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# Has the level of achieved education affected the income of Czech households?

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## Abstract

This paper deals with an analysis of the effects of education on the income of Czech households from 2006-2010. EU-SILC (European Union Statistics on Income and Living Conditions) review results are the main data source. The paper investigates with the living conditions of households and that is mandatory for all states. Based on the unified methodology, that is then possible to make comparison between countries. Households are divided into five categories according to the education attained by the head of the household. It further deals with income differences of individual educational groups expressed by the education coefficient. Households at risk of poverty are also taken into account. Income inequality is measured by way of the Gini coefficient. The analysis uses regression techniques to examine the relation between education and the Gini coefficient, as well as between education and households at risk of poverty. The biggest share is represented by households where the household head has vocational education, followed by households where the household head has secondary education. The regression analyses established strong positive dependence between the education level and Gini coefficient, as well as strong negative dependence between the education level and number of households at risk of poverty. Within analyzed period of five years was observed a negative development in the society in form that there is a bigger possibility of getting into the zone at risk of poverty for households with higher level of education.

**Keywords:** education, EU-SILC, income, living conditions, poverty

## Introduction

The income situation has been the subject of expert analyses due to several reasons. First of all, it is the most important factor in determining the standard of living, and it further reflects the social and economic situation in a country (Vavrejšnová, 2002). Income is *“the maximum amount that a person can spend while still being as well off at the end of the week as he was at the beginning”* (Hicks In: Sefton, Weale, 2006, p. 219). Sefton, Weale (2006) specify that the phrase “being as well off” is to be understood as the present discounted value of the current and future utility that remains unchanged during the interval under review. A lack of income may lead to an undesirable social phenomenon – poverty. Townsend (In: Lister, 2004)

explains poverty as the inability to integrate in the society. It must be emphasized that this inability is caused by a lack of funds.

Based on the Lisbon meeting of the European Council, statistical infrastructure was established in 2000 to analyze the incomes and life conditions of the whole EU (Frick, Krell, 2010). The goal of the European Union Regulation 1177/2003 on statistics concerning incomes and life conditions was to determine a common framework for systematic analysis, and to ensure that a sufficient amount of data was available, based on the selective research of households, and to gain actual results, on a yearly basis and on both a national and a European level, concerning household income, level of poverty and social exclusion.

The EU-SILC data set offers the first opportunity to conduct an analysis covering the full range of EU countries, which allows us to compare multidimensional outcomes with those deriving from the conventional relative income poverty approach (Whelan, Maitre, 2005; Whelan, Maitre, 2010).

The Czech Republic, as well as other Member States, use 60 % of the median equivalent available income per household member as the poverty threshold Atkinson et al. (2005). Poverty is a problem that has always existed, and is increasing as a result of globalisation. The Czech Republic has maintained the lowest percentage of households threatened with poverty out of all Member States. Education has a significant impact on the position of an individual within society and determination of his position on the labour market; education plays an important role in the productivity of the entire society, because it has a positive effect on public health, the environment, reduced criminality etc. Education thus ranks among factors reflected in economic growth and the competitiveness of the economy. It is suitable to point out, that the EU social policy designates only minimum standards to its member states. It is the reason of different ways of education policy in each individual state. Public education in Czech Republic is, at present, reimbursed by the state at all the levels.

People invest to the higher education on the basis that they expect better income situation in the future. It means, higher education level brings them more money. The main target of this article is to identify the connection between education and income level of households in the Czech republic.

## **Methodology**

The EU-SILC (European Union – Statistics on Income and Living Conditions) project is based on a primary representable survey of the income level. In accordance with a directive of the European Parliament and of the Council, the module of Living Conditions has been implemented annually since 2005 by the Czech Statistical Office. The below table shows the number of households included in the survey in individual years.

Tab.1: Number of income survey (EU-SILC) households.

Year	2006	2007	2008	2009	2010
Number of households	7 483	9 675	11 294	9 911	9 098

References: the author's own calculations

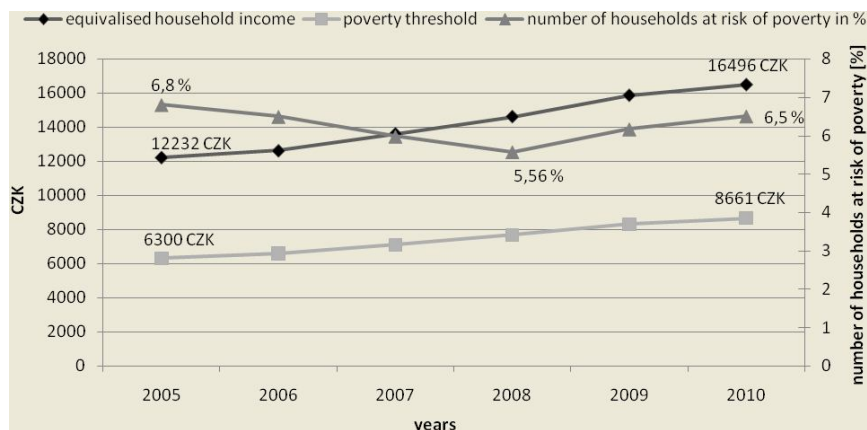
The enclosed analysis is unique because of the micro-data elaboration bought from the Czech Bureau of Statistics. The available income per equivalised household member was set as the main variable. The household member who contributes most to the family budget is assigned the coefficient of 1, children aged 0 to 13 the coefficient of 0.3, and other household members the coefficient of 0.5 for the purposes of the calculation (Longford et al., 2010). Another important variable is the highest attained education by the household head, which is divided into five categories: without education and with primary education, vocational education, secondary education, tertiary education – Bachelor degree, tertiary education – Master and Doctoral degrees. The poverty threshold is set at 60 % of the median available income. The Gini coefficient was used to measure the income inequality, the values of which may rank from 0 to 1, whereas the value 0 represents absolute equality, and the value 1 represents absolute income inequality.

The paper also applies regression analysis to determine the dependency between the Gini coefficient (dependent variable) and education (independent variable), as well as between households at risk of poverty (dependent variable expressed in %) and education (dependent variable). Education is expressed in percentage. The lowest education level has the value of 20 %, while each subsequent level has a 20 % higher value, i.e. tertiary education – Master and Doctoral degrees has the value of 100 %. The significance level is  $\alpha = 0.05$ .

## Results

The below figure 1 shows the development of basic characteristics of the household income situation between 2005 and 2010.

Figure 1: Trend in basic characteristics.



References: the author's own calculations

The median equivalised income per household member is usually at the forefront of interest; this characteristic has a growing trend in the surveyed period. In 2010 the average income per household member amounted to CZK 16 496, which is 35 % more than in 2005. A growing trend was also recorded with another variable, the poverty threshold, denominated in the national currency. Despite the poverty threshold constantly increasing between 2005 and 2010, the percentage of households at risk of poverty was, on the contrary, decreasing until 2008, which can be considered as a very positive phenomenon. In the last surveyed years the number of households at risk of poverty again slightly increased. The trend in the Gini coefficient was very similar. In 2005 its value amounted to 0.2456 and was gradually decreasing until 2009. In 2009 and 2010 it gradually increased up to the value of 0.2351. However, this value was still lower than compared to 2005, which means that the income inequality in the surveyed period decreased despite the slight increase in the last two years.

The data set was classified into 5 basic categories by the type of education. The equivalised average income and median with individual categories is shown below in Table 2.

Tab.2: Income [CZK] by type of education

Education	Average income per equivalised household member [CZK]		Median income per equivalised household member [CZK]		Number of surveyed households [%]		Number of surveyed households [absolute]	
	2006	2010	2006	2010	2006	2010	2006	2010
Primary	9 027	11 820	8 486	11 085	12.56	11.89	940	1,082

Vocational	11 459	14 953	10 581	13 835	46.00	43.84	3 442	3 989
Secondary	13 636	17 366	11 993	15 484	29.75	30.86	2 226	2 808
Tertiary – Bachelor	18 602	19 833	14 997	17 566	0.99	1.41	74	128
Tertiary – Master and Doctoral	18 533	24 142	15 888	20 156	10.70	11.99	801	1,091

References: the author's own calculations

It is obvious from Table 2 that income grows with a higher level of education. In 2010 significant income growth was recorded in two categories – vocational education and tertiary education – Master and Doctoral degrees. Median values differed significantly with growing education levels, which means that household incomes where the household head has a tertiary education show greater differentiation. In both surveyed years, households with their household head having secondary or tertiary education had above-average income, which is shown in Figure 1. In both surveyed years, the category of vocational education followed by secondary education shows the highest frequency in the data set. Tertiary education, both Bachelor degree and Master and Doctoral degrees has the lowest frequency in the data set. There are hardly any people without primary education in the Czech Republic, which is the reason why the primary education category includes also people without education.

For the purpose of surveying the impact of education level on the household income situation, the authors suggest using the coefficient of education, which indicates how many times the household income of households with the household head having an education of a level higher than the income of households with lower education levels. Table 3 shows the coefficient of education for individual compared categories in the surveyed years 2006 and 2010.

In the first surveyed year the biggest difference in income, from the attained education point of view, was between people with tertiary education – Bachelor degree and people with primary education, the income of the first category was 2.061 times higher than the income of people with primary education. When comparing households in which the household head attained tertiary education – Master and Doctoral degrees and households with the household head having tertiary education – Bachelor degree, the coefficient value is 0.996, which shows a lower income for the higher education level. In 2010 it applies that the bigger the difference between education levels, the bigger the difference in incomes. The highest value of the coefficient of education is achieved when comparing tertiary education – Master and Doctoral degrees and primary education, the value of which amounts to 2.042. On the contrary, the value is lowest when comparing tertiary education – Bachelor degree with secondary education amounting to 1.142.

Tab. 3: Coefficient of education

<b>Coefficient of education</b>	<b>2006</b>	<b>2010</b>
Vocational/Primary	1.269	1.265
Secondary/Primary	1.511	1.469
Bachelor/Primary	<b>2.061</b>	1.678
Master and Doctoral / Primary	2.053	<b>2.042</b>
Secondary/Vocational	1.190	1.161
Bachelor/Vocational	1.623	1.326
Master and Doctoral / Vocational	1.617	1.615
Bachelor/Secondary	1.364	<b>1.142</b>
Master and Doctoral / Secondary	1.359	1.390
Master and Doctoral / Bachelor	<b>0.996</b>	1.217

References: the author's own calculations

Households at risk of poverty were then filtered from households classified by individual education categories. In most households at risk of poverty the household head attained only primary education. In both reviewed years the value was very similar and fluctuated by around 15 %. In 2005 the percentage of households at risk of poverty significantly decreased as the education levels increased. However, the situation is different in 2010, namely as regards tertiary education – Bachelor degree. Households with the household head having a Bachelor degree rank second on the scale of households at risk of poverty.

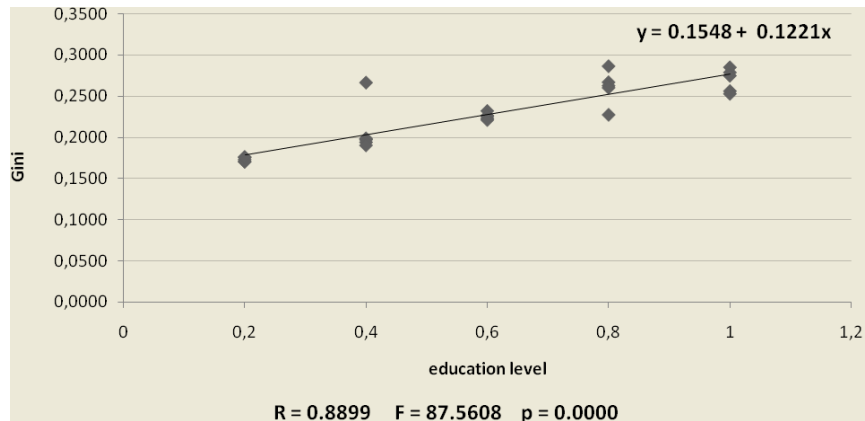
Tab. 4: Households at risk of poverty by education level (own calculations).

<b>Education</b>	<b>Number of households at risk of poverty [%]</b>		<b>Number of households at risk of poverty [absolute]</b>	
	<b>2006</b>	<b>2010</b>	<b>2006</b>	<b>2010</b>
Primary	15.53	15.90	146	172
Vocational	7.03	6.64	242	265
Secondary	3.91	4.31	87	121
Bachelor	4.05	9.38	3	12
Master and Doctoral	1.00	1.92	8	21

References: the author's own calculations

For the purpose of the regression analysis the Gini coefficient was set as the dependent variable and education in % as the independent variable. As there are 5 education categories, 20 % was set as the percentage basis. The first category, i.e. persons without education and with primary education was therefore assigned 20 %. Each higher education level was assigned a value 20 % higher, i.e. the highest level of tertiary education – Master and Doctoral degree was assigned the value of 100 %. The analysis considered data from 2006 to 2010, which means 25 data sets.

Figure 2: Regression Analysis – Education level vs. Gini

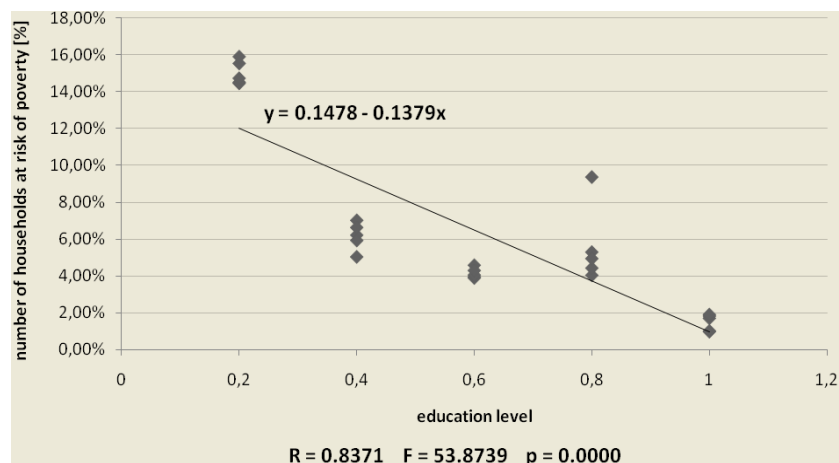


References: the author's own calculations

It can be derived from the above values that there is a strong positive dependence between the attained education level and the Gini coefficient. If education levels increase by one category, the Gini coefficient increases by 0.122 of the unit. Therefore, it applies that there is bigger income inequality at higher education levels.

The second regression analysis, which aimed at establishing the dependence between education and the percentage of households at risk of poverty by attained education level, showed a strong negative dependence.

Figure 3: Regression Analysis – Education level vs. Number of households at risk of poverty



References: the author's own calculations



## Conclusion

The paper investigates the relationship of household income with individual levels of attained education (categories). Based on analyses carried out in the paper it was established that the equivalised income per household member has been increasing since 2006 and the number of households at risk of poverty had been decreasing until 2008, which can be regarded as a very positive trend. Since 2008 there has been a growing trend in all main income characteristics, and the number of households on the poverty threshold has also grown. The biggest share is represented by households where the household head has vocational education, followed by households where the household head has secondary education. Above-average income is attained by households where the household head attained secondary or tertiary education. In 2010 it proved that the bigger the difference between education level, the higher the income. Persons with a Bachelor degree and Master and Doctoral degrees have the lowest share. Households where the household head attained primary education are threatened most by poverty, followed by households where the head of household attained vocational education (in 2006), whereas in 2010 it was persons with a Bachelor degree. Therefore, we can say that households with a higher education level have reached the poverty threshold during the surveyed five-year period. The increase of households at risk of poverty where the household head has a Bachelor degree may be connected with the extension and growth in the numbers of institutions providing tertiary education, which is to the detriment of the quality of education.

The regression analyses established strong positive dependence between the education level and Gini coefficient, as well as strong negative dependence between the education level and number of households at risk of poverty.

The presented publication explains some interesting details, which, in the future, could become the focus of our deep subject of education, especially its influence of family standard living during the first and last decade (decile).

## Reference

ATKINSON, A. B., MRLIER, E., NOLAN, B., 2005. Taking Forward the EU Social Exclusion Process. In *An Independent Report Commissioned by the Luxembourg Presidency of the Council of the European Union* [online]. Březen 2012. Dostupné z: [http://www.esri.ie/pdf/BKMNEXT067\\_Taking%20Forward.pdf](http://www.esri.ie/pdf/BKMNEXT067_Taking%20Forward.pdf)

FRICK, J.R., KRELL, K., 2012. Measuring Income in Household Panel Survey for Germany A Comparison of EU-SILC and SOEP. In SOEP [online]. Únor 2012. [cit. 23-11-2012]. Dostupné z: <http://www.diw.de/soeppapers>

LISTER, R., 2004. *Poverty*. Vydání první. Cambridge: Polity Press. ISBN 0-7456-2564-9.

LONGFORD, M.T., PITTAU, M.G. ZELLI, R. MASSARI, R., 2010. Measures of poverty and inequality in the countries and regions of the EU. In ECINEQ [online]. Říjen 2010 [cit 12-03-2012]. Dostupné z: <http://www.ecineq.org/milano/WP/ECINEQ2010-182.pdf>

SEFTON, J.A., WEALE, M.R., 2006. The Concept of Income in a General Equilibrium. *Review of Economic Studies*. Oxford: Oxford University Press, 79 (1), 219 – 249. ISSN 0034-6527.

VAVREJNOVÁ, M., 2002. *Distribuce redistribuce příjmů obyvatelstva ČR v průběhu devadesátých let (vývojové trendy)*. Vydání první. Praha: Nadání Josefa, Marie a Zdeňky Hlávkových. ISBN 80-239-0214-8.

WHELAN, C.T., MAITRE, B., 2005. *Welfare Regime and Social Class Variation in Poverty and Economic Vulnerability in Europe: An Analysis of EU-SILC*. In ESRI [online]. Únor 2012. [cit. 22-02-2012]. Dostupné z: [http://www.esri.ie/publications/latest\\_publications/view/index.xml?id=2802](http://www.esri.ie/publications/latest_publications/view/index.xml?id=2802)

WHELAN, C.T., MAITRE, B., 2010. Identifying Economically Vulnerable Groups as the Economic Crisis Emerges. *The Economic and Social Review*. Dublin: Economic and Social Studies, 41 (4), 501 – 525. ISSN 0012-9984.

## **Ovlivňuje úroveň dosaženého vzdělání příjem českých domácností?**

Předložený příspěvek se zabývá analýzou vlivu vzdělání na příjmovou situaci domácností v České republice v letech 2006-2010. Hlavním zdrojem jsou výsledky šetření EU-SILC (European Union Statistics on Income and Living Conditions). Jedná se o šetření, které sleduje životní podmínky domácností a je povinné pro všechny státy EU. Na základě jednotné metodologie je pak možné provést komparaci mezi jednotlivými státy. Domácnosti jsou rozdělené do 5 skupin podle nejvyššího dosaženého vzdělání osoby v čele domácnosti. Předmětem zájmu jsou rozdíly v příjmech mezi jednotlivými vzdělanostními skupinami vyjádřené koeficientem hodnoty vzdělání. Zvláštní zřetel je věnován domácnostem ohroženým chudobou. Příjmová nerovnost je měřena pomocí Giniho koeficientu. Regresní analýza zkoumá závislost mezi vzděláním a příjmovou nerovností, ale také mezi vzděláním a domácnostmi ohroženými chudobou. Největší podíl z celkového počtu domácností mají domácnosti v jejichž čele je osoba vyučená, dále se pak jedná o domácnosti v čele s osobou se středním vzděláním. Dle regresí bylo zjištěno, že existuje silná pozitivní závislost mezi stupněm vzdělání a Giniho koeficientem a také silná negativní závislost mezi stupněm vzdělání a počtem domácností ohroženými chudobou. V analyzovaném pětiletém období byl zaznamenán negativní vývoj ve společnosti v tom smyslu, že se častěji dostávají do pásma chudobou ohrožených domácností domácnosti s vyšším stupněm vzdělání.

**Klíčová slova:** vzdělání, EU-SILC, příjem, životní podmínky, chudoba

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