The Macroeconomics of Child Labor Regulation

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- Historically, child labor was widespread in all countries.

- Today, all industrialized countries have child labor restrictions (CLR).

- In developing countries, large cross-country differences in CLR and the incidence of child labor.

- Aim of paper: Positive theory of CLR.
Income versus Child Labor:

![Scatter plot showing the relationship between GDP per capita and child labor rate. The x-axis represents GDP per capita, ranging from 1000 to 10000, and the y-axis represents the child labor rate, ranging from 0 to 60. The data points form a downward trend, indicating a negative correlation between economic development and child labor.](image-url)
Who Gains from Ruling Out Child Labor?

- People owning factors complementary to child labor lose when CLR are introduced.
- Workers competing with children in labor market may gain from CLR . . .
- . . . but only if they do not rely on child labor themselves.
- Family size and education decisions therefore also matter.
Our Approach and Key Results:

- Model with conflict of interest along two margins:
  - Skilled vs. unskilled workers (complementarity with child labor).
  - Families with few vs. many children (potential child labor income).

- Interaction of fertility choice and political preferences leads to multiple steady states.

- Introduction of CLR can be triggered by technological change.
The Model

Demographic Structure:

• Overlapping generations, children and adults.
• Young adults choose family size.
• Constant probability of death $\lambda$ for adults.
• Children become adult when parents die.
Parental Decisions:

- Two family sizes: \( G > P \).
- Parents decide on education \( e \in \{0, 1\} \).
  Alternative is child labor.
- Two skill types: \( S \) and \( U \).
- \( \pi_0 \): Probability for working child to become skilled.
- \( \pi_1 > \pi_0 \): Probability for educated child to become skilled.
- Child labor supply \( l \). Children are unskilled.
Preferences:

- Utility of an adult with $n$ children and skill $h$:

\[
V_{nh} = \max_{e \in \{0,1\}} \left\{ u(c) + \lambda \beta \left( \pi_e V'_S + (1 - \pi_e) V'_U \right) \right\} \\
\quad + (1 - \lambda) \beta V'_{nh}
\]

such that:

\[
c + p n e \leq w_h + (1 - e) n l w_U
\]

\[
V'_h = \max_{n \in \{G,P\}} V'_{nh}
\]
Technology:

- $Y = F(X_S, X_U)$
- Constant returns to scale.
- Diminishing marginal products.
- Implication: Unskilled wage decreasing in $X_U$. 
Unique Steady States with Fixed Policy

- Policy is represented by child labor supply $l$.
- Assume that policy is fixed.
- Under a simple condition, unique steady state exists.
Steady States with Endogenous Policy

Steady-State Political Equilibrium (SSPE):

- Two policy options: Child-labor ban and compulsory education, or no restriction.
- Given policy, all steady-state conditions have to be satisfied.
- Decisive group has to prefer current policy to switch to the alternative.
- Skilled always oppose CLR; assume that unskilled are politically decisive.
Why “No CLR” is SSPE:

- Old unskilled have large families.
- If CLR are introduced, unskilled wage rises.
- But old unskilled lose income and face high education cost.
- If $G$ is large, old unskilled will oppose switch.
Why “CLR” is SSPE:

- Old unskilled have small families.
- If CLR are abandoned, unskilled wage falls.
- Old unskilled lose own income and have little to gain.
- If $P$ is small, old unskilled will oppose switch.
Steady States in a Parameterized Economy:

- CRRA utility function:
  \[ u(c) = \frac{c^{1-\sigma} - 1}{1 - \sigma}. \]

- CES production function:
  \[ F(X_S, X_U) = \left[ \alpha X_S^\kappa + (1 - \alpha) X_U^\kappa \right]^{\frac{1}{\kappa}}. \]

- Model period is 6 years.

- Average adult life span is 40 years.
## Parameter Values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>0.8</td>
</tr>
<tr>
<td>$z$</td>
<td>1</td>
</tr>
<tr>
<td>$\sigma$</td>
<td>0.5</td>
</tr>
<tr>
<td>$\lambda$</td>
<td>0.15</td>
</tr>
<tr>
<td>$P$</td>
<td>1</td>
</tr>
<tr>
<td>$G$</td>
<td>3</td>
</tr>
<tr>
<td>$\pi_0$</td>
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</tr>
<tr>
<td>$\pi_1$</td>
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</tr>
<tr>
<td>$p$</td>
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</tr>
<tr>
<td>$l$</td>
<td>0.1</td>
</tr>
<tr>
<td>$\kappa$</td>
<td>0.5</td>
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</table>
SSPE as a Function of $\alpha$: 

![Graph showing SSPE as a function of alpha with two lines: one for CLR and one for No CLR.](image)
The Introduction of CLR

• Policy switch can arise if the wage premium rises over time.

• Rising skill premium induces young unskilled to choose small families even before CLR are introduced.

• Rising number of small families leads to support for CLR and ultimately causes a policy switch.
Child Labor Restrictions in the U.K.:

- 1833: Minimum age 9 in textile industry.
- 1842: Minimum age 10 in mining.
- 1874: Minimum age 10 in textiles.
- 1880: Compulsory schooling.
- 1893: Minimum age 12.
Pay Ratios in U.K.:
The Experiment:

- An increase in the weight of skilled labor in the production function.

- Starting point: Match wage ratio of 2.5 in steady state without CLR.

- Endpoint: Match wage ratio of 2.5 in steady state with CLR.
$\alpha$ over time
Wage Premium and Population Growth with Endogenous Policy:

Wage Premium

Population Growth
Fraction of Children Working
Wage Premium and Child Labor with Fixed Policy (No CLR):

**Wage Premium**

**Fraction of Children Working**
Implications:

• Introduction of CLR and compulsory schooling is accompanied by fertility decline.

• Child labor falls before CLR are introduced.

• Support for CLR rises after they are introduced.
Did the Working Class have the Power to Abolish CLR?

- Labor unions had political power even before franchise extension.

- In addition, conflict between labor and capital may have been diminished by skill-biased technological change.

- Example: Technology with skilled labor, unskilled labor, and capital:

\[
Y = K^\theta \left[ \alpha X_S^K + (1 - \alpha) X_U^K \right]^{\frac{1-\theta}{K}}.
\]
Effect of CLR on Capitalists:

Capitalists’ Income  Larger Skill Bias
Birth Rates in Europe:
Share of Agriculture in Europe:
## Birth Rates in U.S. States:

<table>
<thead>
<tr>
<th>CLR ...</th>
<th>1850</th>
<th>1900</th>
</tr>
</thead>
<tbody>
<tr>
<td>... adopted by 1900</td>
<td>35</td>
<td>26</td>
</tr>
<tr>
<td>... adopted after 1910</td>
<td>31</td>
<td>30</td>
</tr>
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</table>
Why Don’t All Countries Introduce CLR?

- Distribution of political power during period of increasing demand for human capital matters.

- International trade may lead to specialization in sectors intensive in unskilled labor.

- Other demographic changes interact with political choices.
Conclusions

- Economic theory of CLR can account for the main empirical patterns.
- Interaction of fertility choice and political preferences leads to lock-in effect.
- Increased demand for human capital can trigger fertility decline and introduction of regulation.
- Link between demographic and political change during development.
Fertility in U.K.:
Schooling in U.K.:
Child Labor in U.K.:
Computation of Political Equilibrium:

- Set exogenous time path for production parameters.
- Start in steady state.
- $T$ is an equilibrium switching time if:
  - Given that a switch is expected at $T$, a majority prefers the switch at $T$.
  - Given that a switch is expected at $T$, there is no majority in favor of a switch at $T - 1$. 
Child Labor and Fertility in the Data:

• In a child labor regression, fertility is highly significant even when controlling for GDP per capita and the share of agriculture.

• Cross-country differences in child labor are persistent:
  • Put countries into five bins according to child labor while controlling for GDP per capita and share of agriculture.
  • Computed average ten-year transition probabilities using data from 1960 to 1990.
• Transition matrix:

<table>
<thead>
<tr>
<th>Current Quintile</th>
<th>Quintile in Ten Years</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>High</td>
<td></td>
<td></td>
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<tr>
<td>High</td>
<td>0.80</td>
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<td>0.03</td>
<td>0.02</td>
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<tr>
<td></td>
<td>0.13</td>
<td>0.53</td>
<td>0.13</td>
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<td></td>
<td>0.05</td>
<td>0.17</td>
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<tr>
<td></td>
<td>0.02</td>
<td>0.15</td>
<td>0.32</td>
<td>0.38</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>0.04</td>
<td>0.17</td>
</tr>
</tbody>
</table>

• 1960-1990: 80% of highest group remains in two highest groups.