Were Compulsory Attendance And Child Labor Laws Effective?

An Analysis From 1915 To 1939

Adriana Lleras-Muney
BACKGROUND:

(1) In the early 20th century, secondary schooling increased.

(2) From 1915 to 1939, there were lots of changes in the laws such as Compulsory Attendance and Child Labor Laws.

(3) Need more research on the effect of such changes on education during this period.
CLAIM 1

Positive relationship between mandatory schooling and educational attainment.

CLAIM 2

The laws decreased educational inequality.

Question: Causal relationship?
CLAIM 3

The laws affected educational attainment, not vice versa.

How to prove this?

(1) OLS in both direction
(2) Distribution analysis
(3) Timing analysis
Were compulsory attendance and child labor laws effective?

**TERMS**

**Compulsory attendance laws** specified a minimum and a maximum age between which attendance was required.

**Child labor laws** prohibited children of young age from working.

**Continuation school laws** forced children at work to continue their education on a part-time basis.
Were compulsory attendance and child labor laws effective?

EXPLANATORY VARIABLES

Entrance Age
Dropout Age = Leaving age
Work Permit Age
Childlaw = Work Permit Age – Entrance Age
Comlaw = Dropout Age – Entrance Age

DEPENDENT VARIABLE: education
Were compulsory attendance and child labor laws effective?

DATA

1960 census data used for individuals.
   : 1% sample who were born between 1901 and 1925

Data describing 8 years of laws from various sources.

Data for state characteristics

Missing data usually imputed using linear interpolation.
Were compulsory attendance and child labor laws effective?

**ECONOMETRIC MODEL**

\[
ED_{ics} = \beta X_{ics} + \delta CL_{cs} + \mu Z_{cs} + \alpha_c + \gamma_s + R_{rc} + \varepsilon_{ics}
\]

*ED*: education
*X*: individual characteristics
*CL*: explanatory variables of interest
*Z*: state characteristics
*α*: cohort fixed effect
*γ*: state fixed effect
*R*: region and cohort fixed effect
Were compulsory attendance and child labor laws effective?

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFFECT OF COMPULSORY ATTENDANCE AND CHILD LABOR LAWS ON EDUCATION</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(3)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education laws:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance Age</td>
<td>−.048*</td>
<td></td>
<td>−.045*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td></td>
<td>(0.024)</td>
<td></td>
</tr>
<tr>
<td>Dropout Age</td>
<td></td>
<td></td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.015)</td>
<td></td>
</tr>
<tr>
<td>Comlaw</td>
<td>.008</td>
<td></td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td></td>
<td>(0.004)</td>
<td></td>
</tr>
<tr>
<td>Education to Dropout</td>
<td></td>
<td></td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.004)</td>
<td></td>
</tr>
<tr>
<td>Work Permit Age</td>
<td></td>
<td>.065*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.011)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childlaw</td>
<td>.051*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education to Work</td>
<td></td>
<td>.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuation School (= 1)</td>
<td>.047</td>
<td>.046</td>
<td>.024</td>
<td>.025</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.037)</td>
<td>(0.038)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.15</td>
<td>.1458</td>
<td>.1499</td>
<td>.146</td>
</tr>
<tr>
<td>$N$</td>
<td>478,591</td>
<td>475,049</td>
<td>478,591</td>
<td>475,366</td>
</tr>
<tr>
<td>$F$-statistic on laws</td>
<td>13.58*</td>
<td>9.92*</td>
<td>.4</td>
<td>1.24</td>
</tr>
</tbody>
</table>

* Significant at the 10% level.

* Significant at the 5% level.
<table>
<thead>
<tr>
<th></th>
<th>States with Laws Only</th>
<th>Eight Cohorts</th>
<th>Nonmovers</th>
<th>1950 Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childlaw</td>
<td>.062*</td>
<td>.048*</td>
<td>.042*</td>
<td>.046*</td>
</tr>
<tr>
<td></td>
<td>(.010)</td>
<td>(.017)</td>
<td>(.009)</td>
<td>(.014)</td>
</tr>
<tr>
<td>Continuation School (= 1)</td>
<td>.044</td>
<td>.083</td>
<td>.056</td>
<td>.058</td>
</tr>
<tr>
<td></td>
<td>(.037)</td>
<td>(.063)</td>
<td>(.036)</td>
<td>(.053)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.1458</td>
<td>.1569</td>
<td>.1576</td>
<td>.1538</td>
</tr>
<tr>
<td>$N$</td>
<td>475,049</td>
<td>151,553</td>
<td>306,299</td>
<td>152,270</td>
</tr>
<tr>
<td>$F$-statistic on laws</td>
<td>19.26*</td>
<td>4.69*</td>
<td>10.08*</td>
<td>6.18*</td>
</tr>
</tbody>
</table>

* Significant at the 5% level.

Second and third columns check measurement error effect.
EDUCATIONAL EQUALITY

A brief view: figure of distribution change

Regression result: When childlaw changed,
(1) 10th~50th percentiles changed significantly.
(2) 60th~80th ones did not.
(3) 90th percentile did.

Conclusion: The laws decreased educational inequality.
Were compulsory attendance and child labor laws effective?

Figure 2.—Distribution of education of 25 cohorts
CAUSALITY

1st method is OLS of reverse equation:

\[ CL_{cs} = \beta X_{ics} + \delta ED_{ics} + \mu Z_{cs} + \alpha_c + \gamma_s + R_{rc} + \varepsilon_{ics} \]

The coefficient of \( ED \) was significant at 10% level.

What does this mean? Endogeneity problem?
Were compulsory attendance and child labor laws effective?

CAUSALITY

2nd method is analysis of distribution change.

If it were $ED \rightarrow CL$, it is likely that
the whole distribution would have shifted.

Claim 2 (inequality decreased) is a good sign for $CL \rightarrow ED$. 
Were compulsory attendance and child labor laws effective?

CAUSALITY

3rd method looks at timing.

Run a regression of education several years before on $CL$.

If there is positive relationship, it is likely that $ED \rightarrow CL$.

Results: $CL$ was not correlated with education 3~9, 11, 12 years before.

Why correlation between $CL$ and education 10 years before?
CONCLUDING REMARKS and COMMENTS

1. Cross section regression does not imply causality. → Both regressions do not tell anything.

2. Why not report F statistic of the whole model? → We may regress with crucial variables only.

3. Regression of education several years later on $CL$?