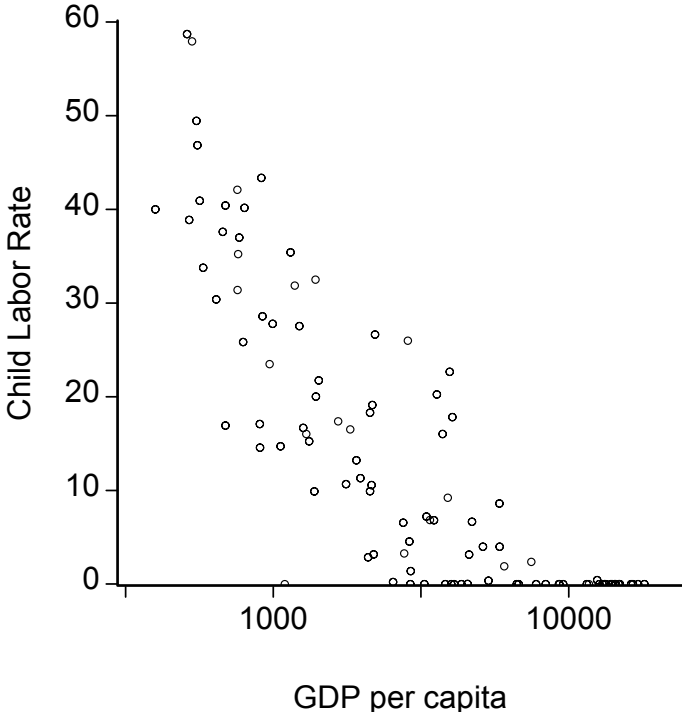


The Macroeconomics of Child Labor Regulation

Matthias Doepke and Fabrizio Zilibotti

- 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:



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 λ 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 .
- π_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 :

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

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:

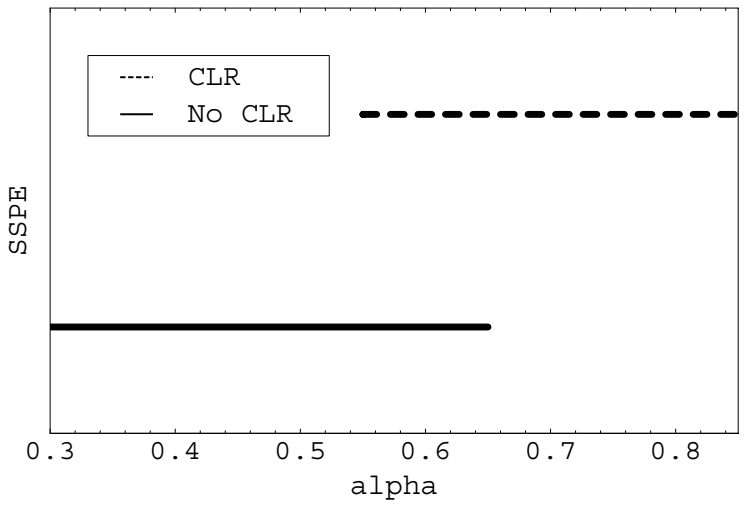
$$F(X_S, X_U) = [\alpha X_S^\kappa + (1 - \alpha) X_U^\kappa]^{\frac{1}{\kappa}}.$$

- Model period is 6 years.
- Average adult life span is 40 years.

Parameter Values:

Parameter	Value
β	0.8
z	1
σ	0.5
λ	0.15
P	1
G	3
π_0	0.05
π_1	0.4
p	0.015
l	0.1
κ	0.5

SSPE as a Function of α :



SSPE

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.:

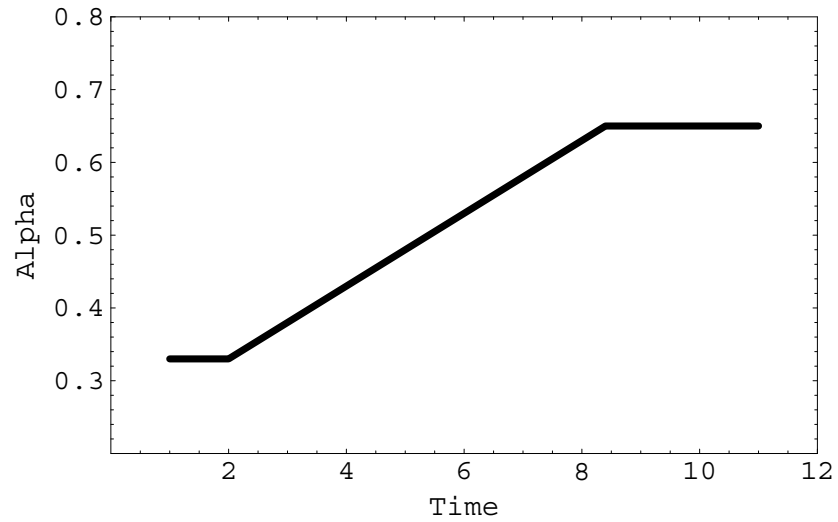
- 1833: Minimum age 9 in textile industry.
- 1842: Minimum age 10 in mining.
- 1874: Minimum age 10 in textiles.
- 1878: General minimum age of 10, Working-time restrictions for children 10-14.
- 1880: Compulsory schooling.
- 1893: Minimum age 12.

Pay Ratios in U.K.:



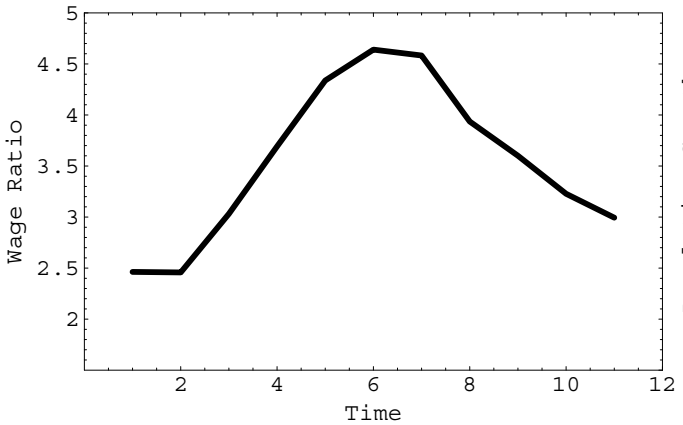
The Experiment:

- 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.

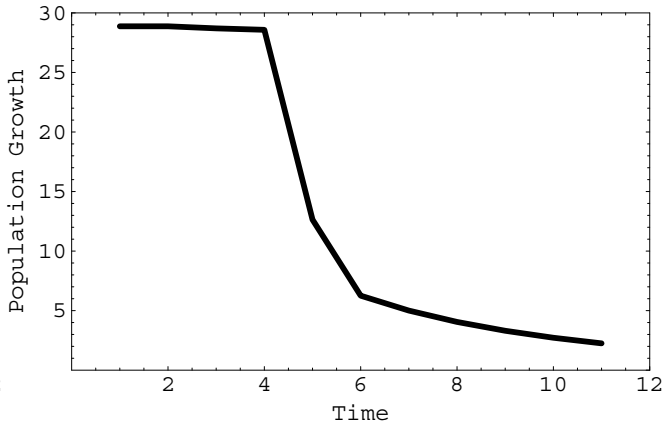


α over time

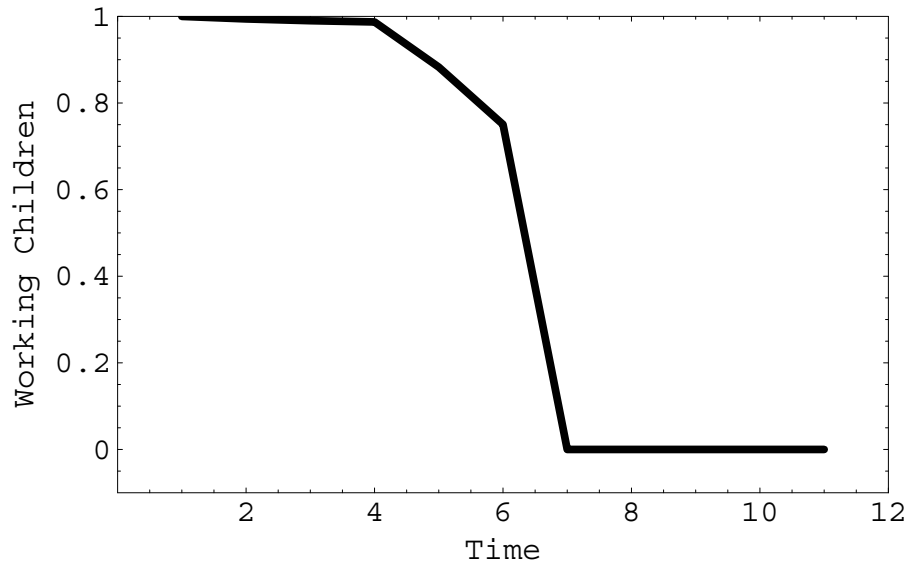
Wage Premium and Population Growth with Endogenous Policy:



Wage Premium

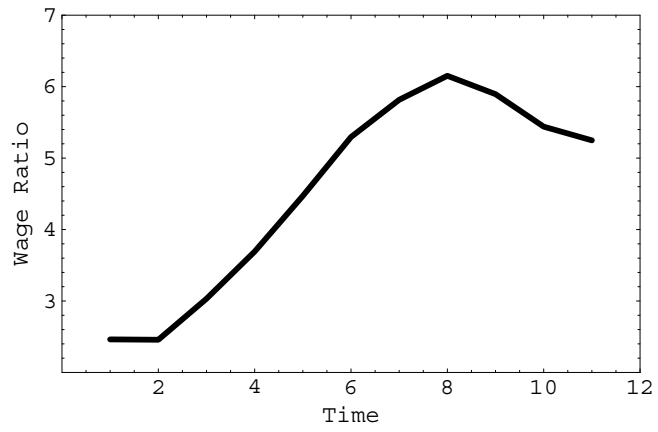


Population Growth

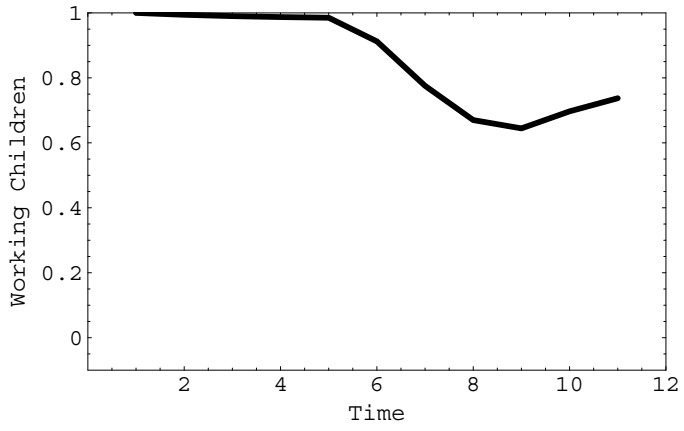


Fraction of Children Working

Wage Premium and Child Labor with Fixed Policy (No CLR):



Wage Premium



Fraction of Children Working

Implications:

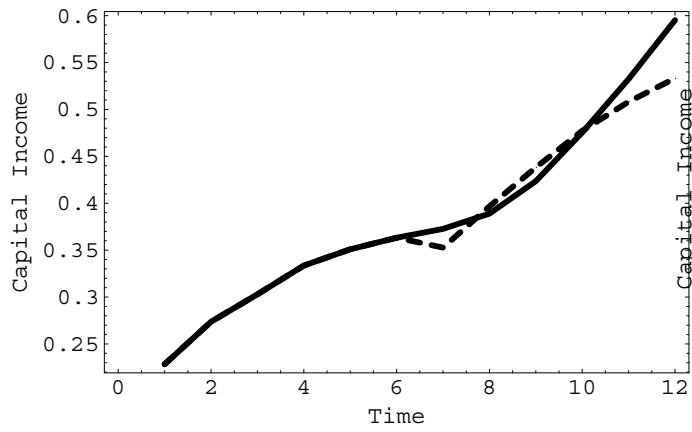
- Introduction of CLR and compulsory schooling is accompanied by fertility decline.
- Child labor falls before CLR are introduced.
- Support for CLR rises after they are introduced.

Did the Working Class have the Power to Abolish CLR?

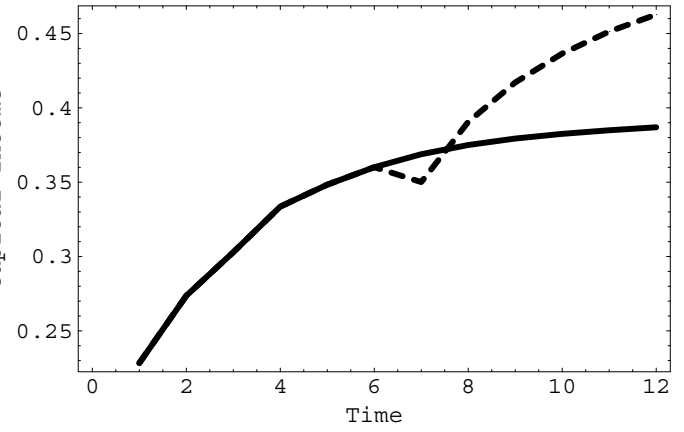
- Labor unions had political power even before franchise extension.
- In addition, conflict between labor and capital may have been diminished by skill-biased technological change.
- Example: Technology with skilled labor, unskilled labor, and capital:

$$Y = K^\theta [\alpha X_S^\kappa + (1 - \alpha) X_U^\kappa]^{\frac{1-\theta}{\kappa}} .$$

Effect of CLR on Capitalists:

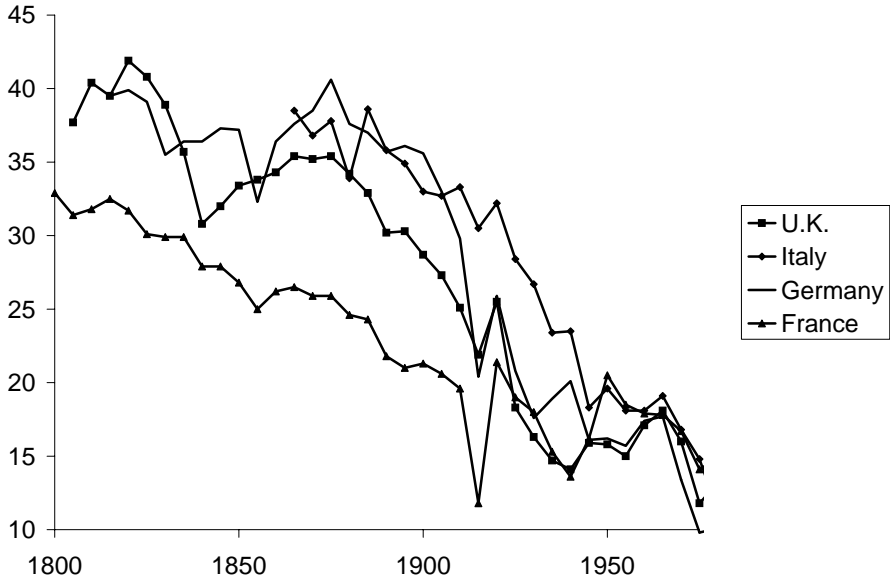


Capitalists' Income

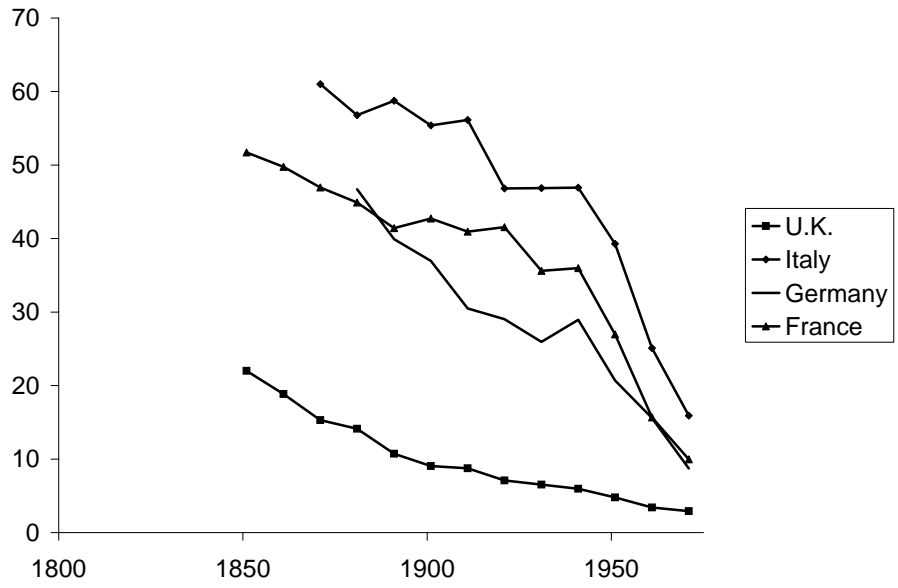


Larger Skill Bias

Birth Rates in Europe:



Share of Agriculture in Europe:



Birth Rates in U.S. States:

CLR ...	1850	1900
... adopted by 1900	35	26
... adopted after 1910	31	30

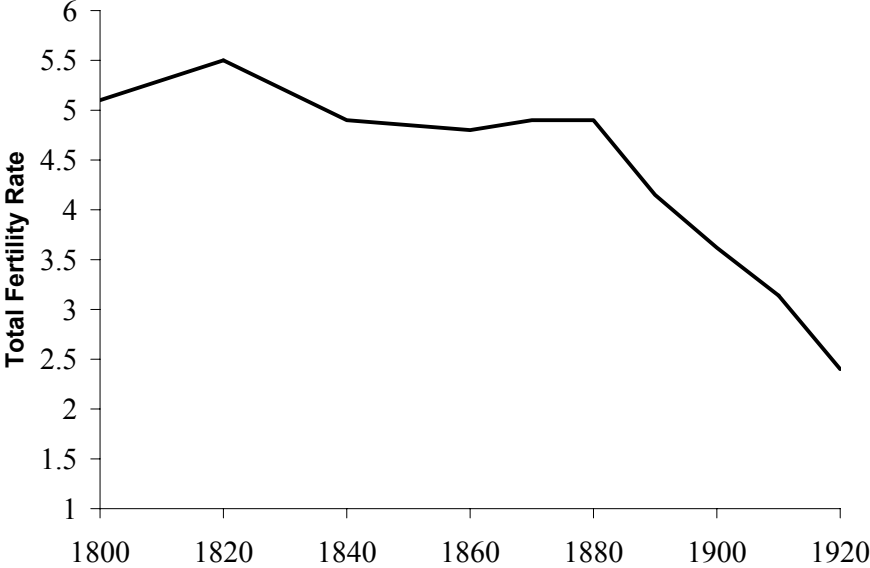
Why Don't All Countries Introduce CLR?

- 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.

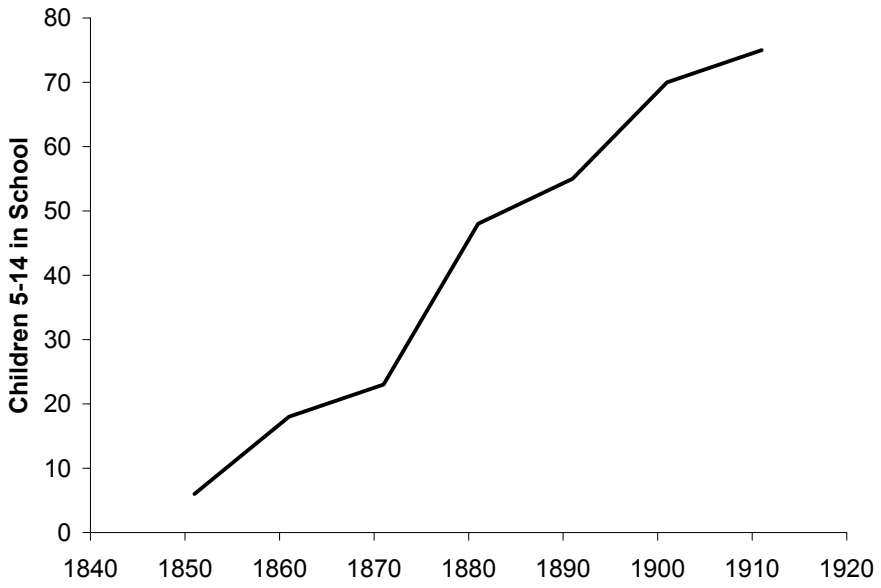
Conclusions

- 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.

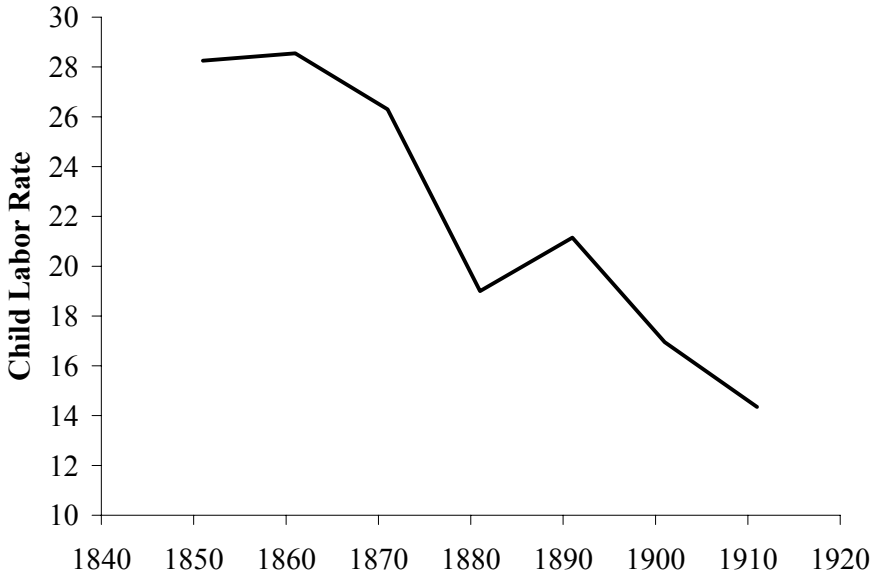
Fertility in U.K.:



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:

Current Quintile	Quintile in Ten Years				
	High		...		Low
High	0.80	0.15	0.03	0.02	0
	0.13	0.53	0.13	0.18	0.03
...	0.05	0.17	0.48	0.25	0.05
	0.02	0.15	0.32	0.38	0.13
Low	0	0	0.04	0.17	0.79

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