 + \alpha_i) N_i & \text{if } w_i < n_i s_i \end{cases} \]

Depending on the position of the demand for labour schedule derived from the maximization of equation (2), and given the stepwise labour supply curve described by equation (3), each country's labour market features two stable equilibria: a 'good' equilibrium in which the adult wage is high enough to support the family without having to resort to child labour and/or a 'bad' equilibrium in which families cannot survive without the added income derived from child labour.

3. The two-country model with an integrated labour market

Suppose workers in country 1 are more productive than in country 2, say because of a higher capital stock, better production technology, a superior infrastructure, or a climate that favours
agricultural or aquacultural production. Then \( w_1 > w_2 \) whenever both countries are in the same type of equilibrium, i.e. in one with or without child labour.

Next assume that countries 1 and 2 open their borders for foreign workers to create an integrated labour market. The employment decision of workers is described by

*The Mobility Axiom:* Workers prefer to work in their home country, where their family lives. They emigrate to work abroad only if the foreign wage rate exceeds the domestic wage rate.

Suppose child labour had been eradicated in both countries. Thus both countries start from their 'good' labour market equilibrium, so that country 1 pays a higher wage rate, as noted above. Then the mobility axiom predicts effective labour in country 1 to be provided in the form of a stepwise, belly-shaped labour supply curve given by

\[
S_1(w_1) = \begin{cases} 
N_1 + \beta_2 N_2 & \text{if } w_1 \geq n_1s_1 \\
N_1 + \alpha_1 N_1 + \beta_2 N_2 & \text{if } w_2 < w_1 < n_1s_1 \\
N_1 + \alpha_1 N_1 & \text{if } w_1 < w_2 
\end{cases}
\]

The consequences for wage rates and employment that result from the removal migration barriers and integrating the two labour markets into one are conveyed by two propositions:

**Proposition 1.** *When labour is more productive in one of two countries and no bad equilibrium with child labour exists in either country as long as labour markets remain isolated, the integration of labour markets may create a bad equilibrium with child labour in the country with initially higher wage rates.*

**Proof.** See the Appendix.

The emergence of child labour is not unavoidable, however, because a good equilibrium without child labour may continue to exist, and both equilibriums would be locally stable.

**Proposition 2.** *When labour market integration generates a bad equilibrium with child labour in the country that featured higher wage rates without migration, this equilibrium may be unique in the sense that the good equilibrium has disappeared.*
Proof. See the Appendix.

This proposition strengthens the possibility described by Proposition 1 in the sense that the equilibrium with child labour may be unavoidable because it could be universally stable.

4. Intuition and graphical illustration

Figure 1 illustrates the effects suggested by propositions 1 and 2 and may provide some intuition. Postulated parameter settings that keep the graph comparatively uncluttered are \( s_i = 0 \) and \( \alpha_i = 1 \).

As long as labour markets are separated, labour market equilibriums are \( B_1 \) and \( B_2 \), respectively, where the solid vertical labour supply curves intersect the country's labour demand curve. Only adults work, since wage rates exceed subsistence needs in both countries. There is a step in the labour demand curve at subsistence income \( n_i s_i \), where families are compelled to send their children to work, though this step has vanished in the poorer of the two countries because the graph lets subsistence income equal zero. The graph is drawn to generate only one unique equilibrium in each country, though multiple equilibriums are possible as well when labour markets are separated.

When borders are opened for migrant or guest workers, adult workers move from country 2 to country 1 because of the higher wage rate, as postulated by the mobility axiom. This moves the labour supply curves into their dashed positions; in country 2 to the left, pushing its wage rate up. In country 1 it increases the labour supply by the same amount, driving its wage rate down. Migration continues until the two countries' wage rates have converged. By then some 75 percent of country 2's adults have migrated and the wage rate is \( \hat{w}_{1+2} \). Since this influx of foreign adults alone would have driven country 1's labour market into point \( A_1' \) and thus the wage rate below subsistence needs, this new equilibrium features child labour in line with the luxury axiom. The second step in country 1's new labour supply curve that occurs at \( \hat{w}_2 \), where foreign workers would decide to return home, does not come into play in the case depicted here.
5. Refinements

The above analysis employed several assumptions that served to keep the argument parsimonious and transparent, but are not strictly needed for the demonstrated result.

One of these assumptions was that worker families do not own any wealth. As Swinerton and Rogers (1999) show, policies that redistribute the capital stock towards workers may indeed eradicate child labour, once a sufficient fraction of workers participates in the returns generated by capital. As long as this fraction remains below this threshold, however, a bad equilibrium with child labour continues to loom as a possibility and the results derived above remain valid.

Another assumption is that workers migrate abroad as soon as foreign wage rates exceed domestic ones. This assumption may certainly be relaxed in favour of assuming some absolute or relative threshold. Qualitative results would not be affected, but the convergence of wage rates would stop before full equalization is achieved.

We also assumed that, even after country 2's workers have migrated, labour supply decisions are still based on country 2's subsistence income, despite the fact that one family member lives abroad and faces higher living costs. This may be relaxed in favour of letting the family's subsistence income be a weighted average, i.e. \( s_1 + (n-1)s_2 \) / \( n \). This does not differ much from our treatment when families are large. And if it matters, it is not likely to affect the above propositions.

Finally, the labour supply decisions in the 'basic' Basu and Van (1998) model are discontinuous. But when individuals may supply any amount of labour, the labour supply curve may become Z shaped as in Dessing (2000), or if the labour supply curve switches from a strict stepwise shape to one where the employment of children kicks in gradually, as in the 'general model' sketched in Basu and Van (1998), there is again no obvious reason why this would affect the nature of our results.\(^2\)

\(^2\) However, see Gärtner and Gärtner (2011) for a discussion of sufficient conditions for the emergence of multiple equilibria in the labour market when the labour supply curve is outward-sloping.
6. Summary and conclusions

By employing the basic model proposed by Basu and Van (1998) and extending it to a two-country version, this note looked at how the opening of borders for foreign workers affects labour markets in developing countries. The two countries are assumed to differ in labour productivity and to feature closed-economy labour market equilibriums in which children do not work. The result is that when barriers to migration are removed in favour of labour market integration, this may generate child labour in the richer of the two countries. While this has been shown to apply in a formal model with rather strict assumptions, it should be robust to quite a number of generalizations. Also, child labour may be considered a stand-in for other expansions of the supply of labour beyond its normal level, such as the holding of multiple jobs, forcing workers into social security because jobs at their skill level do not support families any longer, or the emergence of a government-subsidized new segment of the job market. Thus the results and risks laid out here should not only be noted when studying developing countries, but when looking at the opening and integration of labour markets between heterogeneous industrial countries as well.
Appendix

A1. Proof of Proposition 1

Proof. 'Good' initial equilibria with separated labour markets imply

$$\hat{w}_1 = T_1 f'(N_1) > \hat{w}_2 = T_2 f'(N_2)$$

as well as

(A1) \quad T_1 f'[(1 + \alpha_1)N_1] > n_1s_1

and

(A2) \quad T_2 f'[(1 + \alpha_2)N_2] > n_2s_2.

The proposition claims that after labour markets became integrated, an equilibrium is feasible in which

(A3) \quad n_1s_1 > T_1 f'[(1 + \alpha_1)N_1 + \beta_2 N_2] = T_2 f'[(1 - \beta_2)N_2] > n_2s_2

The inequality given on the right-hand side of equation (A3) follows from equation (A2) and \(f''(\cdot) < 0\).

The inequality given on the left-hand side may hold, given that both sides are determined by independent parameters and \(f''(\cdot) < 0\), which means that \(f'(\cdot)\) approaches 0 when \(\beta_2 N_2\) becomes very large. \(\square\)
A2. Proof of Proposition 2

Proof. The post-integration equilibrium with child labour is unique if

\[ n_1 s_1 > T_1 f'(N_1 + \beta_2 N_2) \]

which again is always possible because both sides are determined by independent parameters and, given \( f''(\cdot) < 0 \), it becomes more likely, the larger \( \beta_2 N_2 \). \( \square \)
References


Figure 1. How labor market integration may generate child labor in a two-country version of the Basu and Van (1998) model.