Impact of Government Expenditure in Education on Unemployment

Anna Canestro, Serena Foini & Catherine Vanaise

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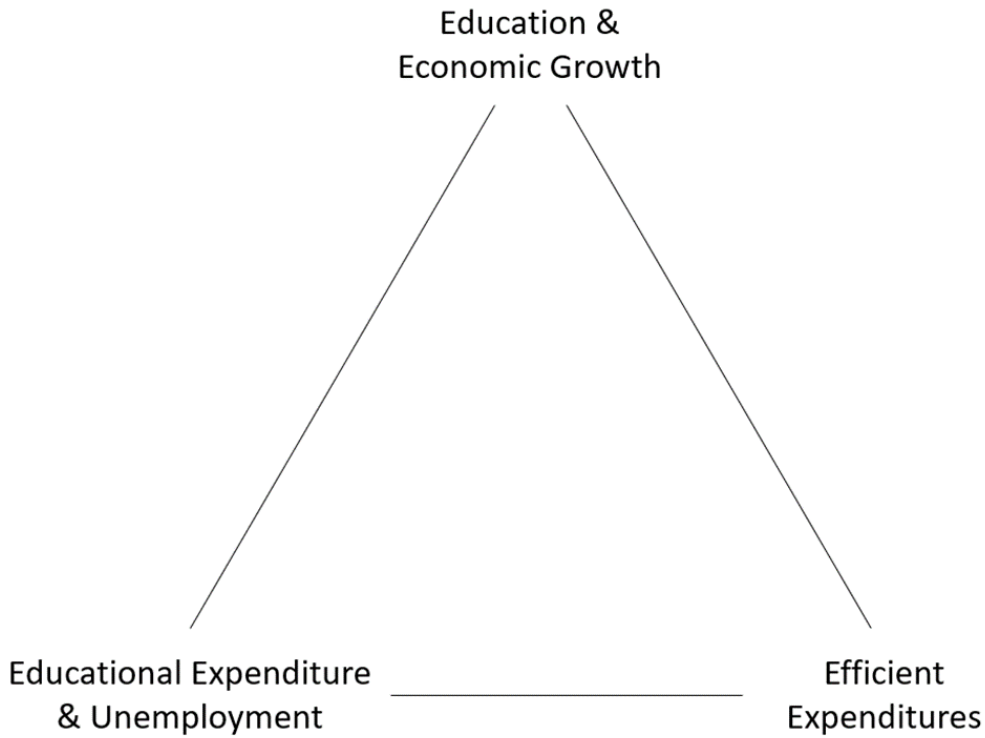
Research Question

How do government expenditures in different schooling levels impact unemployment in OECD countries?

Background

Unemployment levels are constantly under the spotlight of governments, as signals of the economic stability of countries and of the effectiveness of the policies they implement. It is conventionally believed that the acquisition of skills enhances the possibilities of getting hired (Grimaccia & Lima, 2013). Previous literature investigated three important relationships:



Research Gap

A large gap in the literature is found regarding the division of these expenditures among the different educational levels.

1. It is not investigated whether and how investments in a particular level of education – primary, secondary or tertiary – provide greater benefit on the economy.
2. The literature generally focuses more on specific-countries rather than cross-country studies.

Our Aim

- To assess whether the expenditure in education is negatively correlated to unemployment levels.
- To study whether the impact of government expenditures in education on unemployment varies according to the destination of these expenditures – primary, lower and upper secondary, tertiary schooling.
- To better understand on which educational level governments should direct their investments to reach the best possible outcome for diminishing unemployment.

Hypothesis Formulation

Hypothesis 1: Higher government investments in primary education will lead to lower unemployment rates.

Hypothesis 2: Higher government investments in lower secondary education will lead to lower unemployment rates.

Hypothesis 3: Higher government investments in upper secondary education will lead to lower unemployment rates.

Hypothesis 4: Higher government investments in long-cycle tertiary education will lead to lower unemployment rates.

Methodology

Sampling

- Panel data gathered from the OECD.Stat.
- Focus on the period from 2013 to 2017.
- 26 countries out of 38 were included in our sample because of missing data.
- The sample allows for a cross country analysis.
- Geographical heterogeneity maintained.

Australia	Czech Republic	Greece	Israel	Luxembourg	Slovak Republic	United Kingdom
Austria	Estonia	Hungary	Italy	Netherlands	Slovenia	United States
Belgium	France	Iceland	Latvia	New Zealand	Spain	
Chile	Germany	Ireland	Lithuania	Poland	Sweden	

Variables

Dependent Variable

Level of unemployment

- Measured as the percentage of the population between 24 and 64 years of age that is without employment.

Independent Variables

1. The level of total expenditure in primary education (ISCED2011 level 1);
2. The level of total expenditure in lower secondary education (ISCED2011 level 2);
3. The level of total expenditure in upper secondary education (ISCED2011 level 3);
4. the level of total expenditure in long cycle tertiary education (ISCED2011 levels 6 to 8).

Included as percentage of the GDP.

Variables

Control Variables

1. Educational attainment
   - Percentage of university graduates in the population aged 25-64.
2. Student-teacher ratio
   - Number of students per teacher.

Variables

Categorical Variables

Geographical categorization

- South America
- North America
- Western Europe
- Eastern Europe
- Northern Europe
- Oceania
- Middle East

Income categorization

By GDP per capita quartiles.

- Low income (0 - 26,725.25)
- Lower-middle income (26,725.25 - 33,643)
- Upper-middle income (33,643 - 43,618.75)
- Upper income (43,618.75 - 87496)

Data Analysis

Explanatory data analysis

Panel data of 130 observations

```
 unemployment        gdpph          primRatio       lowSecRatio      upSecRatio       terRatio
Min.   : 2.800   Min.   :20427   Min.   : 8.819   Min.   : 6.039   Min.   : 7.129   Min.   : 7.246
1st Qu.: 5.525   1st Qu.:26725   1st Qu.:11.376   1st Qu.: 9.583   1st Qu.:10.330   1st Qu.:13.707
Median : 6.850   Median :33643   Median :13.706   Median :11.584   Median :12.070   Median :15.159
Mean   : 8.488   Mean   :36933   Mean   :14.305   Mean   :11.923   Mean   :12.706   Mean   :15.828
3rd Qu.: 9.850   3rd Qu.:43619   3rd Qu.:16.527   3rd Qu.:13.775   3rd Qu.:13.689   3rd Qu.:17.736
Max.   :27.500   Max.   :87496   Max.   :22.525   Max.   :24.292   Max.   :26.098   Max.   :44.517
                                 NA's   :8        NA's   :14       NA's   :18       NA's   :33
   avRatio        adultEducTer    primEducGdp     lowSecEducGdp    upSecEducGdp    longCycleTerEducGdp
Min.   : 8.303   Min.   :16.29   Min.   :0.587   Min.   :0.5429   Min.   :0.4451   Min.   :0.4472
1st Qu.:11.885   1st Qu.:28.34   1st Qu.:1.046   1st Qu.:0.7482   1st Qu.:0.8289   1st Qu.:1.0641
Median :13.356   Median :35.14   Median :1.328   Median :0.8750   Median :0.9357   Median :1.2299
Mean   :13.642   Mean   :34.08   Mean   :1.375   Mean   :0.9242   Mean   :0.9742   Mean   :1.2809
3rd Qu.:15.214   3rd Qu.:40.27   3rd Qu.:1.642   3rd Qu.:1.1739   3rd Qu.:1.1485   3rd Qu.:1.5401
Max.   :23.960   Max.   :50.92   Max.   :2.499   Max.   :1.3608   Max.   :1.6365   Max.   :2.0531
NA's   :8        NA's   :4       NA's   :1       NA's   :6        NA's   :20       NA's   :12
```

Data Analysis

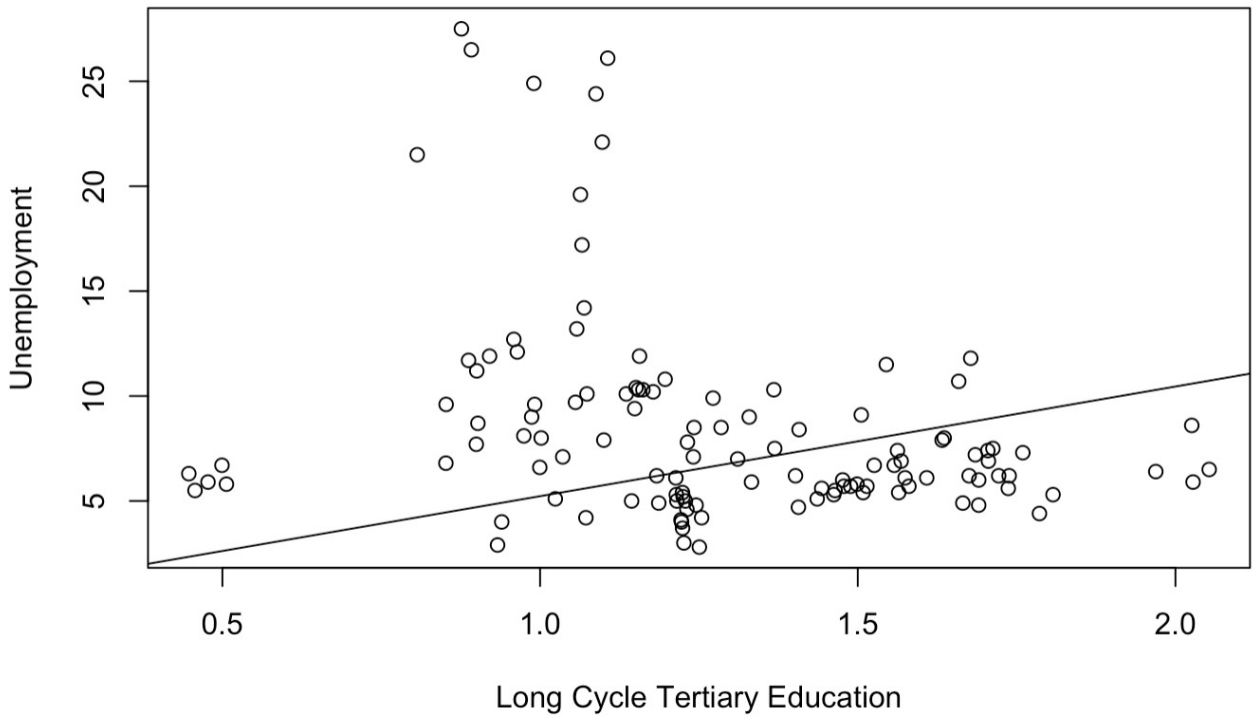
Summary Statistics

	Dependent variable:			
	unemployment	unemployment	unemployment	unemployment
	(1)	(2)	(3)	(4)
avRatio	0.002	0.04	-0.005	0.07
	(0.11)	(0.11)	(0.11)	(0.12)
adultEducTer	-0.57***	-0.51***	-0.39***	-0.52***
	(0.07)	(0.08)	(0.08)	(0.08)
longCycleTerEducGdp		2.41**	0.90	1.29
		(1.03)	(1.28)	(7.30)
lowerMiddle			-3.41	
			(2.28)	
upperMiddle			-4.72	
			(3.33)	
upper			-6.98	
			(4.53)	
longCycleTerEducGdp:lowerMiddle			1.92	
			(1.68)	
longCycleTerEducGdp:upperMiddle			1.59	
			(2.62)	
longCycleTerEducGdp:upper			3.24	
			(3.37)	
longCycleTerEducGdp:southAmerica				-4.58
				(8.49)
longCycleTerEducGdp:westernEurope				2.07
				(9.52)
longCycleTerEducGdp:easternEurope				1.37
				(7.32)
longCycleTerEducGdp:northernEurope				-6.70
				(10.60)
longCycleTerEducGdp:oceania				4.76
				(9.18)
Constant			21.86***	
			(3.82)	
Observations	119	112	112	112
R^2	0.41	0.46	0.42	0.48
Adjusted R^2	0.24	0.30	0.37	0.28
F Statistic	31.83*** (df = 2; 91)	24.41*** (df = 3; 85)	70.60***	9.35*** (df = 8; 80)

Data Analysis

Validity

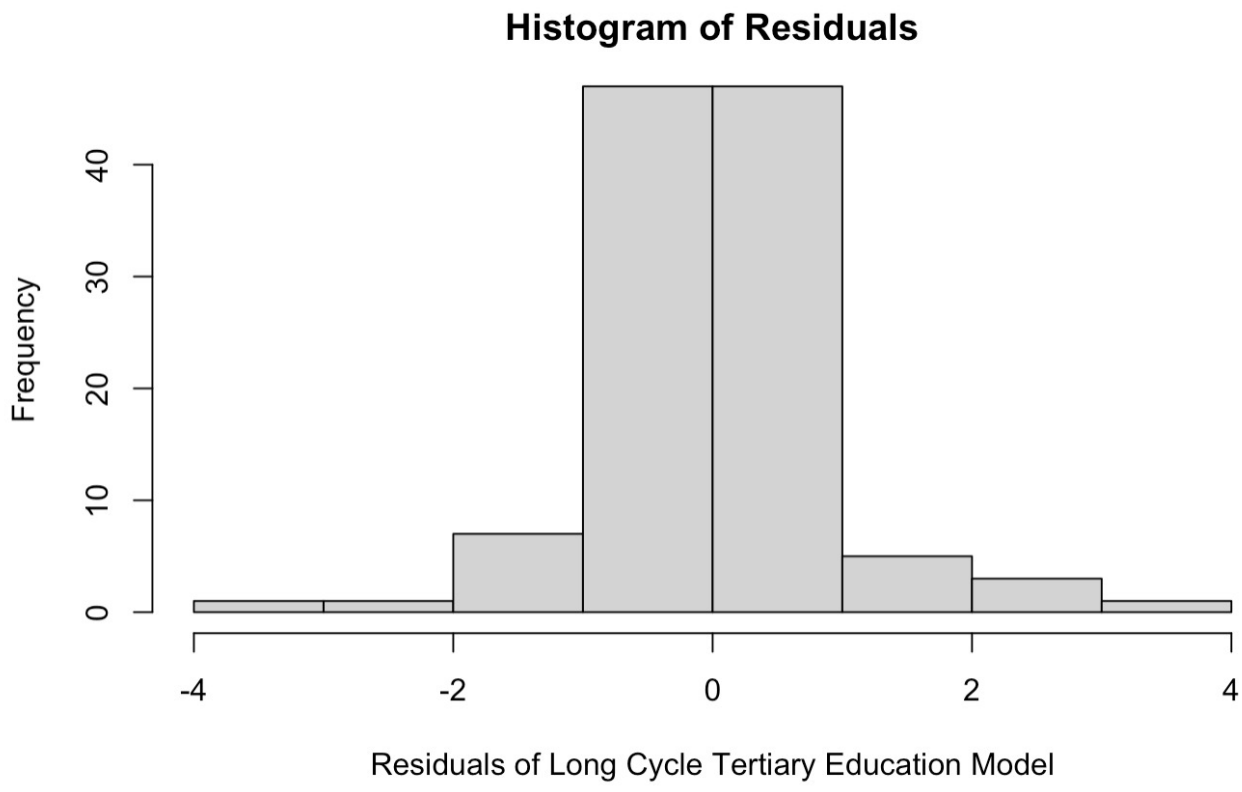
Linearity



Data Analysis

Validity

Distribution of residuals



Data Analysis

Validity

Residuals Homoskedasticity

Breusch-Pagan p-value of 2.2e-16.

Discussion

None of our initial hypotheses can be accepted. Data only highlighted a significant and—opposite from what expected—positive relationship between long-cycle tertiary education expenditures and unemployment rates.

What does it mean?

1. The effects of investments in lower grades of schooling are not directly captured by unemployment levels.
2. The positive relationship between unemployment rates and outlays in long-cycle tertiary education might appear counter-intuitive.
   - Countries spending more in higher education form more educated individuals
   - Upward pressure on labour supply
   - Labour surplus leads to an increase in unemployment rates if not matched by a sufficient labour demand

Conclusions

Limitations

1. Limited sample (size and period)
2. Income distribution
3. General definition of unemployment rate

Further Research

1. Broadening the time frame
2. Considering a greater sample of countries—from various regions and with different levels of income
3. Considering as a dependent variable a smaller percentage of the working population
4. Testing different types of relationships – i.e., the logarithmic form

Thank you

ANY QUESTIONS?