

Reducing income inequalities through public expenditures on education

Panel data analysis for European countries

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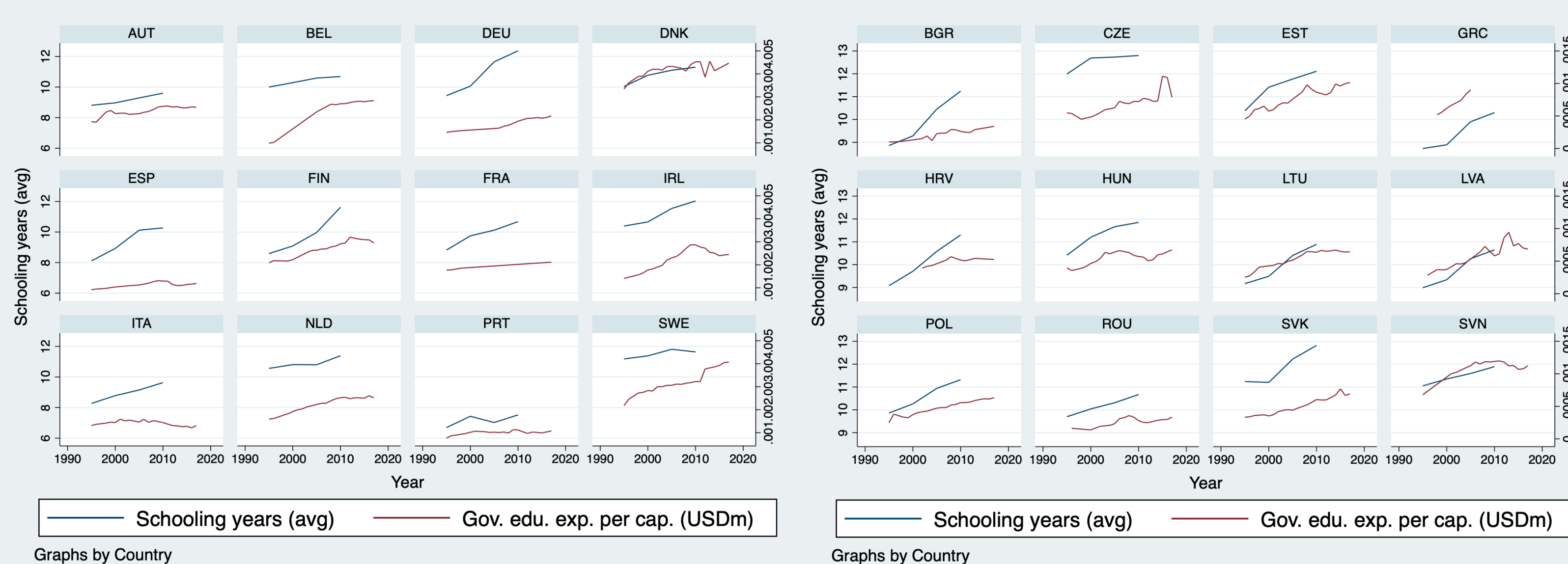
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RESEARCH OBJECTIVES

1. Exploring linkage between public expenditures on education (per capita) and income inequality in European countries.
2. Examining in which cases expenditures on education have the greatest impact on income inequality trends.
3. Identifying differences between the effectiveness of education spendings in Western and Eastern Europe.

BACKGROUND

- Documented relationship between education and distribution of income (*De Gregorio et al., 2002, Review of Income and Wealth*). According to meta-analysis, education simultaneously decreases income share of the richest and also increases the income share of the poorest (*Abdullah et al., 2015, Journal of Economic Surveys*). We can observe positive correlation between the average years of schooling and government expenditures on education per capita in Europe:



- Earlier studies indicated that there may be a negative relationship between educational expenditures and income inequalities (*Sylwester, 2000, Journal of Development Economics*). Based on panel data from 1960-1990, it was proved that expenditures on education (in relation to GDP) are associated with lower income inequality (*Sylwester, 2002, Economics of Education Review*).

- Recent research based on U.S. data suggests that this relationship may be U-shaped (*Artige et al., 2023, Journal of Economic Theory*).

RESEARCH STRATEGY

Research strategy includes deploying both fixed effects and dynamic panel models, using the same group of control variables. In case of fixed effects regression, the model is as follows:

$$Ineq_{i,t} = \beta_1 EduExp_{i,t} + \beta_{2...n} CVar_{i,t} + \alpha_i + \varepsilon_{i,t}$$

In case of dynamic panel regression model, difference GMM approach was adopted, following the methodology presented by Arellano and Bond (1991):

$$\Delta Ineq_{i,t} = \gamma \Delta Ineq_{i,t-1} + \beta_1 \Delta EduExp_{i,t} + \beta_{2...n} \Delta CVar_{i,t} + \Delta \varepsilon_{i,t}$$

The research is based on a sample of 24 European countries, divided into two heterogeneous subgroups (west vs. east) and includes the period from 1995 to 2020.

CONCLUSIONS

1. Level of government expenditures on education per capita may be considered as a weakly significant variable for determining the level of income inequality in European countries (significant only at p-value < 0.1).
2. Government expenditures on education (per capita) seem to reduce income inequality. This relationship is the most evident regarding spending on tertiary education (p-value < 0.01).
3. Government spending on education (per capita) is likely to have a greater impact on the decrease of income inequalities in less developed Eastern European countries than in Western European countries.

DATA

• INCOME INEQUALITY (GINI)

Gini index was obtained using post-tax disposable income. Data source: World Income Database, June 2023.

• GOVERNMENT EXPENDITURES ON EDUCATION PER CAPITA

was obtained by dividing total amount of government expenditures on education (million USD) and total population. Data source: Worldbank EdStats Database & Worldbank Development Indicators, June 2023.

• CONTROL VARIABLES

GDP pc (USD 2017, PPP); population growth (%); unemployment rate (%); services - value added (% of GDP); number of mobile phone subscriptions per 100 people; tax on labour (%). Data source: Worldbank Development Indicators & Eurostat, June 2023.

RESULTS

FIXED EFFECTS REGRESSION

	EUR	WE	EE	EUR	WE	EE	EUR	WE	EE
Gov. exp. on educ. - all levels (pc, mUSD)	-16.17*	-12.32	-110.53*						
	(9.16)	(9.37)	(57.52)						
Gov. exp. on primary educ (pc, mUSD)				-57.85	-22.96	-255.53***			
				(34.98)	(34.00)	(50.90)			
Gov. exp. on tertiary educ (pc, mUSD)							-52.23*	-53.67*	-358.18***
							(29.69)	(27.94)	(90.15)
N	447.00	224.00	223.00	382.00	200.00	182.00	430.00	206.00	224.00
Adjusted R2	0.07	0.16	0.16	0.05	0.13	0.17	0.07	0.18	0.16

(* 0.10 ** 0.05 *** .01)

DYNAMIC PANEL REGRESSION

	EUR	WE	EE	EUR	WE	EE	EUR	WE	EE
Gov. exp. on educ. - all levels (pc, mUSD)	-11.10	-9.19*	-46.41*						
	(9.24)	(5.36)	(25.80)						
Gov. exp. on primary educ (pc, mUSD)				-15.16	-14.95	-148.15***			
				(35.32)	(31.50)	(48.16)			
Gov. exp. on tertiary educ (pc, mUSD)							-63.70***	-65.06***	-146.41***
							(20.18)	(18.34)	(50.50)
N	390.00	194.00	196.00	332.00	173.00	159.00	368.00	175.00	193.00

(* 0.10 ** 0.05 *** .01)

SCATTER PLOTS

