A Static Version of "The Macroeconomics of Child Labor Regulation"

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1 Introduction

In Doepke and Zilibotti (2005), we present an analysis of the political economy of child labor legislation within a dynamic framework that endogenizes skill premia as well as fertility and education decisions. In this note, we illustrate the main tradeoffs that arise in the full model within a simplified static environment.

2 Who Gains from Banning Child Labor?

Beginning from the middle of the nineteenth century, an increasing number of countries have passed legislation which bans the formal employment of children. However, while child labor bans are now near-universal in industrial countries, in many developing countries child labor continues to be widespread. Child labor is often particularly popular among poorer families who depend on the additional income. In these countries, public support for introducing restrictions is low.

What explains diverging attitudes to child labor and persistent policy differences across countries? In this section, we analyze this question from an economic perspective. In the analysis, the group that stands to gain most from banning child

labor consists of unskilled adult workers. To the extent that these workers compete with children in the labor market, by banning child labor they can reduce competition and potentially raise their own wages. However, the situation is complicated by the fact that the same workers may also have working children themselves, so that the potential wage gains have to be traded off against the loss of child-labor income. A family's fertility and education choices therefore also matter.

To analyze these tradeoffs more formally, consider an economy with N_S skilled and N_U unskilled workers. We start under the assumption that each worker has n children, but only the children of the unskilled workers are working. This is consistent with the observation that child labor is generally more prevalent among poorer families, whereas richer, more highly educated families tend to send their children to school rather than to work. The production technology is:

$$Y = AX_S^{\alpha} X_U^{1-\alpha},$$

where X_S is skilled labor and X_U is unskilled labor. Each working child supplies λ units of unskilled labor, where $\lambda < 1$, reflecting that children are less productive than adult workers. If child labor is legal (the *laissez faire* policy), Labor supply is given by:

$$\begin{aligned} X_S^{\text{laissez faire}} &= N_S, \\ X_U^{\text{laissez faire}} &= N_U + \lambda n N_U, \end{aligned}$$

and under the assumption of competitive production wages are given by:

$$\begin{aligned} w_S^{\text{laissez faire}} &= A\alpha \left(\frac{(1+\lambda n)N_U}{N_S} \right)^{1-\alpha}, \\ w_U^{\text{laissez faire}} &= A(1-\alpha) \left(\frac{N_S}{(1+\lambda n)N_U} \right)^{\alpha}. \end{aligned}$$

Workers seek to maximize their total income (i.e., consumption). Adding adult

and child-labor income, total income for the two types of workers is given by:

$$I_S^{\text{laissez faire}} = w_S = A\alpha \left(\frac{(1+\lambda n)N_U}{N_S} \right)^{1-\alpha},$$
$$I_U^{\text{laissez faire}} = (1+\lambda n)w_U = (1+\lambda n)^{1-\alpha} A(1-\alpha) \left(\frac{N_S}{N_U} \right)^{\alpha}.$$

Let us now see who would gain or lose if child labor were to be banned. Under a child labor ban, no children are working, so that labor supply is simply $X_S^{\text{Ban}} = N_S$ and $X_U^{\text{Ban}} = N_U$, and wages are:

$$w_S^{\text{Ban}} = A\alpha \left(\frac{N_U}{N_S} \right)^{1-\alpha},$$
$$w_U^{\text{Ban}} = A(1-\alpha) \left(\frac{N_S}{N_U} \right)^{\alpha}.$$

The ratios of wages under the two policies are:

$$\frac{w_S^{\text{Ban}}}{w_S^{\text{laissez faire}}} = \left(\frac{1}{1+\lambda n} \right)^{1-\alpha} < 1,$$
$$\frac{w_U^{\text{Ban}}}{w_U^{\text{laissez faire}}} = (1+\lambda n)^{\alpha} > 1.$$

Thus, the skilled wage falls and the unskilled wage increases. This happens because child labor is a substitute for unskilled but a complement for skilled adult labor. The result suggests that unskilled workers may be in favor of banning child labor. However, this is no longer clear when we look at what happens to total income:

$$I_S^{\text{Ban}} = w_S^{\text{Ban}} = A\alpha \left(\frac{N_U}{N_S} \right)^{1-\alpha},$$
$$I_U^{\text{Ban}} = w_U^{\text{Ban}} = A(1-\alpha) \left(\frac{N_S}{N_U} \right)^{\alpha}.$$

The income ratios are:

$$\frac{I_S^{\text{Ban}}}{I_S^{\text{laissez faire}}} = \left(\frac{1}{1+\lambda n}\right)^{1-\alpha} < 1,$$
$$\frac{I_U^{\text{Ban}}}{I_U^{\text{laissez faire}}} = \left(\frac{1}{1+\lambda n}\right)^{1-\alpha} < 1.$$

We see that in fact income falls for both groups, including the unskilled. The reason is that the unskilled workers' gain in terms of higher wages is more than offset by the loss of child labor income. Intuitively, the loss of child labor income is proportional to the total reduction in the supply of unskilled labor, whereas the increase in the unskilled wage is less-than-proportional with the decline in labor supply.

The analysis suggests that in a country where unskilled workers children are working as well, public support for introducing child-labor restrictions should be low. The support for child labor restrictions should rise, however, if there is a group of unskilled workers whose children are not working (say, because they send their children to school). Assume that fraction s of unskilled workers send their children to school, while only fraction $(1-s)$ has working children. The wages then become:

$$w_S^{\text{laissez faire}} = A\alpha\left(\frac{(1+\lambda(1-s)n)N_U}{N_S}\right)^{1-\alpha},$$
$$w_U^{\text{laissez faire}} = A(1-\alpha)\left(\frac{N_S}{(1+\lambda(1-s)n)N_U}\right)^{\alpha}$$

Income is now given by:

$$I_S^{\text{laissez faire}} = w_S = A\alpha\left(\frac{(1+\lambda(1-s)n)N_U}{N_S}\right)^{1-\alpha},$$
$$I_U^{\text{laissez faire}}(\text{Working Children}) = (1+\lambda n)w_U = (1+\lambda n)A(1-\alpha)\left(\frac{N_S}{(1+\lambda(1-s)n)N_U}\right)^{\alpha},$$
$$I_U^{\text{laissez faire}}(\text{Children in School}) = w_U = A(1-\alpha)\left(\frac{N_S}{(1+\lambda(1-s)n)N_U}\right)^{\alpha}.$$

If child labor is now banned, incomes are:

$$I_S^{\text{Ban}} = w_S^{\text{Ban}} = A\alpha \left(\frac{N_U}{N_S}\right)^{1-\alpha},$$

$$I_U^{\text{Ban}}(\text{Working Children}) = I_U^{\text{Ban}}(\text{Children in School}) = A(1-\alpha)\left(\frac{N_S}{N_U}\right)^{\alpha}.$$

Thus, for the unskilled workers with children in school the situation unambiguously improves. This result explains why child-labor reform tends to happen in times where child labor is already declining for other reasons, such as an increased demand for human capital and a higher propensity to send children to school among unskilled workers. It is unskilled workers who do not depend on child labor themselves who should be the strongest advocates of reform.

3 Endogenous Fertility and Persistence of Child-Labor Policies

So far, we have focused on the case of a country in which child labor is initially legal. Our results show that as long as child labor is widespread among unskilled workers, support for introducing a child-labor ban will remain low. In cross-country data, we observe that differences in child-labor regulations are highly persistent over time, which suggests the existence of a status-quo bias. To examine whether such a bias can arise in our model, let us now consider the opposite situation of a country where a child labor ban is already in place. Are there any reasons why people might be more supportive of banning child labor if a child labor ban is already in place? As we will see, a status-quo bias can indeed arise in our theory, but only if fertility decisions are endogenous and depend on the current political regime.

We would like to find conditions under which the electorate would be willing to abandon an already existing child-labor ban. Consider first the case where fertility is independent of the policy, i.e., every household continues to have n children as before. In this case, the tradeoff that arises from abandoning an existing ban is exactly the reverse of the tradeoff following from introducing a ban described above. In particular, if all unskilled households would actually send their children to work once the ban is abandoned, they would stand to gain from

introducing child labor and abandoning the ban. In other words, the preferred policy is independent of the current policy, and a status-quo bias does not arise.

The situation is different, however, if the number of children depends on the current state of the law. It is a common observation that parents face a quantity quality tradeoff in their decisions on children: Parents who invest a lot in their children in terms of education etc. tend to have fewer children than parents who send their children to work. We would therefore expect that once a child labor ban is in place (which effectively makes children more expensive), fertility would be lower. For concreteness, assume that fraction o of unskilled workers has already chosen fertility under the assumption that the child-labor ban will stay in place, and that their fertility rate is $n^{\text{Ban}} < n$. The remaining families choose their family size later; in particular, if the ban is abandoned, they will optimally choose the larger fertility size n to maximize child labor income. What are now the relevant tradeoffs? As above, in the presence of a ban workers' incomes are $I_S^{\text{Ban}} = A\alpha \left(N_U/N_S\right)^{1-\alpha}$ and $I_U^{\text{Ban}} = A(1-\alpha)\left(N_S/N_U\right)^{\alpha}$, respectively. If the ban is now abandoned, income is:

$$I_S^{\text{laissez faire}} = A\alpha \left(\frac{(1+\lambda(on^{\text{Ban}} + (1-o)n))N_U}{N_S} \right)^{1-\alpha},$$

for the skilled,

$$I_U^{\text{laissez faire}}(old) = (1+\lambda n^{\text{Ban}})A(1-\alpha) \left(\frac{N_S}{(1+\lambda(on^{\text{Ban}} + (1-o)n))N_U} \right)^{\alpha},$$

for the "old" unskilled with small families, and:

$$I_U^{\text{laissez faire}}(young) = (1+\lambda n)A(1-\alpha) \left(\frac{N_S}{(1+\lambda(on^{\text{Ban}} + (1-o)n))N_U} \right)^{\alpha},$$

for the "young" unskilled with larger families. Comparing incomes, we can see that the old unskilled can now lose from the introduction of child labor. Their income ratio is:

$$\frac{I_U^{\text{laissez faire}}(old)}{I_U^{\text{Ban}}(old)} = \frac{(1+\lambda n^{\text{Ban}})}{(1+\lambda(on^{\text{Ban}} + (1-o)n))^{\alpha}},$$

which is smaller than one if n^{Ban} is sufficiently small relative to n. These families made their low fertility choice under the assumption that child labor would not be an option. Given that they cannot change fertility ex post, they have little to gain from making their own children work, but lose from the lower wages due to other families' children entering the labor force.

This mechanism induces policy persistence: Once a ban is in place, families start to make decisions which in the future increase political support for maintaining the ban. This mechanism can explain why differences in child labor and its regulations can be highly persistent across countries. In particular, the theory predicts that some countries can get locked into steady state equilibria featuring high fertility, high incidence of child labor, and little political support for the introduction of child labor regulation. In contrast, other countries with otherwise identical economic fundamentals, have low fertility, no child labor, and widespread support for the ban of child labor.

Consistent with these predictions, we observe large cross-country differences in child labor rates, even among today's developing countries that are at similar levels of income per capita. The theory also predicts a positive correlation between fertility and child labor rates, even after controlling for other variables that might affect child labor or fertility. Doepke and Zilibotti (2005) test this prediction using an international panel of 125 countries from 1960 to 1990. They regress child labor rates on fertility rates, controlling for time dummies, GDP per capita, the Gini coefficient, and the share of agriculture in employment (arguably an independent factor affecting child labor), and find a positive and highly significant coefficient on the fertility rate, implying that a one standard deviation increase in fertility is associated with an increase in the child labor rate of 2.5 percentage points. The results are robust to the inclusion of country fixed-effects.

4 Conclusion

The preceding analysis shows that the key feature of the political economy of child-labor regulation is that the group that most stands to gain from banning child labor (unskilled workers) at the same time is often economically invested in child labor (because their own children are working). This observation leads

to an explanation of why child labor was banned only after an increasing share of parents send their children to school instead of work, and why differences in child labor and child-labor regulation across countries can be highly persistent over time. In Doepke and Zilibotti (2005), we present a richer analysis of these issues in a framework with endogenous fertility and education decisions, an endogenous skill premium, and dynamic voting. A discussion of the welfare implications of banning child labor is contained in Doepke and Krueger (2006).

References

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