Public Education Expenditures, Growth and Income Inequality

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Outline of the Paper

➢ **How does public expenditure on education effect growth and income inequality?**

➢ Stylized data and empirical results:

- Positive cross-country/state connection between expenditure and growth.
- U shape connection with inequality (from some point expenditure on education increases inequality).

➢ Formulate a model of occupational choice (workers, teachers and managers) with exogenous variations in public education expenditure:

- Static model – all about occupational choice (supply of teachers) given individual exogenous human capital and wages.
- Dynamic model – overlapping generation model were individual human capital depends on older generations investment in education.

➢ The results of the model regarding expenditure and growth depend on the distribution of human capital -> control for human capital dispersion in related regressions.

➢ Model shows U shape relationship between expenditure and inequality.

Main Points

➢ **The paper tackles a very important aspects of long-run growth**.

➢ Accept the result that education leads to growth (expenditure on education = investment).

➢ Harder to accept the result of positive effect of investment in education on income inequality:

- Remarks on the data and regressions leading to the stylized fact.
- Remarks on the model's structure.

The Stylized Facts in the Paper (I)

➢ **Is there an empirical U shape connection between public investment in education (% of GDP) and income inequality?**

➢ Cross sections of US states (figure 1):
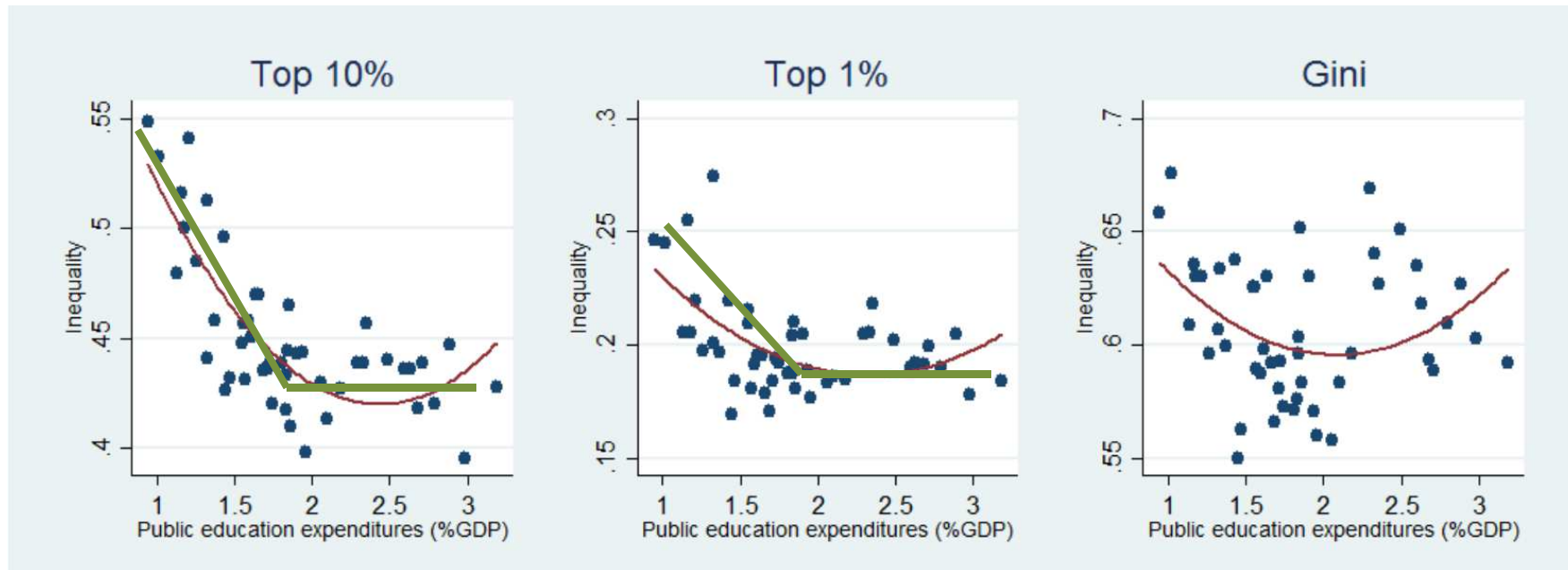
➢ Seems like a <u>downward slope that ends at some point</u>. No upward part. Simple second-order polynomic line can not produce this.
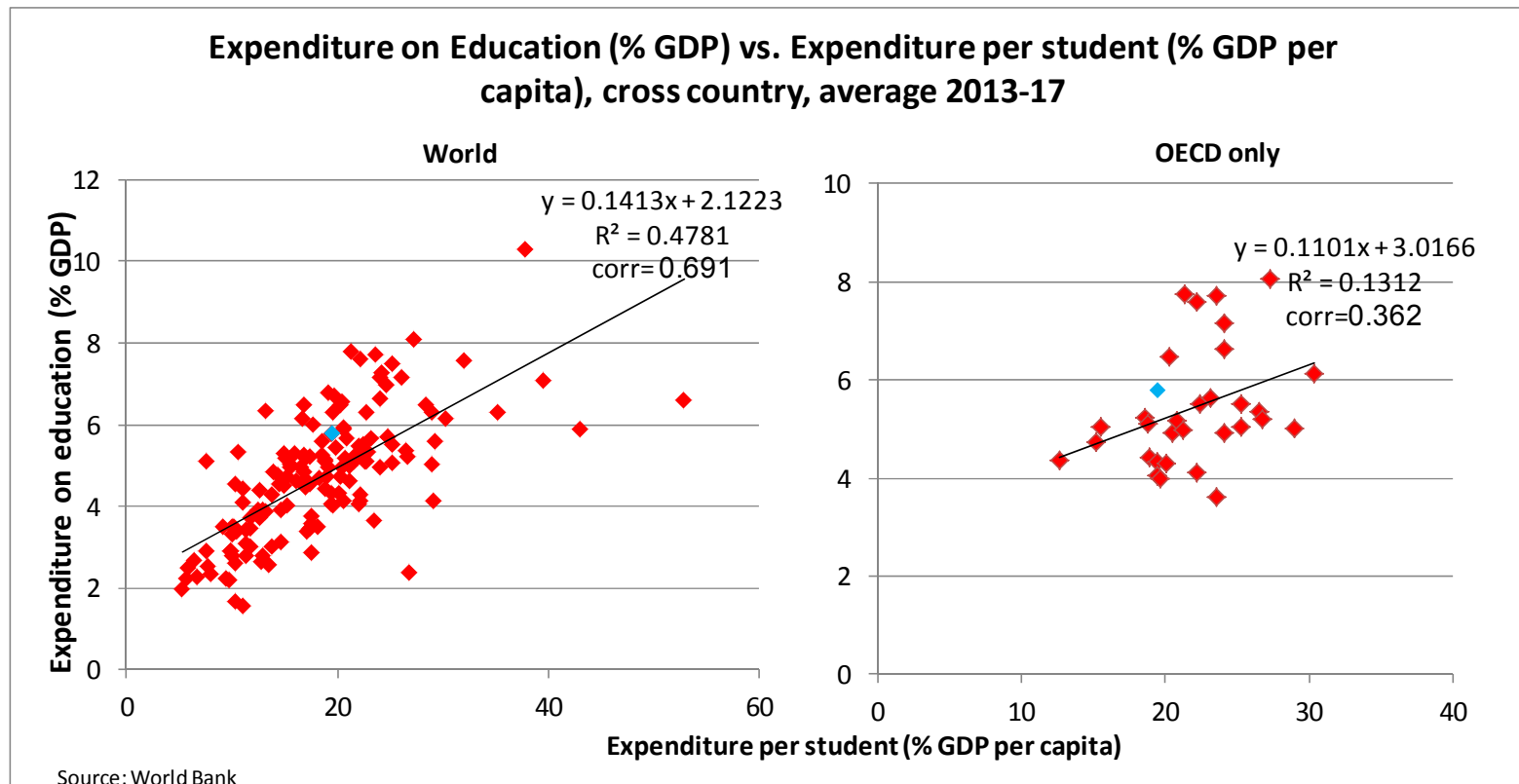
The Stylized Facts in the Paper (II)

➢ <u>Cross country</u> regression results (table 1)   and <u>panel</u> regression <u>US states</u> results:

Dep. var.:	Top 10%	Top 20%
pub. educ.	-4.713**	-4.988**
	(2.112)	(2.107)
pub. educ.²	58.14**	60.49**
	(24.27)	(23.87)

	Gini	Top 10%
Pub. Educ.$_{-1}$	-0.0515***	-0.0468**
	(0.0177)	(0.0221)
Pub. Educ.$^2_{-1}$	0.00478***	0.00428**
	(0.00142)	(0.00174)

➢ Upward part of the regression (starts at approx. 4% / 5.5% of GDP) may reflect <u>reverse causality</u>:
- Investment in education reduces future inequality.
- Countries with high inequality invest more in education to reduce future inequality (maybe on the expense of short term polices to reduce inequality).
- In the panel – control for lagged inequality?

➢ In some parts of the paper, there is to much <u>focus on the immediate impact of education expenditure on the labor market</u>: "an increase in expenditure… lower demand for workers leads to downward pressure on wages and increased inequality…" **The important aspect is the inter-generational effect!**
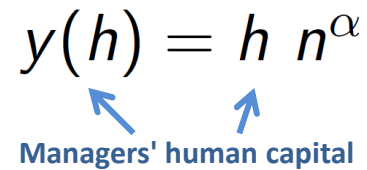
The Stylized Facts in the Paper (III)

➢ Public expenditure on education as share of GDP is <u>not</u> a good measure of the amount spent on education in terms of quality.

➢ Better indicator would be <u>Expenditure per student</u> (% of GDP per capita).

Expenditure on Education (% GDP) vs. Expenditure per student (% GDP per capita), cross country, average 2013-17

World: $y = 0.1413x + 2.1223$, $R^2 = 0.4781$, corr=0.691

OECD only: $y = 0.1101x + 3.0166$, $R^2 = 0.1312$, corr=0.362

Source: World Bank

Remarks on the Models (I)

➢ The static model contributes to the understanding of the paper because it is simple.

➢ But it misses the important inter-generational effect of education (the distribution of human capital *h* is exogenous).

➢ **The productivity of the workers does not depend on their human capital**:

$$y(h) = h\ n^{\alpha}$$

Managers' human capital

Missing the important aspect that education investment raises future earnings of all individual by raising their productivity?

➢ In the static/dynamic comparisons, the **financing of public educational investment is through a distorting income tax** (T):

- Try model with lump sum tax.
- Try to separate the effects from higher education investment from the effect of higher taxes.

Remarks on the Models (II)

➢ The model is all about <u>public</u> investment in education. What about <u>private</u> investment and the interaction between them?

➢ The interaction between public and private investment in education:
- Public resources are distributed equally (or even progressively).
- For individuals with <u>low income</u> public resources may be <u>additional</u>.
- For individuals with <u>high income</u> public resources may <u>substitute</u> private resources.
- Mechanism for inter-generational reduction in inequality.

➢ In the model – <u>High income</u> families "receive" <u>more</u> from public finance increases.
- Human capital "production function" :

$$h_{i,t+1} = a_{i,t} h_{i,t}^{\beta_1} S_t^{\beta_2}$$

Human capital of old agent in family   **Quality of education**

- Second order cross-derivative: $\dfrac{\partial^2 h_{t+1}}{\partial h_t \partial S_t} = \beta_1 \beta_1 \dfrac{h_{t+1}}{h_t S_t} > 0$

- The marginal contribution of public investment in education is bigger for individuals which come from families with high human capital (high income)…. <u>Counter intuitive</u>.

Thank You