

Returns to education in Central European countries: a transitory effect of transition

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Should the returns of education decrease with the number of educated workers?

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- In economic theory, the law of diminishing returns states that if one factor of production is increased while the others remain constant the overall returns will relatively decrease after a certain point (Spillman and Lang, 1924).
- In labour economics, the Becker's "Woytinsky Lecture hypothesis" was developed, according to which marginal returns to higher education fall as the proportion of the population with higher education rises.

Or, can the returns of education remain stable (or even rise) with changes of work and jobs?

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The decrease of returns to education might not be the case if the demand for skilled labour is rising in parallel with a growing educational attainment, due to skill biased technological change, .

- Barth and Lucifora (2006) observed on 12 European countries from 1985 to 2000 that the “supply shock” of tertiary educated did not affect the wage premium which remained stable.
- Rutkowski (2007): while for a long time enterprises in transition economies were improving competitiveness by shedding of redundant labour, now they use productivity gains to invest, expand output and hire more workers. However, the emerging skills shortages may constrain firm growth. This requires improving labour supply incentives and investing in education.

Real trends in the West: mostly small ups and downs or stability

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- **Project PURE** (carried out in 1998-2000 referring on the period 1985-1995 in 15 EU countries) stated that “There does not seem to be a clear pattern in the trends: 16 cases of no trend, 7 cases of increasing returns, and 7 cases of decreasing returns” (separate trends for men and women).
- **Project EDWIN** (carried out in 2002-2005 referring on the period 1984-2003 in 12 EU countries) established four categories of countries depending on decreasing or increasing trends on various levels of education.
- **Country studies** on the UK, Sweden and Austria demonstrated decreasing marginal returns to higher education which fall as the proportion of the population with higher education rises.

Trends in CEE transition countries: a considerable increase in early 1990s

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- In contrast to diverging development in Western countries and often decline of returns to education, we observe the rising returns to education in post-communist countries during their transition to market economy.
- Fleisher, Sabirianova and Wang (2004) calculated the increase of the average return by one year of education from 5% in 1989 to 8% by mid-1990s. The higher the speed of reforms the faster should returns to schooling be adjusted to the market rates.
- Education was purposefully undervalued under the command economy while its quality was high and thus immediately profitable under the market regime - is it enough for explanation?

Returns to education in Central European countries (regression of *ln* wage, various controlling variables)

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		Primary	Vocational	Secondary	Tertiary
CZ Men	1988	ref.	4.3	12.4	33.9
	1996	ref.	16.6	39.1	73.1
CZ Women	1988	ref.	5.5	18.2	45.3
	1996	ref.	10.7	42.1	75.7
HU Men	1989	ref.	11.6	24.8	67.8
	1996	ref.	7.8	39.3	96.7
HU Women	1989	ref.	12.8	26.0	74.1
	1996	ref.	11.6	33.1	88.0
PL Men	1992	-9.3	ref.	(-4.1)-8.6	29.7
	1995	-10.3	ref.	7.6-13.6	44.1
PL Women	1992	-8.6	ref.	14.2-15.8	30.2
	1995	-3.5	ref.	7.4-12.3	43.2

Misleading information based on International Social Survey Programme (ISSP)

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- **Flabbi, Paternostro and Tiongson (2008) presented quite a different picture based on the ISSP surveys 1991-2002: the trend of rising returns to schooling over the transition period is generally weak, except in Hungary and Russia.**
- **Trostel, Walker and Woolledoehe (2002), using ISSP 1985–1995 on 28 countries, found a considerable variation in the rates of returns to education across countries and no evidence of their rise - rather a slight decline in the average, particularly for women. E.g. Czech figures on 1995 (3.5% returns for one year of schooling for men and 4.3% for women) are even below their levels at the end of the communist period.**

Trends in CEE transition countries: the rise came to a stillstand by the end of 1990s

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The inferiority of CEE countries regarding lower returns to education disappeared, there is no gap between transitory and other EU countries in this sense any more.

The trend of increasing returns to education slowed down by mid-1990s but it stopped later.

According to the first comparative EU-SILC survey of 2004-2005, three groups of countries by returns to one year of education (simple Mincerian equation - male, three levels of education, experience, \exp^2):

- High returns of about 11% - **HU, PL, SI, LT, LU**
- Middle returns of about 7-9% - **CZ, SK, EE, AT, DE, FR, NL, UK, IE**
- Low returns of about 5-6% - **SE, DK, FI, BE**

Problems of data comparability

***“The real reason one should be skeptical about indiscriminate rate of return compilations, and in spite of the efforts of the compilers, is that in the original works the estimates are rarely fully comparable.*”**

There are two main sources of non-comparability: data sample coverage and methodology. Ideally, a rate of return to investment in education should be based on a representative sample of the country’s population. But in reality this is the exception rather than the rule.”

Psacharopoulos and Patrinos, 2004.

EU comparative data for the 2000s: company-based and household-based

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- **Structure of Earnings Survey (SES)** with four years periodicity, so far available for 2002, 2006 and 2010. The SES covers businesses with at least 10 employees in the “Industry and Services” sector. Datasets not easily available, here we use only table data provided by courtesy of the Eurostat.
- **European Union Statistics on Income and Living Conditions (EU-SILC)** – a surveys among households in all EU countries since 2005. Personal files include information about gross/net earnings. Datasets provided by the Eurostat for research purposes.
- **Comparison of figures on earnings of the two surveys was never made.**

Comparison of SES and EU-SILC raw data on earnings by education level (% middle wage)

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	CZ	HU	PL	SK	AT	DE
SES						
Low	74.4	78.1	82.4	70.3	75.4	64.9
High	153.5	171.9	202.9	151.4	147.7	165.6
Ratio	2.1	2.2	2.5	2.2	2.0	2.6
EU-SILC						
Low	72.2	81.2	79.2	77.6	67.1	58.2
High	170.3	185.6	166.6	147.8	170.6	156.1
Ratio	2.4	2.3	2.1	1.9	2.5	2.7

Problems with EU-SILC datasets

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Two different ways of data collection on earnings and other sources of income applied:

- **In most countries, all variables collected only by questionnaire. While hours worked and other job characteristics are related to current situation, the information on earnings and income is related to the previous calendar year.**
- **In Scandinavian countries, such information is taken from registers and thus refers to the current year.**

EU-SILC analysis: data sample

- **Prime-age (25-54) respondents were selected in order that the job choice is not influenced by study at the bottom tail and by retirement at the top tail of age distribution.**
- **Respondents who are currently part-time or full-time employed were selected. Self-employed were excluded because their fluctuating earnings would make the analysis biased.**
- **For Heckman selection model, the sample was completed by not-working individuals, namely by unemployed, people fulfilling domestic tasks and care responsibilities, and other inactive persons. Students, (early) retired, disabled and people in military service were not included.**

EU-SILC analysis: dependent variable

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- **The dependent variable is the logarithm of hourly gross wage. Wage derived from gross annual wage according to the number of months of part-time and full-time employment during the year and the number of hours usually worked per week. Outliers with hourly gross wage below 1 and over 100 euro were excluded.**
- **In the EU-SILC, hours worked and other job characteristics related to current situation while the earnings related to the previous calendar year in the majority of countries. Therefore, workers who changed their job during the previous year excluded.**

EU-SILC analysis:

1. Mincer equation, 2. OLS regression

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- **Mincer wage equation includes a dummy variables for males and work experience measured in years (and its square). The variable indicating the number of years spent in paid work is not available, or includes unacceptable share of missing values in some countries. Therefore, years of work experience were derived from the year when the highest level of education was attained.**
- **The extended OLS wage regression includes also a set of job characteristics including the size of the company, the type of job contract, a dummy for supervisory or managerial position and 7 dummies for occupation category.**

EU-SILC analysis:

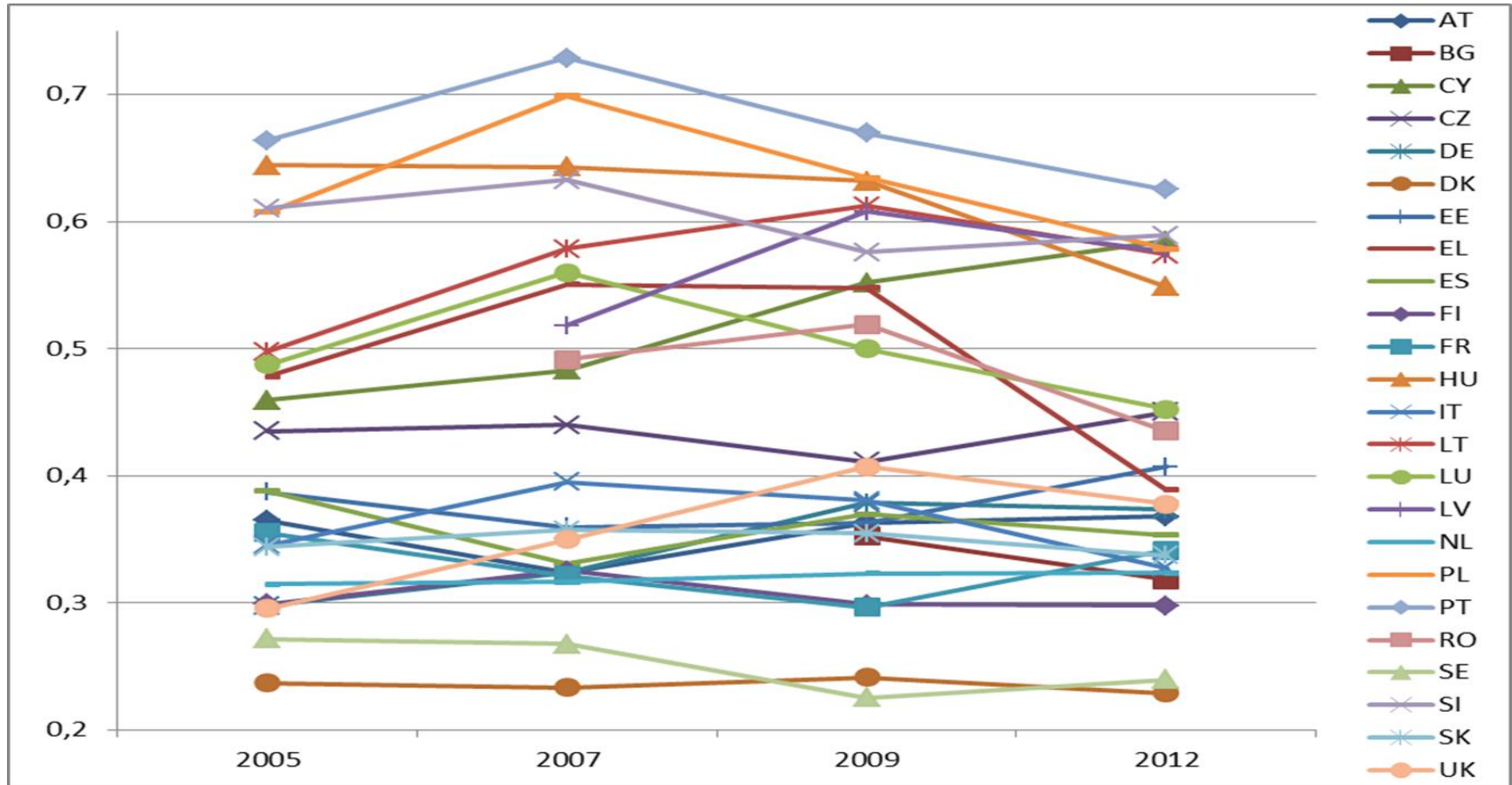
3. Heckman selection model

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- It additionally includes two dummies for age categories (24-35 and 35-44), dummies for the presence of children aged 0-2 and 3-5 years old and dummy for living with partner.
- The other is dummy for non-earned income which is recoded as '1' if the unearned household gross income represents more than a half of the national poverty line, and '0' if otherwise.

Coefficients of tertiary educated (against secondary educated) in Mincer equations

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Explanation of different country levels – not easy, if possible at all

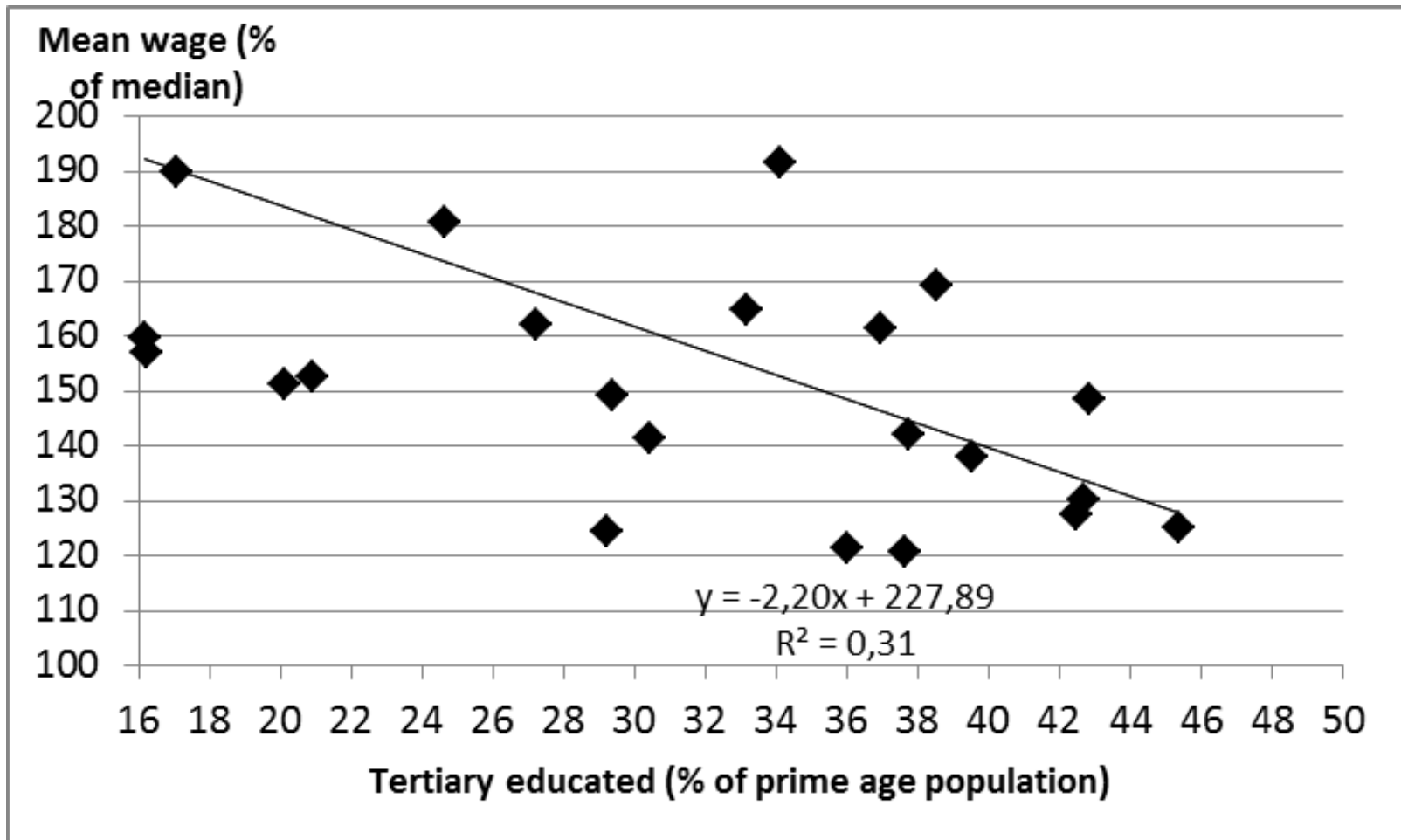
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“While the positive correlation between education and earnings at the individual level is one of the most established facts in economic literature, the existence of a causal relation between the two is not yet widely accepted. The strongest doubts arise from the consideration that earnings and schooling could both depend on additional factors not observed by the researcher, thus constituting a patent case of spurious correlation.”

Daniele Checchi, 2006.

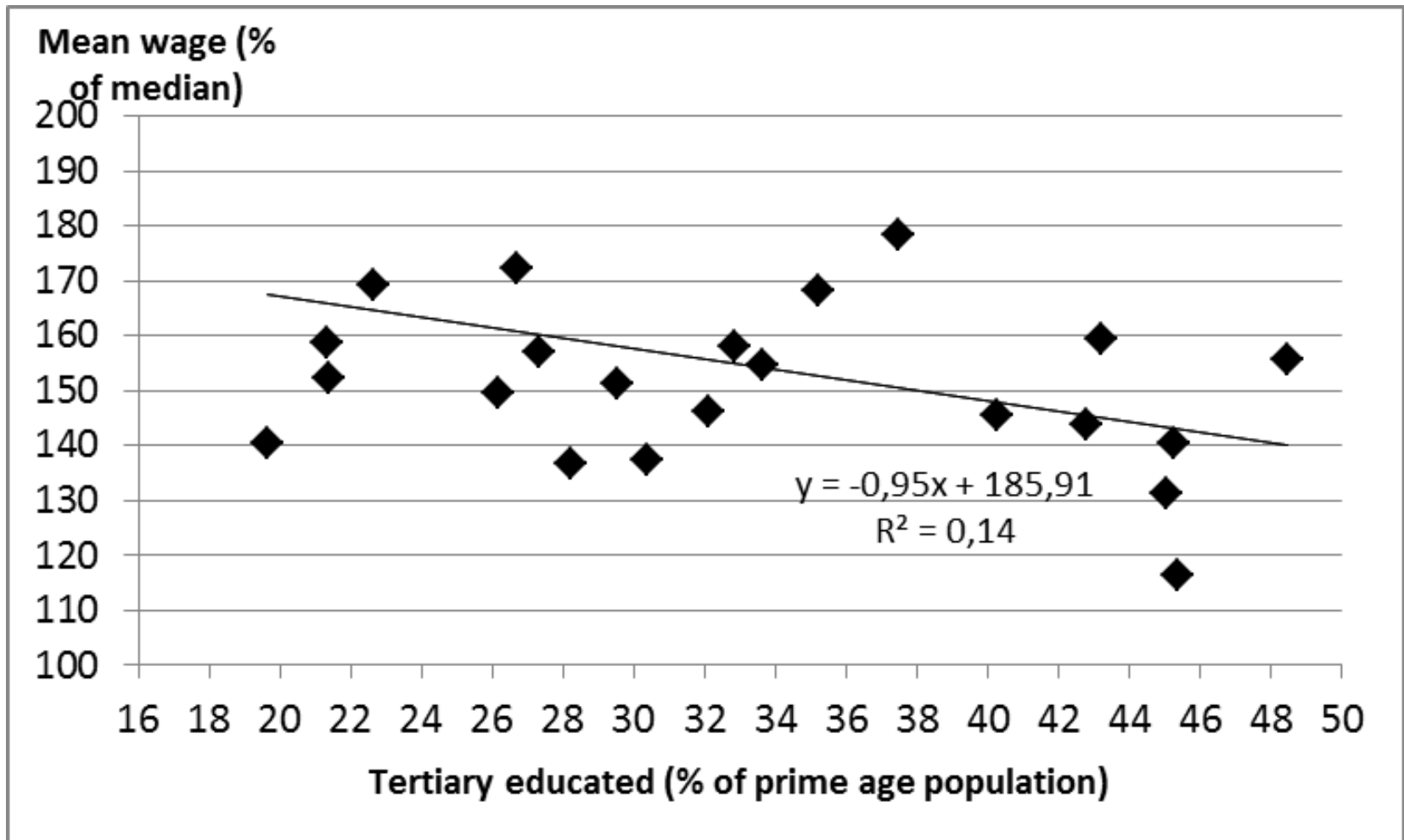
EU countries by relative hourly gross wage of tertiary educated employees and their proportion in 2005

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EU countries by relative hourly gross wage of tertiary educated employees and their proportion in 2012

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A macroview: correlation of returns to tertiary education with several indicators in the EU-27

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Indicator	Source	2005	2012
Percent of tertiary educated in the active population	EU-SILC	-0.55	-0.36
GDP per capita	Eurostat	-0.38	-0.23
Income inequality (Gini)	EU-SILC	0.58	0.32
Employment in tertiary sector	Eurostat	-0.63	-0.27
Rate of urbanization	Eurostat	-0.66	
R&D expenditure (GERD)	Eurostat	-0.58	

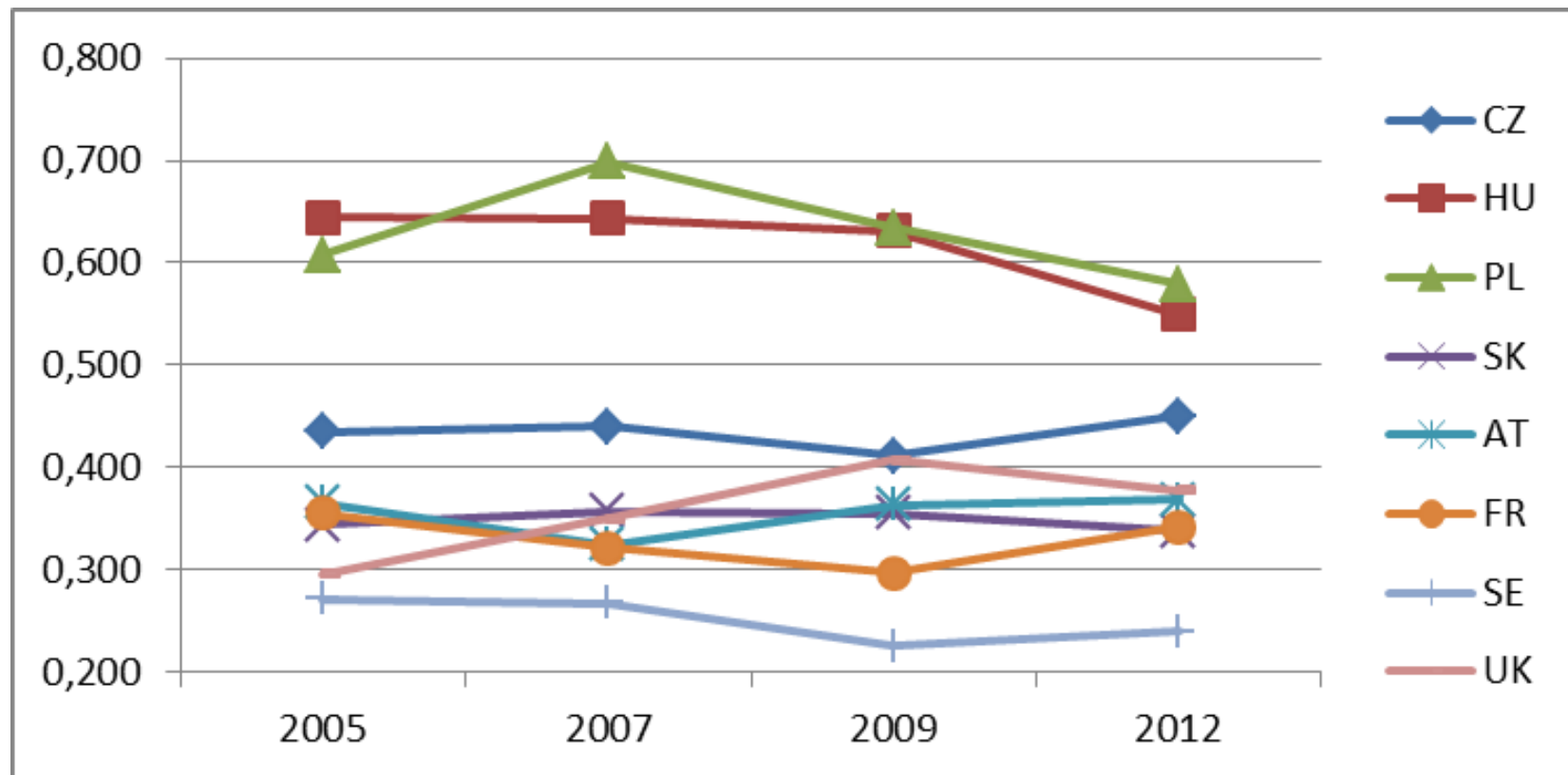
A microview: returns to tertiary education (against secondary), CEE countries comparatively

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Country	2005			2012		
	Mincer	OLS	Heckman	Mincer	OLS	Heckman
CZ	0,44	0,20	0,20	0,45	0,19	0,20
HU	0,64	0,43	0,48	0,55	0,34	0,38
PL	0,61	0,33	0,27	0,58	0,25	0,21
SK	0,34	0,17	0,16	0,34	0,15	0,16
AT	0,37	0,18	0,18	0,37	0,12	0,12
DE	0,36	0,13	0,13	0,34	0,16	0,16
SE	0,27	0,04	0,03	0,24	0,11	0,06
UK	0,30	0,14	0,15	0,38	0,17	0,16

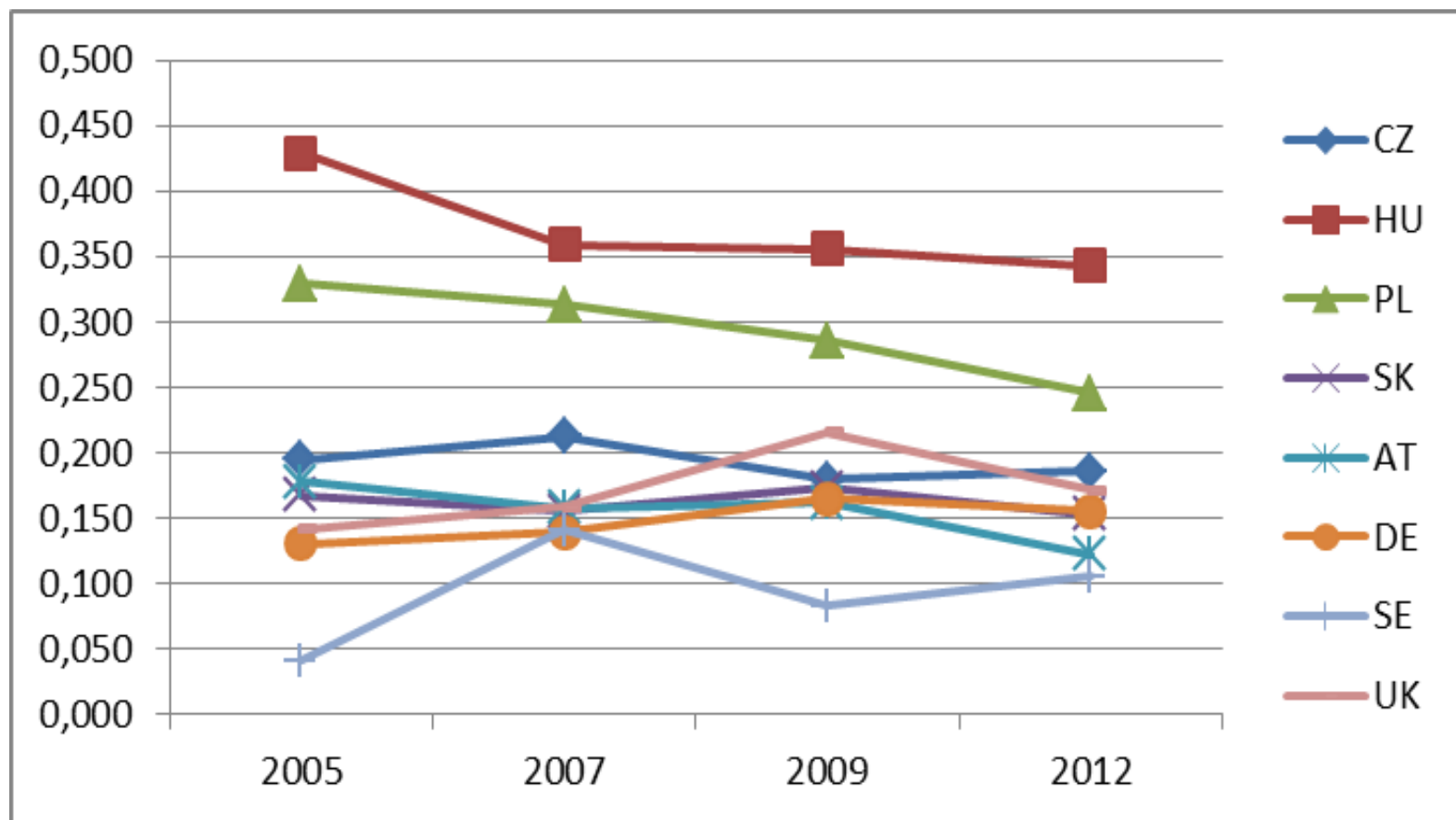
Returns to tertiary education (against secondary), Mincer equation: CEE countries comparatively

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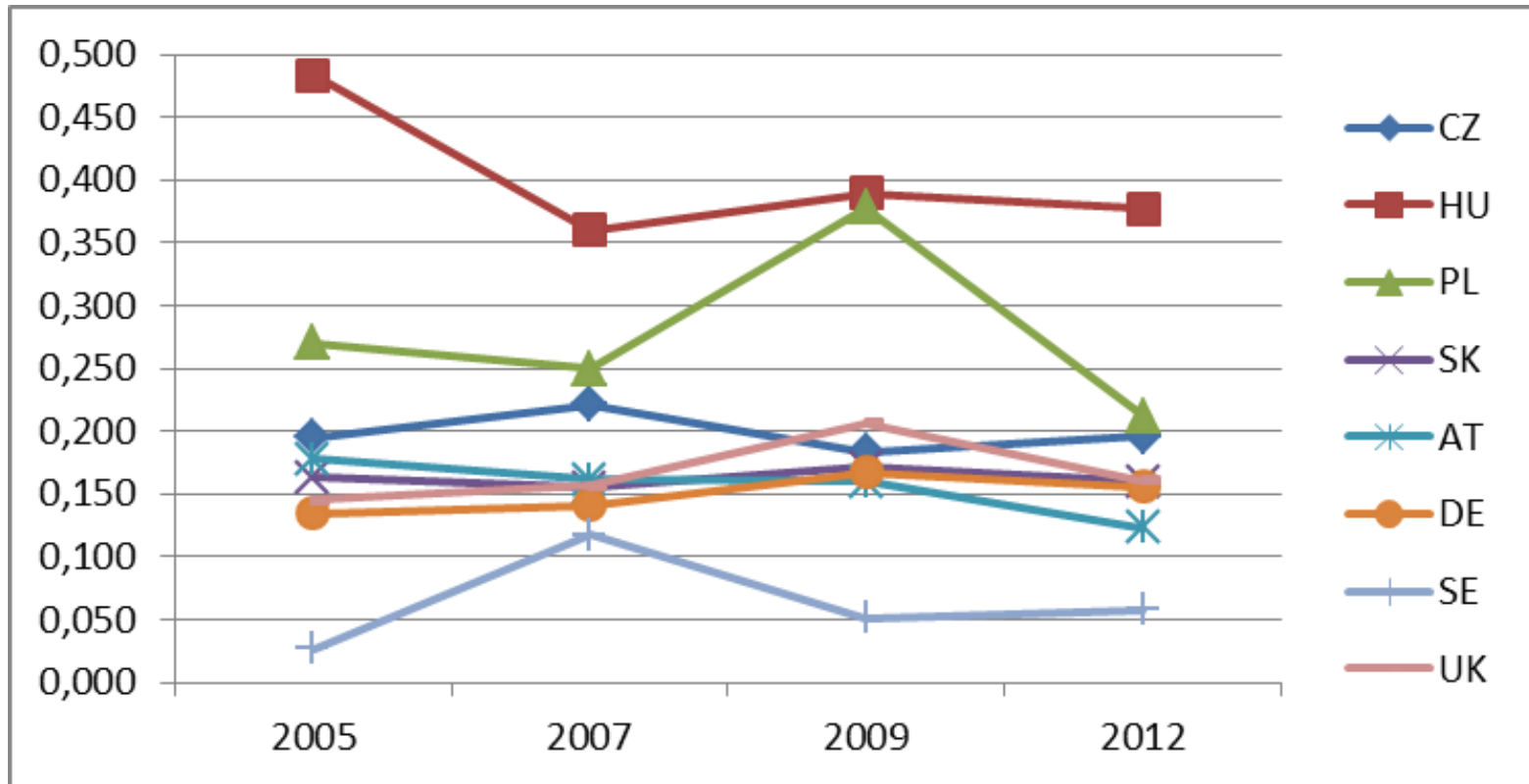
Returns to tertiary education (against secondary), OLS regression: CEE countries comparatively

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Returns to tertiary education (against secondary), Heckman model: CEE countries comparatively

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Next steps of the research

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- **Instrumental Variable regression** for checks of endogeneity of education in wage regression. Possible only for EU/SILC waves 2005 and 2011 which involved modules on *Intergenerational transmission of poverty/disadvantages* containing the variable parents' education.
- **Panel regression on country level**, 25 countries for 8 years. **Dependent variable:** returns to education obtained from Heckman wage regressions based on individual data. **Explanatory variables:** share of tertiary educated in population, GDP, share of employment in services, tax wedge, etc.

Statistical refinements will be probably not enough to explain country variety in levels and trends

Already in 1947, one of the founders of the economics of education Marc Blaug proposed alternative explanations:

- **Economic explanation**: better-educated people earn more because education imparts vocationally useful skills that are in scarce supply.
- **Sociological explanation**: the length of schooling is itself correlated with social class origins or because education disseminates definite social values which are prized by the ruling elite of a society.
- **Psychological explanation**: education merely selects people in accordance with their native abilities and, obviously, abler people earn more than less able ones.

Not only the economic story, not only individual characteristics, not only private returns

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On the country level, the private returns to education necessarily reflect:

- ***Welfare regime***
- ***General social inequality***
- ***Values and culture***
- ***Political context***

Also social returns to education should be considered, estimated to have, in developed countries, about the same size as private returns (Eric Canton, European Commission).

Thank you for your attention

Selected references

- Barth, Erling, Claudio Lucifora (2006). Wage Dispersion, Markets and Institutions: The Effects of the Boom in Education on the Wage Structure. IZA Discussion Paper No. 2181.
- Blaug, Mark (1947). The correlation between education and earnings: what does it signify? *Universities Quarterly* (renamed to Higher Education Quarterly) 1(1), pp. 53–76.
- Checchi, Daniele (2006). Human Capital, Family Background and Inequality in: *The Economics of Education*. Cambridge University Press.
- Filer, R.K., Juraĵda, S. and Plánovský, J. (1999). Education and wages in the Czech and Slovak Republics during transition. *Labour Economics* 6, pp. 581-593.
- Flabbi, Luca, Stefano Paternostro Erwin R. Tiongson (2008). Returns to Education in the Economic Transition: A Systematic Assessment Using Comparable Data. *Economics of Education Review* 27 (6), pp. 724-740.
- Munich, D., Svejnar, J. and Terrell, K. (2005). Returns to human capital under the communist wage grid and during the transition to a market economy. *Review of Economics and Statistics*, 87, pp. 100-123.
- Psacharopoulos, George, Patrinos, Harry Anthony (2004). Returns to Investment in Education: A Further Update. *Education Economics*, 12, No. 2.
- Rutkowski, Jan (2007). From the Shortage of Jobs to the Shortage of Skilled Workers: Labor Markets in the EU New Member States. IZA Discussion Paper No. 3202.
- Trostel, Philip Ian Walker, Paul Woolle (2002). Estimates of the economic return to schooling for 28 countries. *Labour Economics* 9(xx), pp. 1–16.
- Večerník, J. (2013). The changing role of education in the distribution of earnings and household income. The Czech Republic, 1988–2009. *Economics of Transition*, 21(1).