

Child Labour and Import Substitution

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Abstract

This paper examines the impact of import substitution motivated tariffs on child labour and welfare in a small open economy. Using a simple diagrammatic analysis of a two-sector general equilibrium model where parents send children to work when household income falls below a certain needs-based threshold, the model finds that tariffs can raise welfare under some circumstances, even in a small economy, though this welfare increase comes at the expense of greater child labour. Overall, the paper emphasizes the dangers of an import substitution policy in an economy where child labour is prevalent.

Keywords

Child Labour, Import Substitution, Needs-Based Income, Tariffs

1. Introduction

After many decades of globalization, the share of trade in global GDP started to fall after the 2008 financial crisis, a trend that has been exacerbated by the recent COVID pandemic. As such, many industrialized nations are renewing their interest in domestic manufacturing to replace faltering trade with China and, more recently, Russia. Indeed, Russia has gravitated towards import substitution since 2014 (Simola, 2022). This is not limited to industrialized nations alone, with both India and China moving strongly towards re-igniting import substitution (IS) as a trade strategy (The Economist, 2020a), despite the less than stellar performance of import substitution as a development strategy historically. IS essentially involves enhancing domestic production capabilities by restricting imports, either through tariffs or non-tariff trade barriers. Indeed, the Indian government signalled in 2020 that it was thinking of introducing an import substitution policy.¹

¹See, for example: <https://www.hindustantimes.com/india-news/gadkari-highlights-need-for-import-substitution-in-msmes/story-hHXAJBtuRfMATcFk41uBWI.html> and <https://www.financialexpress.com/economy/nitin-gadkari-calls-for-more-innovation-to-identify-import-substitute-products/2147286/> (accessed 9th February, 2025).

The Union Budget for 2020-21 followed through with this by increasing tariffs on a number of products, ostensibly to create a level playing field for micro, small and medium enterprises; consequently, imports were raised by 33% - 50% for roughly 40, mainly consumer, products (Dhar & Ramaa, 2020). Import substitution is also slowly re-emerging in Africa, with South Africa, Uganda and Ghana, to name a few, moving consciously towards substituting imports with local manufacturing (The Economist, 2020b), amidst calls for a pan-African “continental import substitution”.²

Against this backdrop, in this paper we utilize trade theory to emphasize an important repercussion of imposing tariffs to enforce import substitution: its impact on child labour. In doing so, we show why introducing tariffs in an economy that has child labour may actually be attractive: it can potentially increase the overall welfare of society. This increase, however, comes not through a rise in wages of adult labourers as one would hope; rather, it comes through the employment of a larger number of children to offset a *fall* in adult wages. While industrialized economies may also be moving towards substituting imports with domestic production at this time, for developing countries such as India this strategy is fraught with the peril of welfare increases coming at the expense of vulnerable sections of society.

In order to address this issue, we construct a trade-theoretic model with two sectors (one export sector and one import competing sector) and factors of production that include capital and a labour force comprising adults and children. In a manner similar to Basu and Van (1998), and Hazari and Mohan (2021), we assume that adult and child labour are substitutes. Moreover, we incorporate a general version of Basu and Van’s Luxury Axiom, and assume that children are sent to work only when household income falls below a threshold needs-based income, which we interpret as being a level of income that meets the basic needs of shelter, food, clothing, access to medicines and other basic amenities. Indeed, this level may equate to the traditional notion of a subsistence level of income or the income consistent with the poverty line, but it may be something higher depending on societal needs of what constitutes an income threshold for sending children to work. The reason why a needs-based income, as opposed to a mere subsistence income, is a more attractive concept is because it affords a more general understanding of when children earn income. For example, aspirational income can also be introduced in this framework to explain denying children their childhood so that they may become, say, better tennis players or gymnasts. We do not explore these general issues further in this paper, and simply note that such circumstances do exist where children earn income, even when there is no subsistence or poverty related necessity exists.

While Basu and Van (1998) is set in a closed economy, a number of papers have incorporated trade related issues. One strand of this literature, which includes

²See <https://www.un.org/en/un-chronicle/growing-middle-class-and-continental-import-substitution-connecting-dots-unlock-%E2%80%9Cmade> (accessed 9th February 2025).

analyses by Maskus (1997) and Melchior (1996) for example, deals with the imposition of tariffs by foreign countries on an economy employing child labour in its export sector, and brings out the ambiguous effects of such sanctions. In contrast, our paper focuses on tariffs imposed on an import competing sector by a country where child labour is prevalent.

This paper is also similar in spirit to trade models that endogenize the extent of child labour in a liberalizing economy (such as: Chaudhuri & Dwibedi, 2007; Bandyopadhyay & Bandyopadhyay, 2009). However, we emphasize the impact of import substitution and domestic tariffs on the production possibilities of an economy, an aspect that has been by and large ignored in the previous literature. In this paper, the production possibility curve with child labour is derived as a two-step procedure. Specifically, the internationally given prices determine all the factor prices and the production possibility curve is derived from the inelastic supply of adult labour and capital. Once this is achieved, the family decides, depending on its needs, how much labour is supplied to the market to fulfill already existing job vacancies. This procedure then provides us with the production possibility curve with child labour. We note that our paper does not have any labour-leisure choice, as children typically do not have free will decision-making power in circumstances when there is child labour. As such, the endogenous supply of child labour in the model is entirely different from other work, for example Kemp and Jones (1962), where labour supply is endogenized. With this production possibility curve in place we highlight an important feature of the child labour problem using an intuitive diagrammatic analysis: a parametric change in a price variable can cause a shift in the production possibility curve, which typically does not occur in trade theory. Essentially, price (terms of trade) movements are related to the endogeneity of child labour supply. Consequently, when the terms of trade changes, the supply of child labour changes, which in turn allows for the shift of the PPC. The endogeneity of the amount of child labour contrasts this paper with Hazari and Mohan (2021), which is based on a job vacancy model where child labour is a consequence of social exclusion.

Finally, a well-known result in trade theory is that a tariff must necessarily lower welfare for a small open economy; welfare improvements and optimum tariffs can only arise from a country having monopoly power in trade. Our paper highlights in a stark manner that tariffs can be welfare improving for a small country in a second-best framework when there is child labour present. As pointed out earlier, there is a temptation, then, to adopt import substitution because it can improve welfare; however, it comes at the expense of greater child labour. Consequently, apart from the normal reservations that economists have had to import substitution that led to its elimination as a viable strategy for many developing countries, including India in the early 1990s, one can add its potential tendency to increase child labour as an additional problem.

The remainder of the paper is as follows. Section 2 sets up the modelling equations. Section 3 examines the consequence of a tariff on welfare and child labour

utilizing a geometric analysis. Section 4 offers some concluding discussions and comments.

2. A Trade-Theoretic Model of Child Labour and a Needs-Based Income

Consider an economy with households comprising adults and children. We partition the set of households into two parts: capitalist and worker households. The former owns all the productive assets in society, such as capital and land, while the latter derives its income from labour alone.³ We assume that capitalist households always receive enough return on their assets that they are not forced to send their children to work. On the other hand, worker households in aggregate have a minimum threshold income level, I^N , below which some households will send their children to work. We can think of I^N as a level of income that this section of society requires to meet its basic needs. As mentioned in the introduction, I^N may be the aggregate subsistence level of income for these households, or empirically, the income associated with the poverty line; however, it may also be some other income level depending on the context at hand.

Suppose \bar{L} represents the inelastically supplied total adult labour force that can be drawn from the worker households. If I is the income earned by the workers and w denotes the wages of the adult workers, their income is:

$$I = w\bar{L} \quad (1)$$

Since we are presently going to work with a model of a small open economy, the adult wage is a function of the terms of trade, which is given exogenously.⁴ There are two possible scenarios that may occur in this circumstance:

Scenario A: $I \geq I^N$, which implies that the income required to meet the basic needs of the workers is greater than or equal to the income earned in the market. In this case, worker households will not send their children to work.

Scenario B: $I < I^N$, which implies that the income required to meet the basic needs of the households is not met. In this case, some households will choose to send their children to work. We assume that there are enough jobs to employ the children.

In Scenario B above, let w^c represent the wages paid to child workers and L^c be the amount of child labour used in the economy. Our first task is to determine the magnitude of L^c . In order to do so, it seems reasonable to suppose that if the actual adult aggregate income from labour, I , falls short of the needs-based threshold level, I^N , the income from child labour makes up for the difference so that total income reaches the threshold level. That is:

$$w^c L^c = I^N - I = I^N - w\bar{L} \quad \text{when } w\bar{L} < I^N \quad (2)$$

It is evident that $L^c = 0$ when $w\bar{L} \geq I^N$ as child labour cannot be negative.

³We make this assumption for convenience. See Section 4 for a discussion on how to generalize this idea when labour can own some capital as well; for example, a poor farmer may own a plough.

⁴We assume that there are no wage rigidities; consequently, our model has full employment of adult workers.

We make the small open economy assumption, so the exogenous terms of trade determines w . The wages of children are assumed to be less than those of the adult workers; that is, $w^c = \alpha w$, $0 < \alpha \leq 1$, where, in the tradition of distortion theory (Bhagwati, 1971; Haberler, 1950) α is an exogenous parameter as our focus is not on developing a theory of wage determination. Essentially, α reflects the degree to which children can be under-paid (that is, exploited) relative to adult workers. Substituting $w^c = \alpha w$ in Equation (2) and rearranging, we get that:

$$L^c = \begin{cases} \frac{I^N - w\bar{L}}{\alpha w} = \frac{I^N}{\alpha w} - \frac{\bar{L}}{\alpha}, & I^N - w\bar{L} > 0 \\ 0, & I^N - w\bar{L} \leq 0 \end{cases} \quad (3)$$

For given I^N, \bar{L}, α and w , Equation (3) specifies the magnitude of child labour, L^c , in the economy. It is clear that child labour, when it occurs, is falling in w and increasing in I^N .

Having discussed a method of determining child labour, we now construct a two-sector general equilibrium model of a small open economy. To demonstrate our main result, we keep our model as simple as possible. Two commodities X_1 and X_2 are produced in the economy.⁵ These are produced with neoclassical production functions given below:

$$X_1 = F_1(K_1, L_1 + L^c) \quad (4)$$

$$X_2 = F_2(K_2, L_2) \quad (5)$$

where the terms K_i and L_i , $i \in \{1, 2\}$ denote, respectively, the allocation of capital and labour to sectors 1 and 2. The term L^c is the amount of child labour used in the production of X_1 .⁶ We note that only Sector 1 uses child labour in our model, while adult labour and capital are mobile between sectors.⁷ We further assume that X_1 is the exportable good and that X_2 is importable. Sector 2 (the import sector) is assumed to be capital intensive in what follows.

From profit maximization and the assumption of an interior solution, the following unit cost equations follow:

$$(\alpha a_{L1}^c + a_{L1})w + a_{K1}r = 1 \quad (6)$$

$$a_{L2}w + a_{K2}r = P \quad (7)$$

⁵We use X_1 and X_2 to denote both the commodity and the quantity of output produced.

⁶Equation (4) assumes that adult and child labour are perfect substitutes. More generally, one can assume a production function in Sector 1 of the form $X_1 = F_1(K_1, L_1 + \beta L^c)$. As outlined in Hazari and Mohan (2021), this is particularly useful in capturing situations when children work less intensively than adults ($\beta < 1$) or when children work longer or harder than adults ($\beta > 1$).

⁷Adding child labour in Sector 2 does not alter the main thrust of the arguments presented in this paper; it does, however, add to the complexity of the modelling and is therefore omitted here. The presence of child labour in global supply chains remains a significant problem (ILO, OECD, IOM and UNICEF, 2019), and allowing for the export sector to have child labour is sufficient from a modelling perspective to highlight this fact.

where the a_{ij} 's are variable input coefficients, w is the wage rate, and r is the rental on capital. The term P denotes the terms-of-trade, that is, the relative price of the importables. The price of X_1 has been taken as the numeraire. It is assumed that all factor prices are flexible and that the economy is in full employment, so that:

$$a_{L1}^c X_1 = L^c \quad (8)$$

$$a_{L1} X_1 + a_{L2} X_2 = \bar{L} \quad (9)$$

$$a_{K1} X_1 + a_{K2} X_2 = \bar{K} \quad (10)$$

Recall from our earlier discussion that L^c is determined endogenously. The terms \bar{L} and \bar{K} represent the inelastic supplies of adult labour and capital.

The strictly concave utility function for the economy as whole is given by:

$$U = U(D_1, D_2) \quad (11)$$

where D_1 and D_2 represent the demand for X_1 and X_2 , and include the consumption of the children.⁸ In other words, these may be treated as household demand functions. Utility maximization implies that:

$$\frac{U_1}{U_2} = P \quad (12)$$

Here U_i , $i \in \{1, 2\}$, denotes the marginal utility of consumption. In equilibrium we require that:

$$D_1 = X_1 - E_1 \quad (13)$$

$$D_2 = X_2 + M_2 \quad (14)$$

where E_1 denotes the exports of X_1 and M_2 denotes the imports of X_2 . Balance of payments equilibrium implies that:

$$E_1 = PM_2 \quad (15)$$

3. Results

Equations (1) to (15) specify an equilibrium for the economy. We focus our attention on Scenario B above, where child labour is present. The box diagram in **Figure 1** shows, in its horizontal axis, both the inelastic supply of adult labour and of the endogenously determined child labour.

The amount of child labour is given by the distance O_1L^c and $L^c\bar{L}$ is the adult labour. The isoquant $x_c x_c$ shows the amount of X_1 produced by using child labour and capital, while $x_1 x_1$ shows the output produced using adult labour and capital. The isoquant $x_2 x_2$ shows the equilibrium output of X_2 . The slopes of the lines AB and $A'B'$ show the equilibrium wage-rental ratios. We note that AB is steeper than $A'B'$ as child labour earns less than adults due to the assumption that $\alpha < 1$.

⁸This utility function implicitly assumes that households are neutral towards consuming the good produced using child labour. However, it is quite possible that society develops some distaste towards consuming the good produced using child labour. We delve into this briefly in Section 4.

With child labour, the output of X_1 produced by the children is shown by OX_1^c . This is a fixed amount and is associated with isoquant $x_c x_c$. Child labour enhances the production capacity of the whole economy, and the PPC shifts to $T_1 T_1$. In trade theory there are no other instances that we are aware of where PPC shifts occur as a consequence of parametric changes in a price variable; PPC shifts normally occur due to quantity movements. In our context, the price movements cause a shift in the PPC due to an endogenous change in child labour. The production equilibrium is at E_1 and the consumption equilibrium at C_1 , which yields welfare U_1 . Ignoring the ethics of child labour, the enhanced production capabilities benefit adults and allow households to reach threshold income levels. Moreover, the volume of trade increases.

We now present the important insights we can draw from this model. Suppose we impose a tariff. In the standard trade model, a tariff alters the production and consumption equilibrium along a given production possibility curve. In our model, on the other hand, the imposition of the tariff shifts the production possibility curve as well. This is because a tariff on X_2 (the capital intensive good) raises the rental on capital and lowers the adult wage rate, following the Stolper-Samuelson theorem. This lowering of wage rate makes it harder for the workers to meet their basic needs. Therefore, the supply of child labour in the economy goes up.

The magnitude of the shift in the PPC depends on the sensitivity of child labour supply to the lowered income. **Figure 3** and **Figure 4** present two contrasting situations, both of which involve $DRS = DRT \neq FRT$.

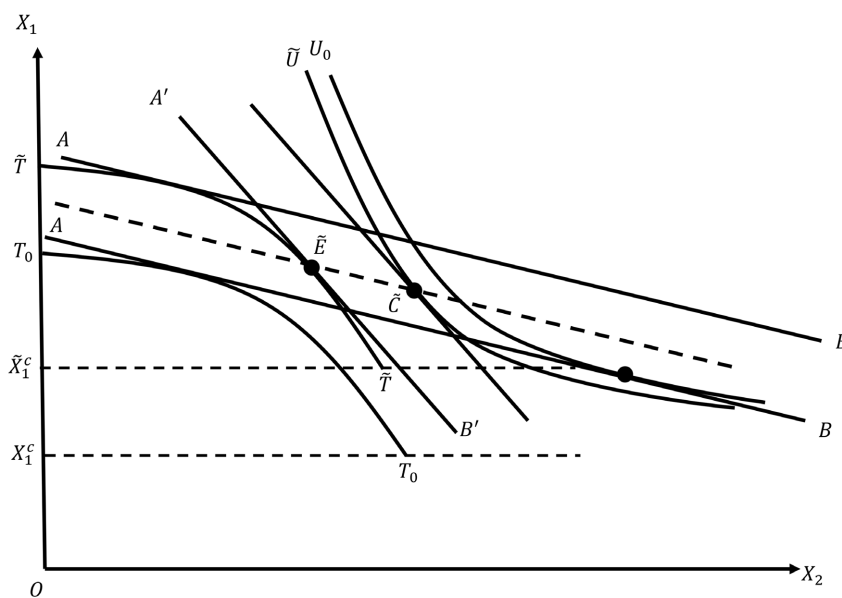


Figure 3. Welfare loss from tariff.

Starting from an initial (pre-tariff) PPC T_0T_0 , in **Figure 3** we show how an imposition of a tariff shifts the PPC to $\tilde{T}\tilde{T}$ as the supply of child labour increases

from OX_1^c to $O\tilde{X}_1^c$. The terms of trade are shown by the slope of AB and the tariff inclusive price by the slope of $A'B'$. The post-tariff production occurs at point \tilde{E} and consumption at \tilde{C} . Given the increase in child labour and the magnitude of the shifts involved, it is evident that the welfare level of the economy has fallen from U_0 to \tilde{U} .

In **Figure 4**, we show a relative larger increase in the supply of child labour from OX_1^c to $O\hat{X}_1^c$ following a tariff, which results in the PPC shifting from T_0T_0 to $\hat{T}\hat{T}$. The post-tariff production and consumption at \hat{E} and \hat{C} result in a post-tariff increase in welfare from U_0 to \hat{U} .⁹

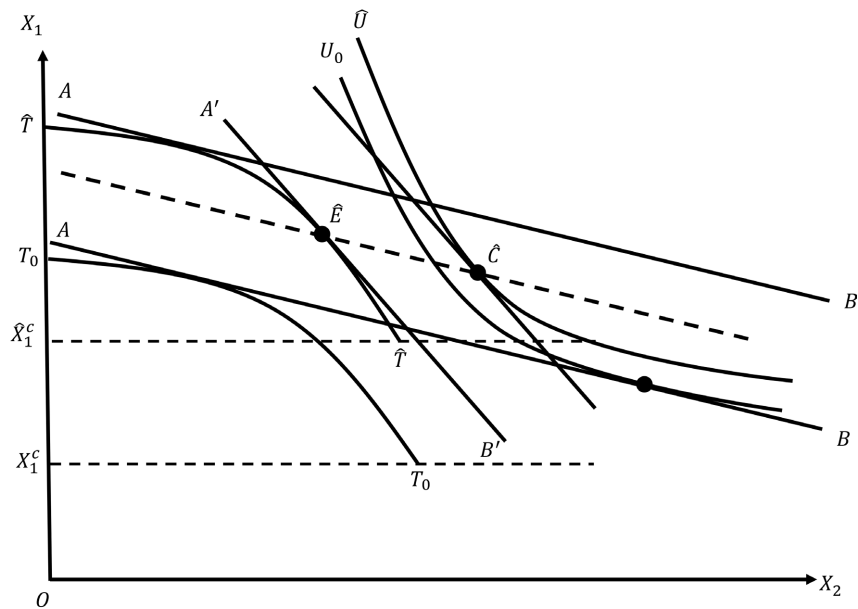


Figure 4. Welfare gain from tariff.

4. Discussion and Conclusions

One of the trends that emerges as a result of the global financial crisis, trade problems between China and the US, and the recent COVID pandemic is that countries are looking inward to reduce reliance on foreign sources of certain commodities. This is causing a re-emergence of import substitution, a policy that has failed to serve the needs of developing countries in the past. While it is tempting to impose to reduce reliance on foreign country imports in an environment when global supply chains are faltering, trade theory has some caveats to offer in terms of the impact this can have on the magnitude of child labour. Specifically, welfare can indeed improve as a consequence of tariffs even in a small open economy; however, this welfare improvement is the result of more children working. Capitalists gain and both the workers and children lose in this framework. In as much as countries such as India, have made conscious efforts to reduce child labour in the past, import substitution can reverse gains made in this area. The main policy im-

⁹We note that in both **Figure 3** and **Figure 4**, tariffs lower aggregate welfare relative to the zero-tariff equilibrium with child labour present.

plication of this paper, therefore, is that governments of developing need to factor this into account when designing policies to protect domestic industries from imports.

Our paper made a number of simplifying assumptions to keep the diagrammatic analysis simple. First, we assumed that households were endowed with either capital or labour, but not both. This can be generalized by supposing that some households that own labour also own some capital. To make things interesting, suppose this magnitude of capital possessed by such households is still small and constitutes a fraction δ of the total capital stock, \bar{K} . In this case, Equations (1) and (2) can be modified to:

$$I = w\bar{L} + r\delta\bar{K} \quad (16)$$

$$w^c L^c = I^N - I = I^N - w\bar{L} - r\delta\bar{K} \quad (17)$$

Assuming that $I^N - w\bar{L} - r\delta\bar{K} > 0$, we get the counterpart of the child labour supply in Equation (3):

$$L^c = \frac{I^N}{\alpha w} - \frac{\bar{L}}{\alpha} - \frac{r\delta\bar{K}}{\alpha w} \quad (18)$$

As before, given that $I^N - w\bar{L} - r\delta\bar{K} > 0$, a rise in α and w will both reduce the supply of child labour. Moreover, as expected, an increase in r, δ or \bar{K} will also reduce the supply of child labour. Thus, allowing households that subsist on labour to also own some capital does not alter the main thrust of our paper, though it does reduce the magnitude of child labour, all else being the same. While we do not attempt this here, an interesting exercise to extend our model would be to see how labour growth and capital accumulation affect the relative welfare of capitalist and labour households, both in the main model and the extension here, when a government pursues import substitution.

A second assumption we made was that in Equation (12) households are neutral towards the ethics of consuming products made with child labour. This contrasts with the labour standards literature such as Maskus (1997), which assumes that foreigners have distaste for child labour and impose tariffs to discourage it. It is reasonable to suppose that domestic residents may also take such a stance driven by the ethics of child labour. This is readily incorporated in our paper by incorporating a “distaste” factor $\phi \in (0, 1)$, such that the utility function in (12) transforms to:

$$U = U((1-\phi)D_1, D_2) \quad (19)$$

Here, the higher the level of distaste, ϕ , the lower the utility derived from any level of consumption, D_1 , of the good produced using child labour. While intuition suggests that this will reduce child labour, it is nevertheless interesting to see how import substitution and exogenous changes in terms of trade interplay with the distaste for child labour to affect the relative welfare of different sections of society. This is especially true since it is likely that only households that do not send their children out for work can afford to curtail consumption of one good,

while households on the threshold of subsistence may have ethical issues as well, but may have no means to express them. Modelling this requires moving away from representative agent models, and disaggregating households not only from the production side based on their ownership of factors of production but also on the consumption side based on their approach to child labour. We leave such extensions for future research.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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