Does Education Improves Institutions?

TEC UC

Lucas M. Roble P.

1. Motivation
2. Theoretical Approach
3. Empirical Approach
   - Data
   - Model
   - Results
4. Mechanism

Why Corruption?

Corruption is an important topic in development economics.

- Ründler and Potrafke (2019), states that it affect growth by decreasing FDI and rasing inflation.
- Alonso-Terme, et al. (2002) found that high corruption increases income inequality and poverty
- Ferraz, et al. (2012), argue that corruption leads worst educational outcomes.

Education

In this research I argue education may affect corruption. In particular, a society more educated (relative to other) have a better performance in corruption indexes.

(i) Theoretical model (inspired in Pearson and Tabellini, 2000).

(ii) Empirical evidence.

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Theoretical Model

Politician:

$$U_{p,1} = \ln(r_1) + \mathbf{P}(\text{Continue})\beta \ln(r_2)$$

Politician are already working (we are not modeling elections)
Citizens:

$$U_{c,1} = \ln[(1-\tau)y_1 + g_1 - cE_1] + \beta \ln[(1-\tau)y_2 + g_2 - cE_2]$$

r = Politician rents
y = Citizens endowment, τ = tax rate
E = Education, c = cost of education

Theoretical Model

Let's say that:

$$g = y\tau - r + \varepsilon_c \quad : \quad \varepsilon \sim \mathrm{U}[-1, 1]$$

And in particular, $\varepsilon_c = (1 - E)\varepsilon$, hence:

Theoretical Model

Let's say that:

$$g = y\tau - r + \varepsilon_c \quad : \quad \varepsilon \sim \mathrm{U}[-1, 1]$$

And in particular, $\varepsilon_c = (1 - E)\varepsilon$, hence:

$$\begin{aligned}
\mathbb{P}(\text{Continue}) &= \mathbb{P}(r < \bar{r}) \\
&= \mathbb{P}(r - \varepsilon_c < \bar{r}) \\
&= \mathbb{P}(r - (1 - E)\varepsilon < \bar{r}) \\
&= \mathbb{P}\left(\varepsilon > \frac{r - \bar{r}}{1 - E}\right)
\end{aligned}$$

$$\mathbb{P}(\text{Continue}) = \begin{cases} 1 & \text{if } \frac{r-\bar{r}}{1-E} < -1 \\ \frac{1}{2} \cdot \left(1 - \frac{r-\bar{r}}{1-E}\right) & \text{if } -1 \leq \frac{r-\bar{r}}{1-E} \leq 1 \\ 0 & \text{if } \frac{r-\bar{r}}{1-E} > 1 \end{cases}$$

Solving

Then we can solve for r^*:

$$\max_{r_1} \; U_p = \ln(r_1) + \mathbb{P}\left(\varepsilon > \frac{r_1 - \bar{r}}{(1-E)}\right)\beta \ln(r_2)$$

$$st. \;\; r_1 \leq \tau y$$

Solving for $\mathbb{P}(\cdot) = \frac{1}{2}\left(1 - \frac{r-\bar{r}}{1-E}\right)$:

$$[r_1] = \frac{1}{r_1} - \frac{1}{1(1-E)}\beta \ln(r_2) = 0$$

$$r_1 = \frac{2(1-E)}{\beta ln(r_2)}$$

Solving

There's also another effect:

$$\mathbb{P}(\text{Continue}) = \begin{cases} 1 & \text{if } \frac{r-\bar{r}}{1-E} < -1 \\ \frac{1}{2} \cdot \left(1 - \frac{r-\bar{r}}{1-E}\right) & \text{if } -1 \leq \frac{r-\bar{r}}{1-E} \leq 1 \\ 0 & \text{if } \frac{r-\bar{r}}{1-E} > 1 \end{cases}$$

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Data: Corruption

Corruption is defined using the "Political Corruption Index".
It includes 6 points:

- Executive bribery and corrupt exchanges (members of the executive power or their agents)
- Executive embezzlement and theft
- Public sector corrupt exchanges (public sector employees)
- Public sector theft
- Legislature corrupt activities
- Judicial corruption decision (bribes in order to speed up or delay the process or to obtain a favorable judicial decision)

Data: Education

It is compose by two measures.

- Learning Adjusted Year of Education (Filmer, et al 2018)
- Share of children in primary school age who are in school in 1950

Data: Education

Learning Adjusted Year of Education $\equiv$ LA is defined as

$$LA_c = S_c \frac{L_c}{L_{best}}$$

Where
$L_c \equiv$ Mean math score in TIMSS test (Grade 8) for country c
$S_c \equiv$ Mean years of schooling completed by the cohort of 25 - 29 year olds

Empirical Approach: Model

As the basic idea is to evaluate the causal effect of education in corruption I am going to run the following modeling

$$C_{2018} = \beta_0 + \beta_1 LA_{2018} + \beta_3 X_{2018} + v_1$$

- $C \equiv$ Corruption
- $LA \equiv$ Education
- X a vector of controls

Controls (X)

(i) Real GDP pc

$$\left.\begin{array}{l} \text{RGDPpc} \iff \text{Educational outputs} \\ \text{RGDPpc} \iff \text{Institutions} \end{array}\right\} \Rightarrow \quad \beta \text{ overestimated}$$

Controls (X)

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(ii) Total government spending on education as a share of GDP

$$\left.\begin{array}{l} \text{Expenditure} \iff \text{Educational outputs} \\ \text{Expenditure} \iff \text{Corruption} \end{array}\right\} \Rightarrow \quad \beta \text{ overestimated}$$

Controls (X)

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(iii) Continent dummies (Continent FE)

Instrumental Variables

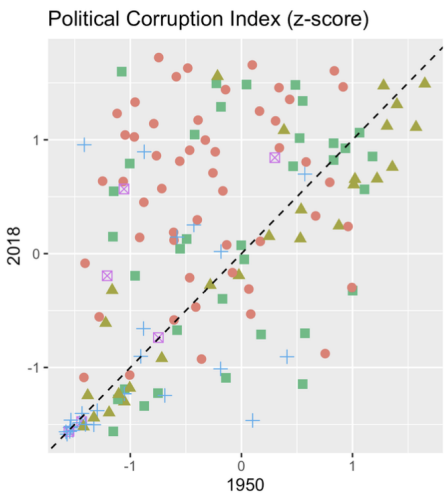
Some evidence suggest that corruption leads worst educational outcomes (Ferraz, et al. 2012). I developed an IV approach with z-scores:

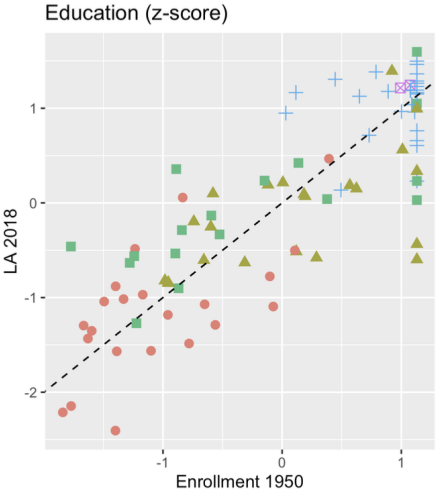
$$C_{2018} = \beta_0 + \beta_1 \widehat{LA_{2018}} + \beta_3 X_{2018} + v_1$$
$$LA_{2018} = \alpha_0 + \alpha_1 E_{1950} + \alpha_3 X_{2018} + v_2$$

Were, z-score:

$$z = \frac{x_{it} - \bar{x}_i}{\sigma_{x_i}}$$

Instrumental Variables: Relevance and Exogeneity





Results

	IV *(Second-stage)*	IV *(First-stage)*	OLS
Learning Adjusted, 2018	−0,6606**	-	−0,4763***
	(0,2493)		(0,1305)
Share of children in primary school, 1950	-	0,4205***	-
		(0,07601)	
RGDP per capita, 2018	−0,3372**	0,1836**	−0,3989***
	(0,1296)	(0,07691)	(0,09828)
Education expenditure (%GDP), 2018	−0,1439	0,1010	−0,1670*
	(0,07988)	(0,05348)	(0,07022)
Continent FE	✓	✓	✓
Observations	88	88	88
F-statistic	22,78	54,75	42,16

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Mechanism

There are two candidates that we are going to discuss:

- Citizens are better supervisors.
- Educations $\Longrightarrow$ better and less corrupt politicians.

Political Accountability, Botero, et al. (2013)

Botero, Ponce and Shleifer (2013) uses data from 67 seven countries and two main questions:

- "During the last year, did you submit any complaint about the services provided by the different government agencies in your country?"
- Did you or anyone else report the crime to the police or other authority? (conditional in, crime = physical abuse by the police or the military)

	Complain About	Goverment Services
College (WJP)	,051**	,053**
	(,01)	(,01)
High/Middle School (WJP)	,028**	,029**
	(,009)	(,01)
Trust Index	–	−,074**
		(,026)
Second income quintile	–	−,003
		(,008)
Third income quintile	–	−,010
		(,012)
Fourth income quintile	–	,005
		(,011)
Highest income quintile	–	,001
		(,011)
Male	–	,021**
		(,005)
N	60.634	52.272
Country FE	YES	NO
Mean dep. var.	,156	,159

Better Politicians, Martinez-Bravo (2017)

She argue that the extension of mass education can lead to changes in the quality of leaders elected and have an impact on the effectiveness of local governance.
She "shows that the first election to which newly educated cohorts could run as candidates led to important increases in the provision of key public goods"

- Number of doctors
- Presence of primary health care centers
- Safe drinking water

And... They are better *"managers"*

$$y_{vp} = \beta_0 + \beta_1 educ_v + \gamma_p + X'_{vp}\delta + \varepsilon_{vp}$$

	Proyect duration	Proyect duration^c
mean	3.56	3.56
Years Educ. (OLS)	$-,04^{***}$	$,036^{**}$
	(,013)	(,013)
Years Educ. (2SLS)	$-,245^{***}$	$-,145^{**}$
	(,071)	(,069)
N	7.637	7.637

c means that we are controlling by type and completion

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Conclusion

EDUCATION MATTERS


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