Child Labor: Theory of Foreign Trade and Investment Intervention

Michalak, Katja and Naqvi, Nadeem

Harz university of Applied Sciences, KIMEP University

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Katja Michalak*
kmichalak@hs-harz.de
Harz university of Applied Sciences
Friedrichstrasse 57-59
38855 Wernigerode, Germany

And

Nadeem Naqvi*
naqvi@kimep.kz
Department of Economics
KIMEP University
Almaty, Kazakhstan

Abstract

The principal result of this paper is that under endogenous international capital mobility inward FDI reduces the incidence of child labor if stimulated by a country's trade policy of granting protection to the sector that employs child labor. Child labor persists, however, if there is exogenous inward FDI and it is small in magnitude; it is eradicated in equilibrium if this FDI is sufficiently large. If the supply of capital in the country is fixed, granting greater tariff protection or higher export subsidy to a sector that employs child labor reduces its incidence, and may eventually eliminate it. Since a country's aggregate real income decreases as the import tariff increases, it may sometimes face the dilemma of having to choose between higher real GDP or fewer child workers as an entailment of its foreign trade policy. These results are obtained under standard assumptions about technology, and maximizing behavior on the part of both producers and families, with the latter maximizing a Kanger-Sen non-binary preference ranking relation subject to their budget constraints. (171 words)

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1. Introduction

Child labor as a persistent, mass phenomenon, particularly in the first quarter of the 21ˢᵗ Century, is a disturbing aspect of social reality.[1] The immediate policy reaction to this phenomenon is invariably to ban it, or at least boycott imports tainted with child labor. In fact, in the mid-1990's Senator Harkins introduced a bill in the United States Congress aimed precisely at boycotts of such imports into the US. Partly as a reaction to the Harkins bill, Basu and Van (1998) provided a rigorous economic theory of child labor as a persistent, mass phenomenon, insofar as they demonstrated the existence of child labor in a Walrasian general equilibrium, and argued forcefully against such boycotts. Indeed, they admonished (p. 415),

> [W]e have stayed away from many of the larger issues and confine our attention to a rigorous economic analysis because it is not clear to us how we can take on board different aspects of this important phenomenon – economic, sociological, psychological – all at once. There is no choice but to dissect such a large phenomenon into several parts and to analyze these one at a time. Moreover, we hope that our paper demonstrates how well-meaning spontaneous recommendations can often backfire. This is an area where what seems obviously the right thing to do may turn out, on deliberation, to be quite the opposite. As a consequence, this is also an area where individuals and groups, with their own self-interested agenda, can garner mass support for policies which actually benefit them while superficially appearing to help the cause of the laboring children. Formalism and scientific inquiry can be a bulwark against this.

While the position they took was entirely judicious – and the Harkins bill fortunately never became law – boycotts of imports embodying child labor is not the only foreign trade policy choice available for influencing the incidence of child labor.[2] There are, in fact, several foreign trade and investment policy interventions that can actually reduce the incidence of child labor, but a theoretical investigation of this interconnection is strikingly missing from such discourse to date. The purpose of this paper is to remedy this shortcoming. Since the clamor for such boycotts resurfaces time and again, a readily available list of demonstrably effective policies as substitutes ought to be helpful in keeping such counter-productive kneejerk sentiments at bay.

There is now a growing empirical literature on the effects of trade openness and foreign direct investment (FDI) on the incidence of child labor, as in extremely careful investigations by Neumayer and De Soysa (2005) and Edmonds and Pacvnik (2005 and 2006), among

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[1] According to the Global Estimates of Child Labor by the ILO (2017), in 2016 there were 152 million children between the age of 5 and 17 years who were workers, 48% as young as 5 – 11. Of these, 73 million were engaged in work in hazardous health conditions. Sectoral employment of child workers was 71% in agriculture, 12% in industry, and 17% in services. Boys accounted for 58%, and girls, 42% of child workers.

[2] Boycotting imports that use child labor does achieve the desired effect that employers in exporting countries fire child workers, but that invariable places these displaced children and their families in worse predicament by, among other things, shifting these child workers to employment in other, non-export sectors, some of which involve more hazardous working conditions. Additionally, if such import boycotts cause a decline in demand for labor in the exporting countries, the adult wage rate can fall, which, in turn, induces more families to enter their children into the work force. Thus the actual effect of the boycott may be quite the opposite of what was intended, as noted by Basu and Van.

others.[3] While this literature documents the effects of foreign trade and investment policies on child labor, it lacks trade-theoretic support from general equilibrium open economy models of trade theory. To fill this gap, we take the most parsimonious approach methodologically possible, and build a generalized version of Basu and Van's labor supply function – with inter-family differences in non-labor income – into a Specific Factors model, to investigate the implications for child labor of interventions that take the form of import tariffs or export subsidies, both (i) when they stimulate inward FDI in a regime of endogenous international capital mobility, and (ii) when the stock of capital in the country is fixed. We also consider the effect of an exogenous inflow of capital into the economy suffering from child labor.[4] For completeness, we also report the effects of import tariffs and export subsidies on child labor in the Heckscher-Ohlin model. In fact, Basu and Van only opposed a ban on imports tainted with child labor, not policies in general. On the contrary, they argued that "[t]here are many other kinds of policy – taxes, subsidies, and other restrictions – the effects of which can be checked out using our model" (p. 425). This very line of inquiry is pursued in this paper.

Basu and Van's discovery of multiple Walrasian general equilibria in an economy – some with child labor and some without – may also have been responsible for focusing theoretical attention on policies that are internal to an economy, such as (1) banning child labor, (2) minimum-wage legislation and its enforcement, and (3) other labor-market reforms.[5] In fact, Basu (1999, 2000 and 2002) has extensively investigated ways of shocking an economy away from a "bad" equilibrium with child labor to a "good" equilibrium without any child labor whatsoever, by means of labor market policy reforms or institutional reforms within an economy, even if driven by international labor standards that are external to that economy. Other issues that have received theoretical attention are: (i) an inverted U shape under alternative labor market arrangements of the relationship between the size of a family's land holdings and its supply of child labor (see Bar and Basu (2008) and Basu et al. (2010)), and (ii) that credit constraints can combine with low wage rates to precipitate child labor in equilibrium (see Ranjan (1999, 2001) and Menon (2010)).[6]

The focus of this paper is different, however. It returns the debate back, some twenty years later, to questions such as: what can be done by the government of a country to reduce the incidence of child labor in its own economy by making changes in its own foreign trade and foreign investment policies. Or, what can be done by someone outside this economy, by deploying policies towards commodity trade or policies dealing with international capital mobility, to mitigate the problem of child labor. A systematic, theoretical examination of the

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[3] See also Cigno et. al (2002) in this context.

[4] We do not consider the effects of foreign aid that takes the form of the country receiving a gift of real GDP, although that can also be investigated, but rather focus on foreign direct investment that works through the markets (via local business expansion) to spur additional demand for labor, and thereby raises the wage rate.

[5] Such multiple general equilibria carry over to our model as well. However, we relegate their treatment to the appendix, so as not to detract from the central message of our paper.

[6] Also see in this context, Basu and Zarghamee (2009), Baland and Robinson (2000), Beegle et al. (2006), Dumas (2013), Bell and Gersbach (2009), Bommier and Dubois (2004), among others.

effects on the incidence of child labor of foreign trade and investment policies, adopted by a country or by foreign countries, is the subject matter of this paper.

While the number of child workers in excess of 150 million in 2016 is not statistically insignificant, and while a theoretical investigation of the relationship between foreign trade and investment policies and child labor is missing, a case still has to be made positively and affirmatively for such an examination of the relationship between the two to be undertaken. Two questions must be answered: (1) Why should we be interested in reducing child labor? And, (2) is there reason to believe that the considered use of foreign trade or investment policy can reduce child labor? We next take up these questions in turn.

Why should we want to do away with child labor in the world? This is an issue of social evaluation, or normative economics. We argue below that child labor is an injustice on the definition of injustice in *The Idea of Justice* according to Sen (2009). We further argue that it is a remediable injustice. And, according to Sen (2009), the purpose of a theory of justice is to (i) identify remediable injustices, and (ii) to design remedies for such injustices, so as to achieve greater justice in society in a piecemeal manner.[7] This goal of redressing a remediable injustice, in the limited sphere of mitigating child labor via foreign trade and investment policies, is the subject matter of the investigation reported here.

According to Sen's theory of justice, if the capabilities set of a person is constricted relative to the capabilities sets of others in society (without any role of that person in its shrinkage), then that person is suffering from an injustice.[8] A person's capabilities set is the set of alternative functionings vectors from which the person has the substantive freedom to choose. Which functionings vector the person eventually chooses is determined by the person, based on whatever he or she has reason to value, and the person achieves that state of functionings – being or doing – through his or her own agency. What are the components of a functionings vector of a person? There is no pre-specified list, and the context is material, but they include such attributes as having adequate nutrition, housing, personal safety, leisure, high life expectancy (as part of a group), freedom from morbidity, to such matters as to taking part in the life of the community, and to be able to appear in public without shame, essentially whatever the person has reason to value.[9]

A significant matter to be taken into account in translating a person's commodity holdings into that person's capabilities to function is to pay explicit attention to the personal

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[7] Sen (2009) contrasts his theory of justice, which he calls a comparative theory of justice, with the pre-eminent theories of justice, which are contractarian in character, and which are transcendental in that they characterize a perfectly just state of society, though without providing any guidance on how to achieve greater justice if existing reality is riddled with injustices.

[8] This definition of injustice is subject to a qualification regarding demands of fairness that may require some interpersonal differences in respective capabilities sets to remain in place. For instance, women almost everywhere have a higher life expectancy than men, in practically every country, and it would be unjust to withhold some health care interventions from women to shrink their capability sets to bring them in line with those of men, as noted by Sen (2002).

[9] Sen (2009, Ch. 11- 14) contains a most lucid statement of the Capabilities Approach to social evaluation.

characteristics with regard to his or her ability, or lack thereof, to convert these commodities into capabilities to function.[10] Based on this very rough caricature of Sen's theory of justice, we argue, next, that a child being a worker is an injustice on the ground that his or her capabilities set is constricted relative to the capabilities sets of children who are not workers.

Consider two otherwise identical children, except that one is a worker (CW) and the other is not, thus a non-laboring child (C). There are stark differences between the lives of the two children: C takes an afternoon nap, CW does not, C plays with other children, CW doesn't, C goes to a kindergarten or elementary school, CW doesn't, C exhibits levels of emotional and intellectual development common to the greatest many children in the world the same age, CW doesn't. All this is in the present. But, C has a high likelihood of becoming an educated, skilled worker as an adult, CW is unlikely to have such an expansive capabilities set as an adult, thereby laying the ground for their respective unequal capabilities sets in future. The capabilities sets of child workers are unambiguously constricted, shrunken, compared to the capabilities sets of children who are not child workers at present, and such abridgement will be perpetuated in future also. Thus, by Sen's theory of justice, child workers suffer from an injustice.[11] There is a case, therefore, for redressing this injustice wherever it might occur.[12]

Next, why employ foreign trade and investment policies to combat child labor? The primary driver, but by no means the only cause, of the supply of child labor by the adult of a family is, as Basu and Van argue, and as we also assume, the heart-wrenching predicament of the adult that his or her own income is insufficient to meet the subsistence needs of the family comprising of the adult and a child. If the income at the command of the adult is enough to meets the family's subsistence needs, it is the adult's preference that the child remain a non-laboring child. It is thus the lowness of the family's income, to a critical level below the family's subsistence expenditure, that brings forth the supply of child labor by the adult of a family.[13] Four interrelated observations are worth making in this context.

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[10] For example, a bicycle may serve as a mode of transport for an able-bodied person, but would not provide the same functioning to a person with certain types of disability, or the nutritional intake would be less from the same amount of food for a person afflicted with intestinal parasites. See Kuklys (2005) for the substantial upward revision of poverty rates in the U.K. when such handicap conversion factors are included to account for the additional income needs of families with persons with one form of serious disability or another.

[11] The social evaluation in summary form undertaken here is in the space of individual capability sets, which are essentially sets – one per person – of the substantive freedoms or *opportunities* from which a person eventually through his or her own agency chooses specific functioning outcomes, based on whatever he or she has reason to value. This is not an evaluation in the space of individual utilities or of individual incomes or wealth holdings, which typically tend to be scaler (or vector) *outcomes*. Also, while a non-binary preference relation of the adult in the family is deployed in the next section, this is done solely for the descriptive purpose of modeling behavior, but no attempt is made here to undertake a normative assessment by taking social welfare as a systematic function of individual preferences, as in Arrow (1963), for instance. For a probing investigation of alternative spaces in which social evaluation may be undertaken, and for a forceful case in favor of social evaluation in the space of individual capabilities, see Sen (1999).

[12] But, this is not the only injustice in the phenomenon of child labor. The injustice suffered by the parent whose child becomes a worker is also taken up in the concluding section.

[13] It is thus not greedy employers who are responsible for child labor. In fact, for a (i) profit-maximizing employer (ii) who faces competition from other firms, the source of labor – adult or child – cannot be of

First, the policy instruments we consider are effective in alleviating the incidence of child labor arising due to the lowness of family income, but they may not reduce that component of child labor which arises from other causes.[14] Second, child labor is not the same thing as labor performed by a child whether for a market wage or for the family. A child helping lay the dining table or with washing dishes is certainly labor performed by a child, as is mowing the neighbor's yard or babysitting done by a child, but that is not what we call child labor as the problem that we would wish to alleviate. Instead, child labor is, in our theory, labor performed by a child precisely to earn income that will supplement family income for the purpose of reaching the goal of meeting the family's subsistence need that would otherwise go unmet.

Third, boundary questions such as whether age 17 or 16 or any other should constitute the dividing line between an adult and a child is not crucially important to our argument. In 2016, according to the ILO, over 72 million child workers were as young as 5 – 11 years old, and there is no ambiguity about whether an eleven-year-old is a child. That is at least 72 million children too many, and we argue that it is actually possible to reduce that number with a considered choice of foreign trade and investment policies.

Fourth, it is noteworthy that some, though not all, families have such critically low incomes, so that it is their children who become workers, not of richer families. Even among the families at risk of their children becoming workers, there is variation in family income – and this is a novel feature of our model, on which more presently. It is the children of poorer at-risk families who become child workers, and not of the richer at-risk families. What we seek is a set of policies that will raise the economy-wide wage rate, and thereby increase family incomes, so that fewer children – coming from fewer families – will remain child workers.

To conduct the investigation thus, we must depart from Basu and Van, and from all other theoretical investigations of the matter, in deliberately assuming non-identical families, in particular in terms of family income.[15] While in Basu and Van's investigation all families are identical, so that in equilibrium either no child works or all children work, we assume *inter-family differences in non-labor incomes*; however, for a non-trivial decision problem for the families we assume these incomes to be sufficiently low so as not to cover the families' entire subsistence expenditure needs, thereby requiring a positive wage rate for these families' subsistence. While in their general model, Basu and Van do allow for the child's labor supply to be chosen from the continuum [0, 1], all families in their general model are also identical. They go on to say, "our model is not critically dependent on the homogeneity of agents. However, to raise *further* questions of policy and impact on different kinds of households it

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significance due to fear of suffering losses, but only the only the magnitude of this input employed matters to the employer in determining the output of the commodity to be sold.

[14] If some children become workers, for instance, due to parental illness, substance dependency, or indeed any reason other than low family income, then the remedies lie elsewhere.

[15] A 'hybrid equilibrium' in which some, though not all, children work is considered in by Swinnerton and Rogers (1999) and Basu and Van (1999) in the context of redistribution policies aimed at eliminating child labor.

will be natural to generalize along these lines in future" (p. 420). Here we pursue this suggestion and model families that differ in their magnitudes of non-labor income.

For a great many families, certainly, the only source of income is labor income. If the wage rate is less than subsistence family consumption, the children of such families will become workers. However, given the same economy-wide wage rate, if some children do not work in the same country, it must be because these families have some non-labor income, say income from land or capital, which renders family income high enough to keep their children out of the labor force. But, in the middle somewhere are families that have some non-labor income, but this income does not cover their entire subsistence expenditure, so that a positive wage rate is necessary for their children not to become workers. As the wage rate rises, fewer children from fewer families remain child workers. Thus, our assumption of inter-family differences in non-labor income induces smoothness in the labor supply function, which helps highlight the role of increasing the demand for labor expressly to raise the wage rate in equilibrium, thereby pulling more families out of the critically-low-income predicament that gets them to enter their children into the labor force.

In this range, changes in the wage rate, the rental rate of capital or the rent of land play a crucial role in determining whether or not a family's income falls above or below its subsistence expenditure in equilibrium, and thus determines the rate of incidence of child labor in the economy. We also know from the trade policy literature that tariff protection affects real wages and factor prices in general. Thus there are theoretical grounds for expecting foreign trade and investment policy choice to affect the incidence of child labor. This establishes the remediable character of the injustice of child labor.

Specifially, we find that under endogenous international capital mobility inward FDI reduces the incidence of child labor if stimulated by a country's trade policy of granting protection to the sector that employs child labor. Child labor persists, however, if there is exogenous inward FDI and it is small in magnitude; it is eradicated in equilibrium if this FDI is sufficiently large. If the supply of capital in the country is fixed, granting greater tariff protection or higher export subsidy to a sector that employs child labor reduces its incidence, and may eventually eliminate it. Since a country's aggregate real income decreases as the import tariff increases, it may sometimes face the moral dilemma of having to choose between higher real GDP or fewer child workers as an entailment of its foreign trade policy.

Section 2 contains an outline of the child-labor hypothesis, based entirely on Basu and Van (1998), and Basu (1999, 200 and 2002), and deals with the derivation of the labor supply function with varying numbers of child workers at different wage rates. Section 3 builds this child-labor phenomenon into a specific factors model to investigate the effects of inward FDI – both endogenous and exogenous – into an economy. Section 4 contains a discussion of the effects of trade policy on the incidence of child labor when the supply of capital in the economy is fixed. Section 5 is the concluding section, and it also contains a discussion of some moral dilemmas that characterize the very foundations of the theory of foreign trade policy evaluation that are exposed by our investigation. Section 5 also contains some implications

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of our investigation for a past (and possibly pending) case of trade dispute settlement in the World Trade Organization between the US and India. The Appendix deals with the issues of multiplicity of equilibria and their stability.

2. Family's Child Labor Supply Decision

Basu and Van make a forceful argument that a family has an aversion to entering its children into the labor force as workers unless it has to, and only by force of the need of the family's survival which can actually be met by its children's labor does the family make its children work. Otherwise, the family's strict preference is against permitting its children to work; they wish childhood upon their children, not ardous work, if they can help it. Despite such a preference of families, Basu and Van are able to prove the existence of child labor as a mass phenomenon in general equilibrium. This is all the more striking, theoretically, than showing the existence of this phenomenon in general equilibrium merely with preference neutrality of the decision-making parent towards child labor.

In our formal model, following Basu and Van, we assume that each family is made up of one adult and one child. The adult in every family always supplies 1 unit of labor regardless of the wage rate or family income. If a family enters its child into the labor force, the child also supplies 1 unit of labor, so that the familiy's labor supply is 2 units of labor.[16] One decision the adult in the family must make is whether or not to enter the child into the labor force. [17]

In the absence of child labor, the income of family i is

$$y_i = w + n_i \ \forall i = 1, \ldots N, \tag{1}$$

where N is the number of families, $w > 0$ is the wage rate and $n_i \geq 0$ is the family's non-labor income, both measured in the same commodity.[18] Let $s > 0$ be the exogenously fixed subsistence expenditure of each family, also measured in the same commodity. Of course, with child labor the family's income is $w + y_i = 2w + n_i$, and we assume throughout that this is at least equal to the family's subsistence needs, s.[19]

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[16] Basu and Van assume that while the adult in the family always supplies 1 unit of labor, the child supplies a positive fraction γ units of labor per unit time. Since child labor is a substitute for adult labor in production, in general equilibrium the child wage rate will be γw, where w is the adult wage rate, so that (a) with child labor, the family's income is $w(1 + \gamma) + n_i$, and (b) with the number of families being N, the total supply of labor if all children work is $N(1 + \gamma)$. Nothing in our results changes qualitatively if we assume that $\gamma = 1$, and that is what we assume henceforth. Thus in our model, aggregate labor supply can be a minimum of N, or a maximum of $2N$, or somewhere in between.

[17] Bar and Basu (2008) also model a positive cost of adult supervision of child workers in their investigation of the relationship between giving additional land to potentially afflicted families and child labor, quite relevant for the question they are after, but not material to our context.

[18] Say in Kg. of corn per day or per year.

[19] If $2w + n_i < s$, it raises issues that we do not address here dealing with the threat to the survival of the family, malnutrition, hunger, or even sale of the child by the adult. We offer some preliminary observations on this important matter in the last section.

Following Basu and Van, we also take on board their *Luxury Axiom*, that child leisure is a luxury good, and the *Substitutability Axiom*, that child labor is a substitute for adult labor in production. In addition we make the following assumption.

Low Non-labor Income Axiom: Assume that $\forall i: n_i < s$, so that every family needs a positive wage to subsist.

One justificaton of this assumption is that if a family's non-labor income is greater than subsistence expenditure, then it not only supplies no child labor, but it also does not supply any adult labor.

The preference of the adult, who is the sole decision maker in each family, can be represented by a Kanger-Sen non-binary ranking relation[20] of strict preference $P_i(V^i)$ that is dependent on the family's background set V^i, and is defined on the set of alternatives

$$\{(c_i, l_i) \mid c_i \geq 0, l_i \in \{1, 2\}\} \tag{2}$$

where c_i is the family's consumption and l_i is its labor supply. The specific prefrences of the adult, $\forall \delta > 0$, are

$$(c_i, 1) \, P_i(V_1^i) \, (c_i + \delta, 2)$$

and $\tag{3}$

$$(c_i + \delta, 2) \, P_i(V_2^i) \, (c_i, 1)$$

where V_1^i stands for the condition $y_i \geq s$, or that the family's income without child labor at least meets its subsistence needs, and V_2^i stands for the condition $y_i < s$, that the family's income without child labor is insufficient to meets its subsistence needs.

The adult in the family maximizes his or her preference $P_i(V^i)$ subject to the budget constraint

$$c_i \leq w l_i + n_i. \tag{4}$$

The solution to the family's maximization problem is the demand function

$$c_i(w, n_i) = \begin{cases} y_i, & \forall y_i \geq s \\ w + y_i, & \forall y_i < s \end{cases} \tag{5}$$

and the labor supply function

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[20] See Sen (1997), where the adult acts in a fiduciary responsibility on behalf of the child in the family, and thus acts in accordance with the moral value of shielding the child from the rigors of labor, to the extent possible for the adult, upon which the adult's binary preference relation is conditional. This conditionality confers non-binariness on the ranking relation. While such a relation is incomplete, if it is reflexive and acyclical, a non-empty maximal set still exists under this relation (Sen (1995)), and we exploit this property to derive the consumption demand and labor supply functions of a family as outcomes of its adult's maximization as an act of his or her choice.

$$l_i = \begin{cases} 1, & \forall y_i \geq s \\ 2, & \forall y_i < s. \end{cases} \qquad\qquad (6)$$

Our formulation is the same as that of Basu and Van, except for $n_i = 0$ in their model. This latter assumption of Basu and Van makes all families identical, so that if one supplies child labor, so do all. While in their model either all children in the economy work, or none do, we deliberately introduce inter-family differences in non-labor income so that in our model children of some families, though not necessarily of all, work in some equilibria. The consequence is the possibility of varying magnitudes of child labor in different equilibria – from more families or fewer – in addition to the polar cases of all or none.

In particular, assume that $n_i = rk_i$, where $r > 0$ is the rental rate of capital, and k_i is the amount of capital owned by family i, given exogenously. Assume also that the amount of capital owned by each family is indexed in strict monotonic increasing order: $k_N > k_{N-1} > \cdots > k_2 > k_1$, with $k_1 = 0$. Thus, without child labor the income of family i is $y_i = w + rk_i$, with $y_1 = w$ as the income of the poorest family, and $y_N = w + rk_N$ as the income of the richest family, with the low non-labor income assumption entailing $\forall i: rk_i < s$. The wage rate and the rental rate are parameters for a family, and their values will be determined endogenously in general equilibrium (in the models of Sections 3 and 4), but for a given value of $r = r^0$, define

$$\widehat{w}_i(r^0) = s - r^0 k_i \qquad\qquad (7)$$

as the *reservation wage* of family i, such that, from (1), (6) and the fact that $n_i = rk_i$, it follows that if $w \geq \widehat{w}_i$, the family only supplies adult labor, $l_i = 1$, but if the wage rate falls below $\widehat{w}_i$, it supplies child labor also, $l_i = 2$. Essentially, the amount of a family's subsistence expenditure that is not covered by its non-labor income must be met by the adult's labor income for the family to supply no child labor, failing which the family supplies child labor also.

By construction (7), it follows that as $n_i = r^0 k_i$ rises with i, $\widehat{w}_i$ falls, so that $\widehat{w}_1 > \widehat{w}_2 > \cdots > \widehat{w}_N$, with $\widehat{w}_1 = s$ (since $k_1 = 0$). In particular, if $w > \widehat{w}_1$, there is no child labor. But if $\widehat{w}_2 < w < \widehat{w}_1$ then Family 1, only, enters its child as a worker, and if $\widehat{w}_3 < w < \widehat{w}_2$, then the children of familes 1 and 2 become workers, and so on, until the wage rate falls to $w < \widehat{w}_N(r^0) = s - r^0 k_N$, in which case all children become workers. Thus the labor supply function in this economy is

$$L^S = \begin{cases} N, & w \geq s \\ f(w), \ f'(w) < 0, & s > w \geq \widehat{w}_N(r^0) \\ 2N, & w < \widehat{w}_N(r^0). \end{cases} \qquad (8)$$

Such a labor supply function for the economy is depicted as the curve L^S in Figure 1.

In Figure 1, if aggregate demand for labor is D^4, the economy-wide wage rate $w > s$ is sufficiently high that no family enters its child into the labor force, in equilibrium D. But if aggragate demand is D^1, the wage rate is below the reservation wage $\widehat{w}_N$ of the richest

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family, so that all children in equilibrium A are workers. Under labor demand D^2 and D^3, respectively in equilibria B and C, the children of poorer families work but the children of richer families do not. This is the empirical reality surrounding the policy choices. And policies that raise the wage rate in equilibrium will, piecemeal, reduce the incidence of child labor, with the children of richer families – among those whose children are working – getting released from child labor first. While there is child labor in both equilibria B and C, there are fewer children working in C because the equilibrium wage rate is higher than the reservation wage of more families than is the case with B. In fact, any policy that raises the equilibrium wage rate will reduce the incidence of child labor, provided, of course, the fall in non-labor income is not more than offsetting.

[Insert Figure 1]

This leads directly to a consideration of trade policy, (1) because we know from the Stolper-Samuelson theorem, for instance, that if imports are labor intensive then an import tariff will raise the domestic relative price of the import competing good, and that in turn will raise the wage rate in general equilibrium, leading to a reduction in the number of child workers if non-labor income does not fall too sharply, and (2) any inflow of foreign capital into this economy will raise the marginal productivity of labor – under conditions that render labor and capital cooperative inputs – thereby increasing the aggragate demand for labor and the wage rate in equilibrium, to which will correspond fewer laboring children.

Figure 1 brings out the crucial role played by the demand for labor in determining the incidence of child labor in the economy. Any policy that ends up raising the demand for labor will, by itself, reduce the number of laboring children, by raising the wage rate in equilibrium. The next section deals with sorting out such issues when there is inward FDI, and the subsequent section deals with trade policy, in general equilibrium.

3. Foreign Direct Investment

Consider a two-sector model of an economy that produces an agricultural commodity A with a production function

$$A = A(K_a, L), \tag{9}$$

where K_a is the amount of capital demanded and L is the amount of unskilled labor demanded. What has been refered to as labor in the previous section will henceforth be treated as synonymous with unskilled labor.

This production function satisfis the following properties. All inputs are indespensible: $A(0, L) = A(K_a, 0) = 0$; constant returns to scale prevail: $A(\alpha K_a, \alpha L) = \alpha A(K_a, L), \alpha > 0$; all marginal products are positive: $A_K > 0, A_L > 0$; the production function is concave: $A_{KK} \leq 0, A_{LL} \leq 0, A_{KK}A_{LL} - A_{KL}^2 \geq 0$; and the law of diminishing returns holds: $A_{KK} < 0, A_{LL} < 0$. From this it follows as an entailment that labor and capital are cooperative inputs, in the

sense that if more capital is employed then the marginal product of labor rises, and if more labor is employed than the marginal product of capital rises: $A_{LK} > 0$.[21]

The manufacturing sector's production function is

$$M = M(K_m, H), \tag{10}$$

where K_m is the amount of capital demanded and H is the demand for skilled workers. This production function has the same properties as the agricultural production function. This is the production structure of the Specific Factors model, as in Jones (1971), where capital is intersectorally mobile but unskilled labor is specific to agriculture, and skilled labor is specific to manufacturing.

All firms in both sectors are price takers in all markets. The demand for unskilled labor and capital in agriculture is determined by the conditions of equality of values of marginal products of the factors with their respective factor prices:

$$p_a A_L(K_a, L) = w \tag{11}$$

and

$$p_a A_K(K_a, L) = r \tag{12}$$

where p_a is the domestic price of the agricultural commodity, and w is the unskilled wage rate.

In the manufacturing sector, w_H, the skilled wage rate must equal the value of marginal product of skilled labor, so that

$$p_m M_H(K_m, H) = w_H. \tag{13}$$

In (13), p_m is the domestic price of the manufactured commodity, and factor demand in manufacturing must also satisfy

$$p_m M_K(K_m, H) = r. \tag{14}$$

Throughout we treat this as a small, open economy that acts as a price taker on world commodity markets, with p_a^* and p_m^* as the world prices. The supply of skilled labor is also treated throughout as inelastically supplied at $\bar{H}$. Additionally, while the quantity of capital owned by unskilled workers is $\Sigma_1^N k_i < Ns/r$, this is by assumption less than the domestically owned part of the total capital employed in the country in the two sectors, $K_a + K_m$, because of our assumption of low non-labor income of every one of the N families. Who owns the additional capital in the country that is not owned by unskilled workers in not crucial to our argument, as long as neither these capital owners nor the skilled workers provide any supply of unskilled labor or of child workers from their families.

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[21] Note that constant returns to scale ensures that $A_{KK}A_{LL} - A_{KL}^2 = 0$, so that $A_{KL} = A_{LK} = \sqrt{A_{LL}A_{KK}} > 0$.

Consider first the case of endogenous international capital mobility, as in Neary (1985, 1988) and Chandra and Naqvi (1997), among others. Let r^* be the world rental rate of capital. Under endogenous international capital mobility, if the domestic rental rate of capital is greater than the world rate, $r > r^*$, foreign capital flows into this country, and the reverse flow occurs if $r < r^*$, so that in equilibrium the values of marginal product of capital in both sectors equal r^*. That is, we have

$$p_a A_K(K_a, L) = r^* \tag{12a}$$

and

$$p_m M_K(K_m, H) = r^*. \tag{14a}$$

The graph of (12a) in Figure 2 shows how, for a given r^*, the employment of capital in agriculture, $\widetilde{K}_a$, is detrmined in free trade equilibrium (when $p_a = p_a^*$), for a given value of unskilled labor employment L.

[Insert Figure 2]

Further, Figure 3 contains (i) the graph of the unskilled labor supply function L^S in (8), and (ii) the graph of the demand for unskilled labor implicit in the value of marginal product of such labor in (11). Figure 3 shows how, for given r^* and p_a^*, the employment of labor, $\tilde{L}$, and the equilibrium unskilled wage rate, $\widetilde{w}$, are determined in free trade equilibrium for a given value of capital employment in agriculture K_a.

[Insert Figure 3]

Essentially, (8), (11) and (12a) uniquely determine $\widetilde{w}$, $\tilde{L}$, and $\widetilde{K}_a$ in equilibrium, here in free trade, under the restrictions on the production functions.

Suppose next this country introduces a policy of import tariff if the agricultural commodity is imported, or an export subsidy if it is exported. Then the domestic price of this commodity becomes $p_a = p_a^* + t$, where $t > 0$ is the import tariff or the export subsidy. This will render the value of marginal product of capital in agriculture greater that r^* in (12a), and as is evident form Figure 2, to lower the marginal product of capital in agriculture to restore equilibrium, there will be an inflow of foreign capital into the agricultural sector, with $\widetilde{K}_a^t > \widetilde{K}_a$. In Figure 3, both because the domestic price of the agricultural commodity is higher, and because more capital is now employed in agriculture (and labor and capital are cooperative inputs), the curve representing the value of marginal product of unskilled labor will shift to the right. In the new, trade-policy-induced equilibrium at C, the unskilled wage rate is higher, $\widetilde{w}_t > \widetilde{w}$, and the incidence of child labor is lower, $\tilde{L}_t - N$, than at the free trade equilibrium $\tilde{L} - N$ at B. This is because the constancy of the rental rate of capital under endogenous international capital mobility ensures that no family suffers a fall in non-labor income due to the introduction of trade policy, and a higher unskilled wage rate induced by such a policy ensures that fewer families now have family income below their subsistence expenditure. There is no ambiguity in this result.

Proposition 1: *Under endogenous international capital mobility inward FDI reduces the incidence of child labor in the country if induced by a country's own trade policy of protecting the sector that employs child labor.*

We turn next to an economy in which the supply of capital is exogenoulsy given, $\bar{K}$, so that the rental rate of capital is also endogenously determined in general equilibrium, in addition to the unskilled and skilled wage rates. Equations (8) – (11), (13) and

$$p_a A_K(K_a, L) = p_m M_K(K_m, H) \tag{15}$$

and

$$K_a + K_m = \bar{K} \tag{16}$$

now describe the equilibrium of the economy, with (15) and (16) now replacing (12a) and (14a). The unskilled labor market equilibrium is still depicted in Figure 3 – the graph of (8) and (11) – and the capital market equilibrium – the graph of (15) and (16) – in Figure 4.[22]

<div align="center">[Insert Figure 4]</div>

Figure 4 shows how the equality of the mariginal produts of capital in agriculture and manufacturing determines both the allocation of capital $\bar{K}$ to the two sectors, $\widetilde{K}_a$ and $\widetilde{K}_m$, as well as the equilibrium rental rate of capital r^0, for given values of L and H. And for given values of K_a and K_m, since the demand for skilled labor equals its inelastic supply of $\bar{H}$ in equilibrium, the demand for unskilled labor and the unskilled wage rate are determined as $\widetilde{L}$ and $\widetilde{w}$ in Figure 3, with the understanding that $\widehat{w}_N(r^*) = \widehat{w}_N(r^0)$.

Suppose now there is an exogenous FDI inflow into this country in the amount K^f. The horizontal axis in Figure 4 gets stretched from $O_a O_m$ to $O_a O'_m$, by this magnitude. The dashed line in Figure 4 is the same curve as the bold line representing the value of marginal product of capital in manufacturing, except that it has been redrawn relative to the new origin O'_m that reflects larger supply of capital in the economy in the amount $\bar{K} + K^f$. Post exogenous FDI, the rental rate of capital in equilibrium is lower, $r^1 < r^0$, and more capital is now employed in both sectors. Since inputs are cooperative, this raises the marginal productivity of skilled labor in manufacturing, and the marginal product of unskilled labor in agriculture, and thus raises both wage rates.

While a rise in the unskilled wage rate increases family income of every family, a fall in the rental rate of capital reduces non-labor income of all families that own capital – all but Family 1, the poorest, which owns no capital. The effect of these factor price changes on family income is thus ambigous for all but the poorest family. In particular, $r^1 < r^0$ implies that from (7), $\forall i = 2, \dots N$: $\widehat{w}_i(r^1) = s - r^1 k_i > \widehat{w}_i(r^0) = s - r^0 k_i$, reflecting a greater deficit of non-labor income necessary to meet each of these families' susbsistence needs. This upward

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[22] Of course, there is no commodity market equilibrium issue here, because of the assumption that this is a small, open economy, which can buy or sell any amount of each commodity at exogenously given world prices.

shift in the reservation-wage schedule of the families necessitates redrawing Figure 3, the labor market equilibrium diagram, as Figure 5.

[Insert Figure 5]

In Figure 5, the richest family, Family N, suffers the greatest decline in non-labor income, $\hat{w}_N(r^1) - \hat{w}_N(r^0) = (r^0 - r^1)k_N$, due to a fall in the rental rate of capital, because it owns owns the greatest amount of capital. This is the greatest increase in reservation wage experienced by any family, and every other family suffers an everdecreasing hike in reservation wage, with the marginal family, Family 1, suffering do decrease at all. Thus, pivoted at $w = s$, the reservation wage schedule rotates counter-clockwise, so that the relevant reservation wage schedule at $r = r^1$ is the dashed line. If the pre-FDI equilibrium is at A, the new, post-FDI equilibrium in the unskilled labor market will be at B', rather than at B. The new equilibrim in the unskilled labor market B' can be to the left or the right of the vertical through the previous equilibrium at A, implying that post-FDI there may be less or more laboring childen in the economy.

This ambiguity as the consequence of exogenous inward FDI points to the persistence of child labor in general equilibrium. But, this is the case if the inflow is small, and has the consequence of a small wage increase. If the inflow of FDI is substantial enough, however, to drive the wage rate up above the subsistence expenditure, as in equilibrium C in Figure 5, then the concommitant fall in the rental rate and thus a family's non-labor income ceases to matter, because all child labor has been wiped out by such a substantial dose of inward FDI.

Much care must be exercised in dealing with a policy that encourages exogenous inward FDI. Such magnitutes of FDI which raise labor income marginally, but which also reduce non-labor income – even though it is small for such families ($n_i = rk_i < s$) – has an ambigous effect on total family income without child labor ($y_i = w + rk_i$), and thus may fail to reduce the incidence of child labor in the economy. It is also clear from Figure 5, however, that if a sufficiently large amount of FDI reaches the agricultural sector, then the value of marginal product of unskilled labor will increase enough to raise the wage rate above the family-subsitence bar ($w > s$), as at equilibrium C. This conclusion is summarised as the following proposition.

Proposition 2: *Child labor persists if inward foreign direct investment is exogenous and is small in magnitude, but is eradicated in equilibrium if this FDI is sufficiently large.*

Proposition 2 deals with what can be done from outside a country – possibly by a foreign country – to eradicate child labor, not by giving foreign aid, but by giving incentives to foreign entrepreneurs to relocate their capital in the country afflicted with child labor, for the purpose of business expansion there that will work through the labor market to raise the wage rate sufficiently. This actually occurred starting 2001 when the US, after suffering terrorist attacks on September 11, quite suddenly normalized foreign trade and investment relations with India – which had earlier been strained because India had refused to sign the

Nuclear Non-proliferation Treaty – and consequently India experienced unprecedented rates of GDP growth, labor demand, and wage increases.

4. Tariffs and the Incidence of Child labor

Suppose now that the supply of capital in the economy is fixed at $\bar{K}$ (there is no inflow of capital, exogenous or endogenous), and the only instruments of policy available to a government are import tariffs or export subsidies. Again, (8) – (11), (13), (15) and (16) characterize the Walrasian equilibrium of this economy.

When (15) changes from $p_a^* A_K(K_a, L) = p_m M_K(K_m, H)$ under free trade to

$$(p_a^* + t)A_K(K_a, L) = p_m M_K(K_m, \bar{H}), \ t > 0 \tag{15a}$$

under an import tariff on (or an export subsidy to) the agricultural commodity, at initial values of K_a, L and K_m, the LHS of (15a) becomes higher than the RHS. To lower the value of marginal product of capital in agriculture, K_a must increase, and correspondingly K_m must fall, which raises the value of marginal product of capital in manufacturing, and thus increases the rental rate of capital, from r^0 to r^1 in Figure 6. Post-tariff, the employment of capital in agriculture $\bar{\bar{K}}_a$ is higher than in free trade.

<center>[Insert Figure 6]</center>

The increase in the rental rate of capital rotates the reservation schedule of the families clockwise, as shown in Figure 7. Also, both the increase in capital employment in agriculture, and the increase in the domestic price of the agricultural commodity together shift out the value of marginal product of labor, resulting in the equilibrium shifting from B to C in Figure 7. In the post-tariff equilibrium the equilibrium wage rate is higher, $\bar{\bar{w}} > \tilde{w}$, the rental rate is higher, $r^1 > r^0$, and as a concequence, every family's income $y_i = w + rk_i$ is higher. Naturally, there are fewer child workers $\bar{\bar{L}} - N < \tilde{L} - N$ in the economy in the post-tariff equilibrium.

<center>[Insert Figure 7]</center>

In fact, if the tariff is raised further – which can be done up to the prohibitive tariff rate – more capital will shift from manufacturing to agriculture, which will both raise the equilibrium wage rate and the rental rate of capital, and this will cause a monotonic decline in the incidence of child labor, quite possibly eliminating it eventually. It is possible, however, that there are still child workers in equilibrium even when the tariff has been raised to its prohibitive level and thus cannot be raised any further. In such a case, the number of child workers will be fewer in autarky than at any tariff below the prohibitive rate, but not zero. These conclusions are summarized in the following proposition.

Proposition 3: *Granting greater tariff protection or higher export subsidy to a sector that employs child labor monotonically reduces the incidence of child labor, and may eventually eliminate it.*

<center>15</center>

This policy prescription is somewhat strong. And it is obtained under standard assumptions about technology in economic theory, and on Basu and Van's *Luxury Axiom* and *Substitutability Axiom* and on our assumption of lowness of non-labor income of families whose children are at risk of becoming child workers. Of course, we have assumed maximizing behavior on the part of both producers and families. Each family, though, mximizes a Kanger-Sen non-binary ranking relation of strict preference, and we know that this relation generates a non-empty maximal set over a partially ordered domain, which we have assumed.[23]

In light of the simple remedy for child labor highlighted by Proposition 3, it is fair to ask why such a readily available solution has not been adopted, and such large numbers of children – over 150 million in 2016 – continue to labor, many in hazardous conditions.

The answer may lie in a standard result in the theory of international trade policy. This is restated here.

Tariff and Real Income: *The aggregate real income of a country is maximum in free trade, and ceteris paribus, it monotonically decreases as the import tariff on an imported commodity increases, reaching a minimum at the prohibitive tariff (that entails autarky).*[24]

This relationship between a tariff and real income of a country and the result contained in Propositions 3 are brought together in Figure 8. In the right panel, in free trade ($t = 0$), the country's real income is at a maximum, but as the import tariff rises, its real income falls

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[23] The sharpness of the result contained in Proposition 3 is the consequence of the Specific Factors production structure deployed here, with unskilled labor specific to agriculture only, and skilled labor specific to manufacturing only. However, if the Heckscher-Ohlin model is deployed for an examination of an import tariff on the agricultural commodity, some ambiguity in the conclusion will result for small tariff increases, as in Proposition 2, because the Stolper-Samuelson theorem will hold. To see this, note that in the altered model, there is no skilled labor, and unskilled labor is employed in both sectors: $A = A(K_a, L_a)$, $M = M(K_m, L_m)$, $K_a + K_m = \bar{K}$, and $L_a + L_m = L^S$. This model satisfies what Neary (1985) calls the property of local factor price equalization, so that factor prices (w, r) are determined in equilibrium independently of factor supply levels.

If agriculture is labor intensive, as it tends to be in poor countries that suffer from child labor, then an import-tariff-induced increase in the price of the agricultural commodity will cause the wage rate to rise, and the rental rate of capital to fall. This will result in all but the poorest families suffering a fall in non-labor income, so that the reservation wage schedule will rotate counter-clockwise, as in Figure 5. As a result, we will find, as in Proposition 2, that *persistence of child labor is the result of marginal increases in tariff protection of the labor intensive sector, but the incidence of child labor will fall if tariff increases are sufficiently large.*

[24] Let C_a and C_m be the aggregate quantities of the agricultural and manufactured commodities consumed in the country. Total expenditure on consumption is $E = p_a C_a + p_m C_m$, where p_a and p_m are the domestic prices of the two commodities. Assume that $p_m = p_m^*$, the world price, and $p_a = p_a^* + t$, where $t \geq 0$ is the import tariff on the imported agricultural commodity. Aggregate consumption is financed by aggregate income, which is $p_a A + p_m M + t(C_a - A)$, where the last term is tariff revenue. And, $E = Y$, so that $\frac{dE}{dt} = \frac{dY}{dt}$. Since in equilibrium the marginal rate of transformation is equal to the price ratio, $\frac{dA}{dM} = -\frac{p_m}{p_a}$, it follows that *at given commodity prices*, $\frac{dE}{dt} = t\left(\frac{C_a}{dt} - \frac{dA}{dt}\right)$. Since $\frac{C_a}{dt} < 0$ (because of downward sloping demand curve) and $\frac{dA}{dt} > 0$ (because of upward sloping general equilibrium supply curve), it follows that $\frac{dE}{dt} = 0$ if $t = 0$, and $\frac{dE}{dt} < 0$ if $0 < t < t_p$, where t_p is the prohibitive tariff at which imports are zero, or $C_a = A$.

monotonically until the tariff becomes prohibitive, $t = t_p$, where imports are zero (or $C_a = A$), and autarky is reached. However, as the tariff rises, the number of child workers declines monotonically, as given by the curves $\hat{C}(t)$ or $\tilde{C}(t)$ in the left panel in Figure 8.

[Insert Figure 8]

If $\hat{C}(t)$ represents the response of the number of child workers to tariff changes in Figure 8, then before the import tariff reaches the prohibitive rate, the incidence of child labor in the economy will be zero at $t = t^*$, which may be called the optimal tariff that eradicates child labor. However, it is possible that the economy suffers from a chronic child labor problem, and even a prohibitive tariff fails to eradicate child labor if $\tilde{C}(t)$ represents the response of the number of child workers to tariff changes. The best that a tariff can accomplish in such a circumstance is to lower the incidence of child labor to $C_{Autarky}$, in Figure 8. If such is the predicament, the only external-policy recourse left is to rely on large doses of foreign direct investment, as highlighted in Proposition 2.

What Figure 8 brings out is a direct conflict between a country achieving the goals of (a) real income maximization and (b) reducing the incidence of child labor. This conclusion is inescapable.

Proposition 4: *Starting from free trade, if a country increases the rate of import tariff or export subsidy to a sector that employs child labor, the incidence of child labor declines and so does the real income of the country, up to the prohibitive rate or the eradication of child labor, whichever comes first.*

When the interest of the parents of child workers and the child workers themselves are in direct conflict with the interest of the country that wishes to maximize its aggregate real income, there clearly arises a moral dilemma. Economic theory provides no solution to such a dilemma. The solution lies, if one exists at all, in moral and political philosophy. And in political philosophy, the only theory of justice that provides guidance in the form of practical reason is Sen's (2009) theory of justice, which aims to remove remediable injustices in piecemeal fashion. And, as we have argued, child labor is an injustice, which, as our paper shows, is a remediable injustice. What Proposition 4 highlights is the fact that mitigating this injustice is not invariable costless; some sacrifice of aggregate real income of a country may be required to remove this injustice. Thus our investigation reveals that a lack of willingness to make such sacrifice by intervening in free trade by deploying instruments of trade policy could also account for the persistence of child labor.

A country may have the willingness to sacrifice some real national income to mitigate the prevalence of child labor from which it suffers, but sometimes it may encounter outside pressures that seek to prevent it from doing so. India, for instance, has been protecting parts of its agricultural sector, which is a policy in line with the recommendations that emerge from our investigation if child labor is a concern in this sector. However, on this the US recently brought action against India at the World Trade Organization (WTO). Since an appreciation of the conflict between these two goals is missing in the literature on child labor

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and foreign trade and investment policy, cases of trade disputes before the court in the WTO – such as the dispute between the USA and India on the Indian ban on imports of poultry from the USA – may not have received in the past the kind of reasoned articulation India could have mounted on grounds of protection of this industry from foreign competition for the explicit purpose of keeping the incidence of child labor from rising in the country. Instead, India argued – entirely falsely – that American poultry was potentially infected with the bird flu virus, and recently lost the case in the WTO.[25] This case, and possibly others like it, can actually be appealed legitimately on grounds of protecting the children of the country from the injustice of becoming laborers, if a case to that effect can empirically be made.

5. Concluding Remarks

Not only is child labor an injustice suffered by the children who are workers but it is also an injustice suffered by the parents of child workers. The capabilities of such parents to achieve a specific functioning – to prevent their children from becoming workers – is severely compromised when contrasted with the capabilities of a great many other parents. This indictment of child labor is non-welfarist insofar as the assessment is made in the space of individual freedom sets, not in the space of individual preference relations or welfare functions. In fact, every free-trade equilibrium in every version of the model we have examined here is Pareto efficient whether or not it involves laboring children, because these are undistorted, perfectly competitive economies under consideration. Such social states characterized by child labor are, therefore, more unjust than states without any laboring children on Sen's definition of justice, though they are efficient on the weak Pareto criterion.

To appreciate the contrast, note that the weak Pareto rule declares a social state x socially superior to social state y if and only if everyone in society, without exception, strictly prefers x over y. And, a state is Pareto efficient if and only if there exists no other attainable state that is Pareto superior to it. The Pareto rule evaluates social states in the space of personal binary preference relations or their utility (personal-welfare) function representations, whereas Sen's evaluation of injustice is conducted in the space of individuals' sets of substantive freedoms. Such divergent social evaluation outcomes of the same object of observation entails, as the next logical step, of having to choose between the two moral principles themselves: do we want a Pareto efficient outcome even though it is fraught with injustice, or do we want more justice for the laboring children and their parents?

While there are many reasons why child labor arises as a mass phenomenon, we have focused exclusively on the lowness of family income as the primary cause, both because it is empirically true that a large component of child labor is due to this, and because it can be remedied by the right choice of economic policies. We have shown that a country can adopt specific trade policies unilaterally to at least mitigate the incidence of child labor, if not eradicate it altogether. We have also shown that other countries can send productive capital to a country afflicted with child labor, and that too will work through the markets to raise

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[25] See WTO (2019), DS430, for Dispute Settlement, and see related continuation of Dispute Settlement DS431, between India and the USA, expected by June 2019.

the productivity of the workers whose children are workers, raise their wage rates, and thus enable such parents to withdraw their children from the labor force.

Much work still remains to be done on identifying effective remedies for the phenomenon of child labor, wherever in the world it still persists. Basu and Van have provided firm economic theoretic foundations for an understanding of this affliction. Policy analysis – both theoretical, as reported here, and empirical – for mitigating and eventually eradicating the injustice of child labor from the world has unfortunately tended to lag behind. This paper is an attempt at advancing such policy analysis further. But one issue that we have not considered formally (see Fn. 19), and one that deserves close attention, is what happens when the income of the family even after including the child's income is still not enough to meet the family's subsistence needs. In such a case the possibility arises that due to the family's survival need, it may choose to sell its child, resulting in a ready supply of children into human trafficking. The demand for children in human trafficking can be dealt with as a law enforcement matter but the supply problem demands a more intricate solution, as we have outlined above. Our preliminary conclusion is that the policies that we have identified for dealing with child labor may still mitigate the problem of trafficking in children from the supply side, but if it persists in chronic form then only huge doses of private foreign capital infusion will help raise the domestic demand for labor – via domestic business expansion – and hence raise the wage rate sufficiently to dry up the supply of children for sale. More careful work is needed here.

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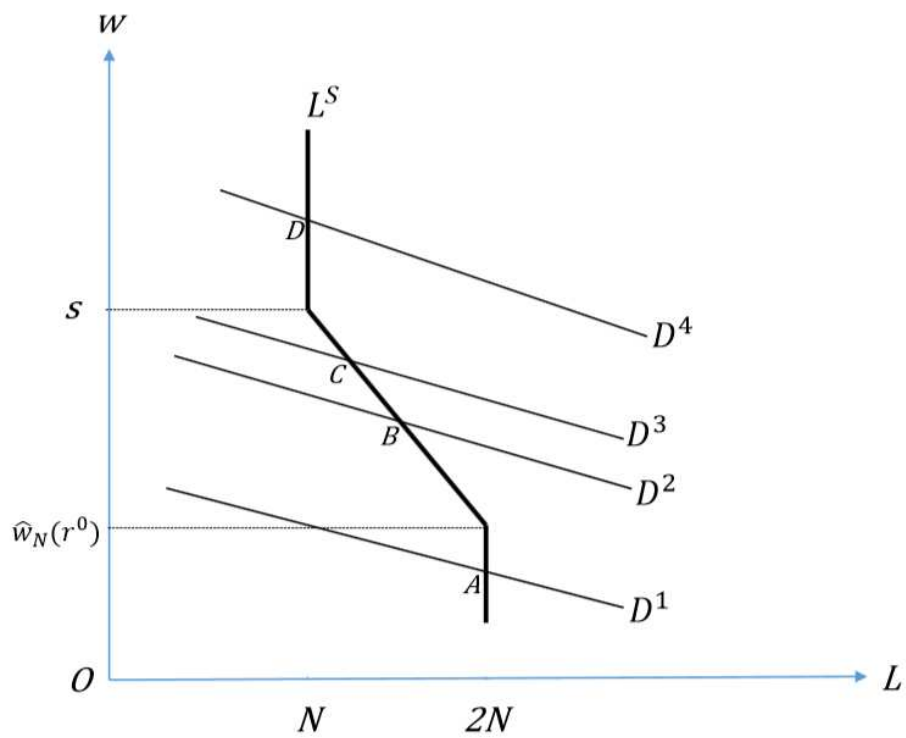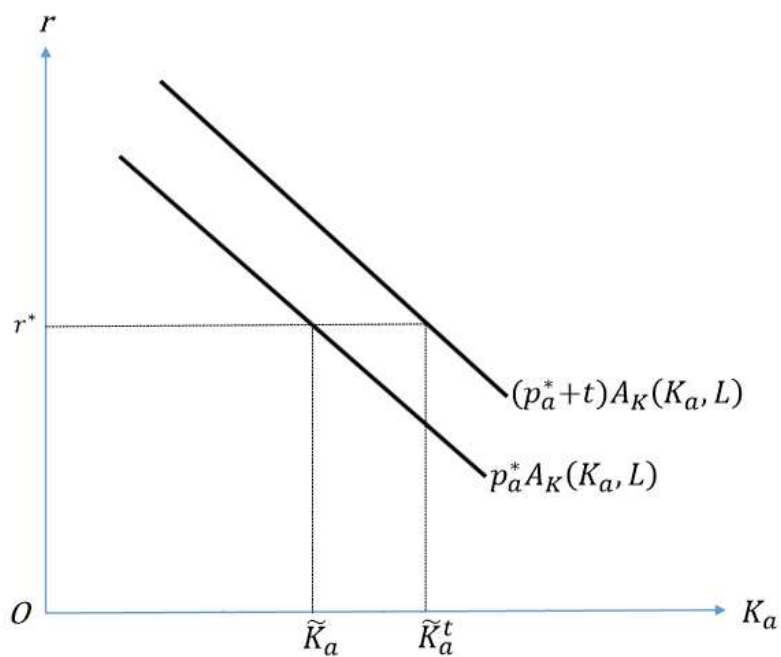
Figure 1

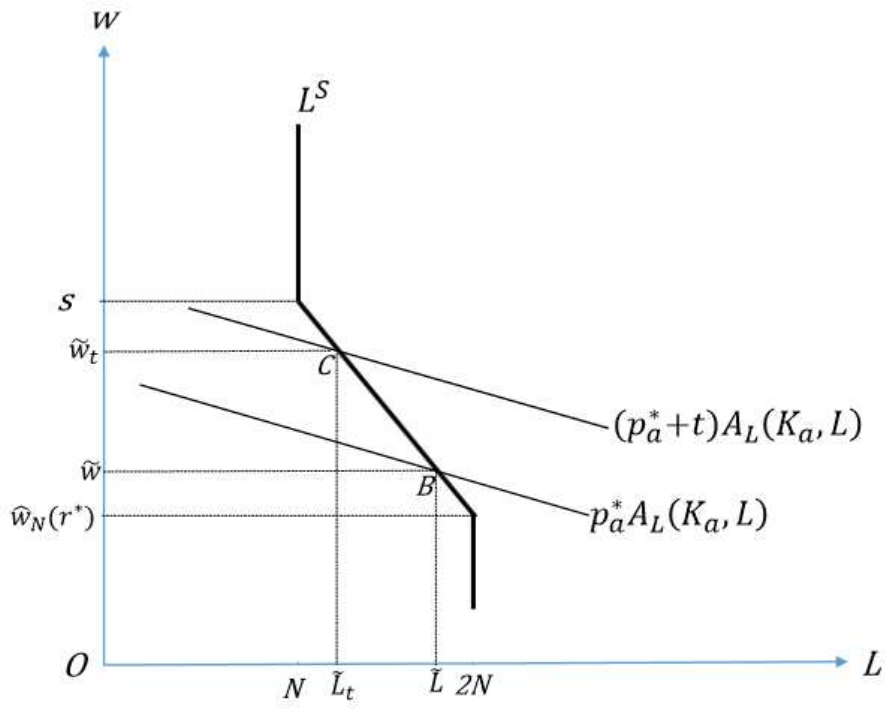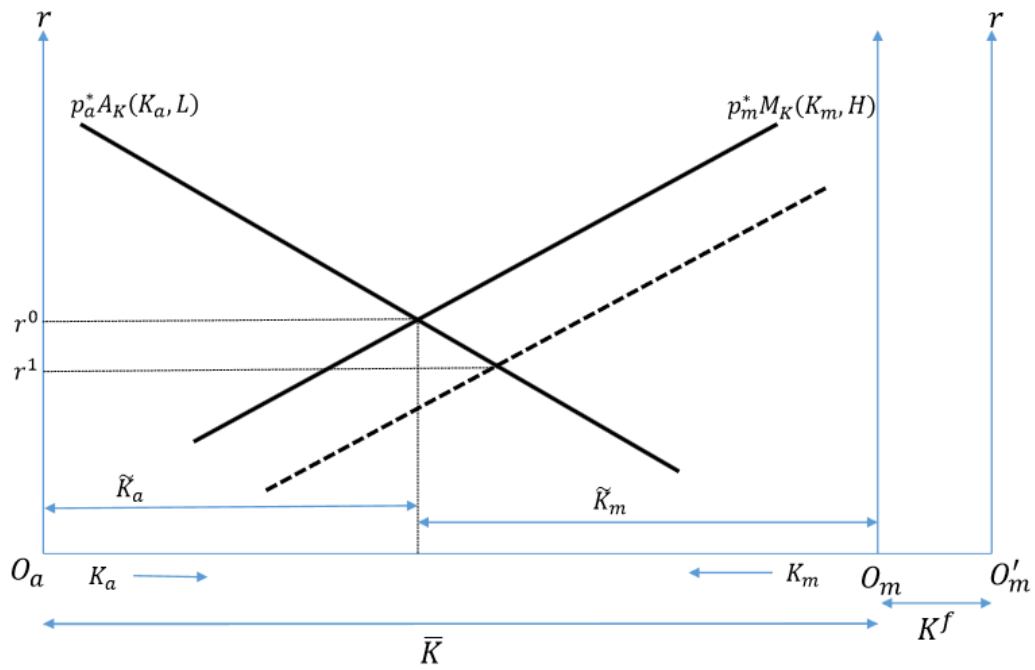**Figure 2**

Figure 3

Figure 4
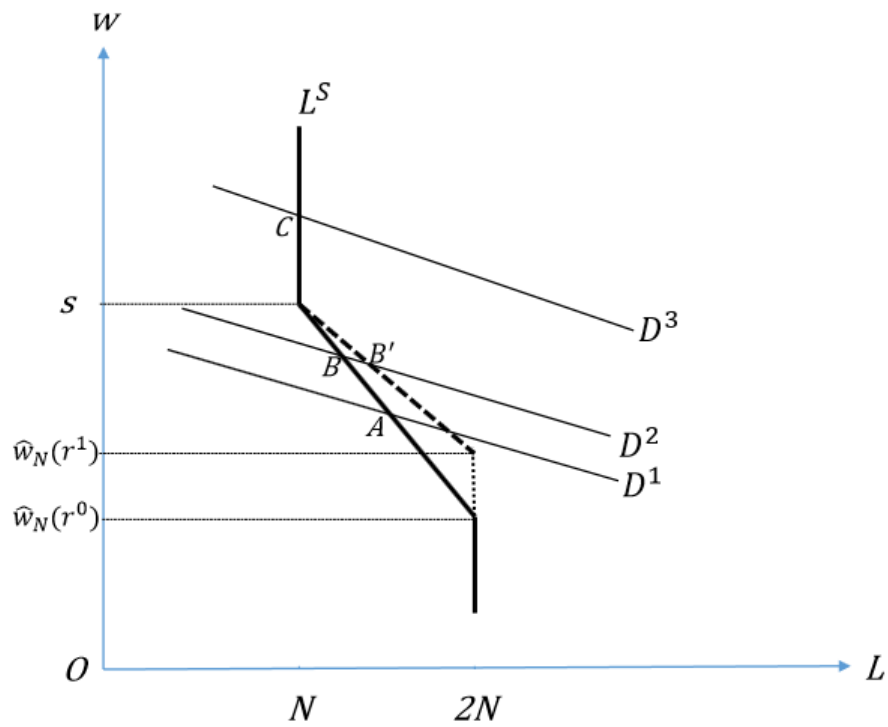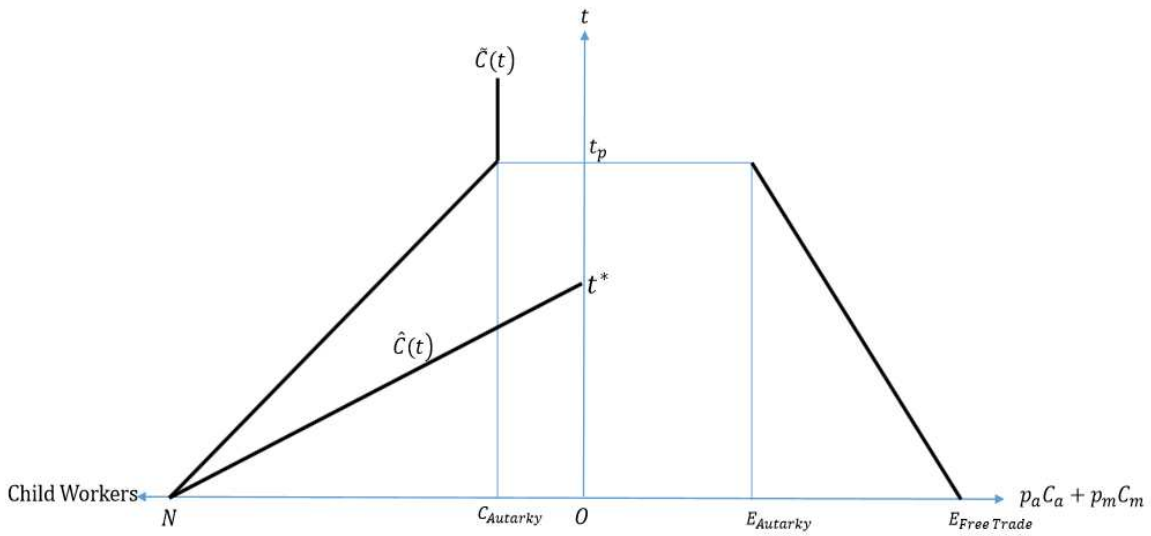
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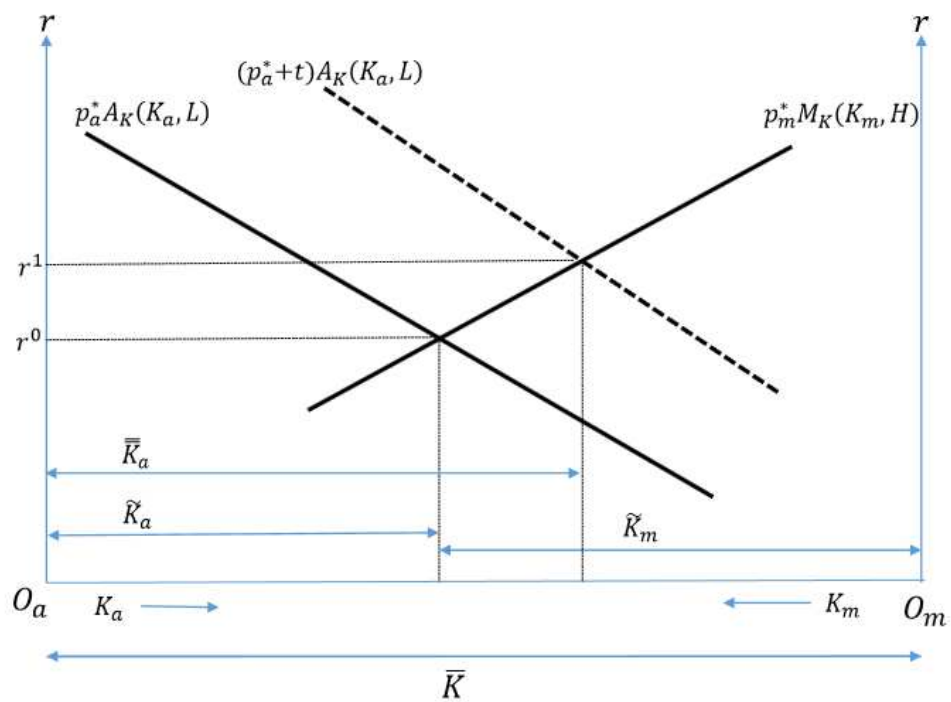
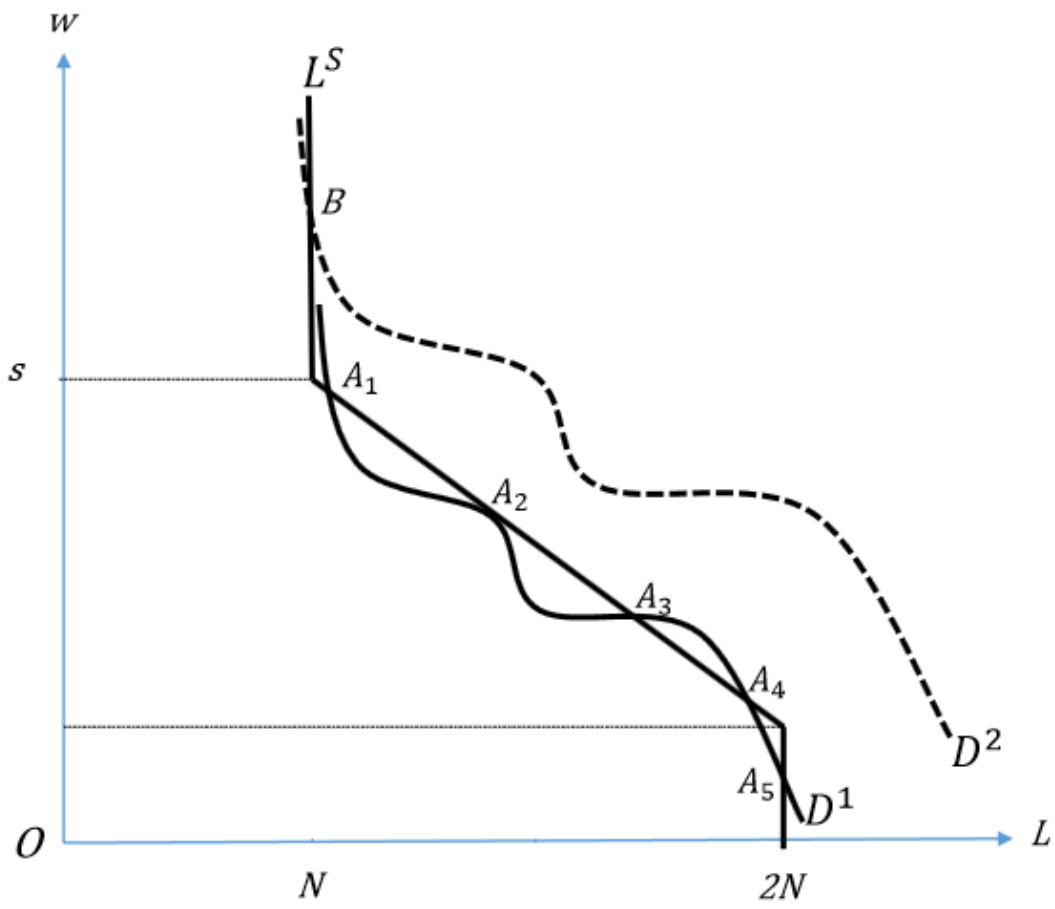**Figure 6**
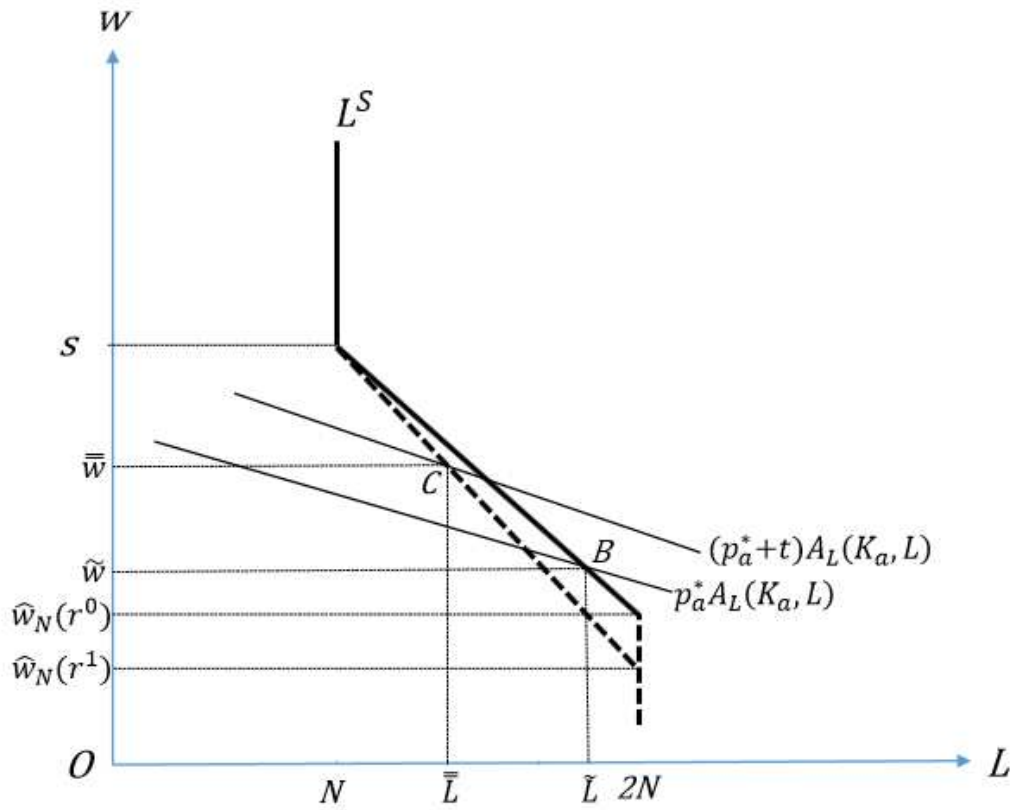
Figure 7

Figure 8

Figure 9

Appendix

In our examination we have deliberately stayed away from the issue of multiple equilibria, which occupies a more prominent place in the results reported by Basu and Van, and especially Basu (2002). Such multiplicity can arise in our model as well, and we take that up here. Figure 9 depicts five possible equilibria, $A_1 - A_5$, if, along with the economy's labor supply curve as in Figure 1, the demand for labor is given by a non-linear, downward-sloping curve such as D^1. But some of these equilibria are outright unstable, or quasi-stable. Trade theory dealing with domestic distortions was replete well into the 1970s with numerous paradoxes or perverse results, almost all of which Neary (1978) showed to be predicated on unstable equilibria, and were thus deemed to be of limited practical interest. This is because stable equilibria persist despite some turbulence and thus are likely to be observed, but the slightest of shocks moves the economy away from an unstable equilibrium, so that the latter is unlikely to persist long enough to be observed. Unstable equilibria certainly ought not to be subjected to comparative statics analysis, which is the main task we undertake in our examination.

[Insert Figure 9]

Taking Neary's (1978) lead, consider the plausible dynamic adjustment mechanism

$$\dot{w} = \alpha(L^D - L^S) \tag{A1}$$

where $\dot{w}$ is the time-rate-of-change of the unskilled wage rate, $\alpha > 0$ is the speed of adjustment of the wage rate, and L^D and L^S are the quantities of labor demanded and labor supplied respectively.

According to the adjustment process (A1), equilibria A_1 and A_4 are unstable, insofar as at wage rates in their neighborhood above them there is excess demand for labor which will result in further wage increases above these equilibria, and at wage rates below them there is excess supply of labor that will cause further wage declines. Equilibrium A_2 is quasi-stable in that it is stable above, but unstable below the wage rate at A_2. Equilibria A_3 and A_5 are clearly stable under (A1).

If the primary object of the exercise were *description* or characterization, which was the case with the work of Basu and Van (1998) and Basu (2002), then an investigation of multiple equilibria would be of considerable theoretical interest. However, our interest here is in deploying one policy shock or another to move the economy from a less desirable equilibrium such as A_3 under labor demand D^1, to a more desirable one such as B after the demand for labor curve has shifted to D^2. Since in the practical approach taken here our primary interest is in increasing the demand for labor so that the equilibrium wage rate rises and fewer children, from fewer families, remain in the labor force, the multiplicity of equilibria under unchanged demand D^1 remains an issue of more theoretical interest than of practical concern.