Positive and negative impact of increased tertiary attainment

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Abstract

The theory of human capital clearly states that the investments into the education bring many benefits and are worth the cost. The OECD Education at a Glance analysis provides support for both public and private investing in tertiary education as the net present value is positive for all observed countries. Considering the benefits of education, a growth in tertiary education should be viewed very positively. In this context, the European Strategy Europe 2020 set up one of its main goals for EU27 countries as follows: to increase the educated population so that it reaches 40% (tertiary educated people aged 30-34). This article, on an example of Slovakia, provides an analysis of both positive and negative impact of increased tertiary attainment.

Keywords: higher education, Slovakia, Europe 2020

JEL Classification: I23, I29

1. Introduction

Human capital, in short, is the intangible capital that people possess including their competencies, knowledge, and attitude. From the economic standpoint, the expenditures on education, training, medical care, etc. are considered the investments in human capital.

The concept of the theory of human capital goes back to Adam Smith, who in his Wealth of Nations (1776), mentions that education makes people more sophisticated and progressive. More formally, the theory of human capital was introduced in 1960 by economist Theodore Schultz and further developed by other economists, most notably Gary Becker, the scholar of Chicago School of Economics and the author of the book, Human Capital (1963). Another representative of the Chicago School of Economics, Jacob Mincer, helped to develop the empirical foundations of human capital theory. Other well-known economists, such as Lucas, Romer, Mankiw, Weil, Denison and Sala-i-Martin, have examined the impact of human capital and education on the economic growth of a country (Lisý, 2003). Many other authors contributed to the development of the theory of human capital; however, the ones mentioned above are certainly the most notable ones.

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Our article concentrates on the investments in tertiary education and discusses positive and negative impact of increased tertiary attainment.

2. The role of education in forming human capital

2.1 Benefits and costs of education

In general, there is no doubt that education provides utility; otherwise, there would not be a need for it. In the short term, it most likely provides the joy of learning; in the long run, it should increase one's productivity for years to come and, most likely, increase a person's earnings for life. In this sense, education can be viewed as an investment because similar to investments in properties or stocks, the investor hopes for a return exceeding the initial cost. Families need to consider the private costs and benefits when choosing how to allocate scarce family resources. From a public policy perspective, governments also need to consider the social costs and benefits of education, vis-à-vis the many alternative uses of the same public funds. According to the economist's model of human behavior, no investment will be made unless the benefits anticipated from the investment are higher than the expected costs, including the opportunity costs (WorldBank, 2002).

The **benefits** of investment in human capital are limitless; however, in classifying the benefits of schooling, Schultz (1963) defines three main streams: present consumption, future consumption (investment), and future producer capability (investment in future capabilities to produce and earn income). The theory of human capital - represented by the notable authors (mostly Schultz, Becker and Mincer; complemented by Mankiw, Romer, Weil, Blaug and Čaplánová) - mostly reflects on these benefits of education: the average income of an educated person is higher than the average income of a less educated individual, the chance of becoming unemployed is lower with a higher level of education, the crime rate diminishes with an increased level of education and the family planning is more coordinated with a higher level of education. On the national level, the theory of human capital often states that the productivity of an educated individual should be higher and subsequently the higher the productivity, the higher the GDP of the economy. Even though it is difficult to measure the relationship between education and productivity, the positive relationship is supported by empirical analysis and can also be presumed by the fact that employers generally pay a higher wage to an educated person. If the increased productivity were not there, the additional costs provided by the employers would be irrational.

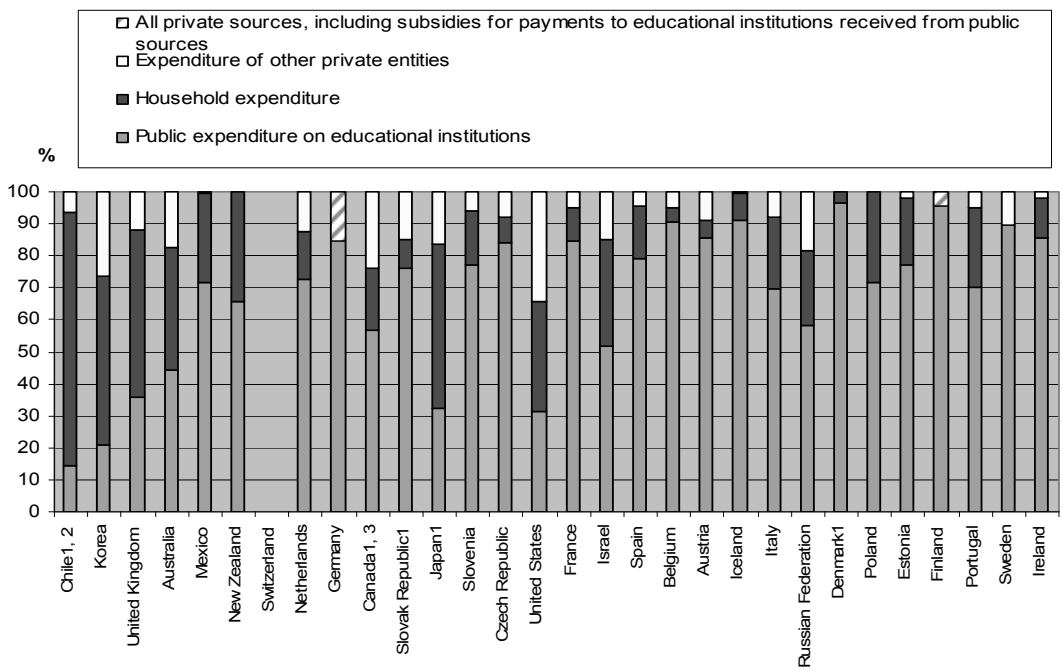
Faridi, Malik and Rao (2010) point out that education combined with health improve human capital, raise the productive capacity and are considered the core components of growth and development**.** According to Romer (1986), "The more people you have prospecting, the more you will be stumbling on rich veins of gold". Those veins of gold are produced in US graduate schools, especially in PhD science and engineering programs.

All these statements provide a support for the investments in the human capital.

Besides the benefits of education that have already been mentioned, the literature states several other ones: the attitude toward environmental protection is greater when people are more educated; better educated people tend to cope with daily life situations more easily (e.g., dealing with administration); with better educated people, there is a better textbook market; and the children of more educated parents tend to be more educated themselves. Also, countries with higher educated people tend to be more democratic and have fairer elections (Čaplánová, 1999).

On the other hand, there are some indisputable **costs** associated with the education. The theory of human capital distinguishes between the private cost and the public cost in addition to direct costs and indirect costs of education. From the private individual's perspective, the direct costs are the fees families actually pay, plus other out-of-pocket expenses for textbooks, travel and accommodation. The public cost is the payment for buildings, electricity, faculty, librarians, and administrators used in the public education process. From both the private and public perspectives, the indirect costs are the opportunity costs, the time students spend studying and their foregone earnings. Chart 1 depicts the distribution of public and private expenditure on the tertiary education for various countries.

Figure 1: Distribution of public and private expenditure on educational institutions (2007)



Source: Education at Glance, OECD 2010.

In most countries of the EU, education is predominantly publicly financed. As we can see from the chart, there are several countries where public sources finance above 90% of tertiary education: Belgium, Iceland, Denmark and Finland. On the other hand, there are countries where the public expenditure is below 50%: Chile, Korea, the United Kingdom, Australia, Japan and the United States. The proportion of private funding in countries such as Australia, the United Kingdom and the United States may be affected by the presence of international students, who are usually excluded from receiving public funds.

In the previous sections of this paper, we have described the most common benefits of education and its costs. Without a proper cost-benefit analysis, our main goal – to analyze an impact of the increased tertiary attainment – would be lacking a solid theoretical background. For this reason, the next section of the paper focuses on the return on education.

2.2 Rate of return on investment in education

Once the outlined benefits and costs of education are measured and discounted at an appropriate rate of interest, the essential elements of a cost-benefit analysis are available. There are three basic ways of presenting the cost-benefit analysis: first by means of a benefit-cost ratio, second by calculation of the net present value, and third by calculating the internal rate of return on the investment (Woodhall, 2004). Several economists have tried to measure the relationship between the inputs and outputs in education. At an individual level, Mincer's approach is considered to be the cornerstone of the literature on the relationship between earnings and human capital investments. The classical Mincer approach links the logarithm of average earnings to completed years of schooling and years of experience as follows:

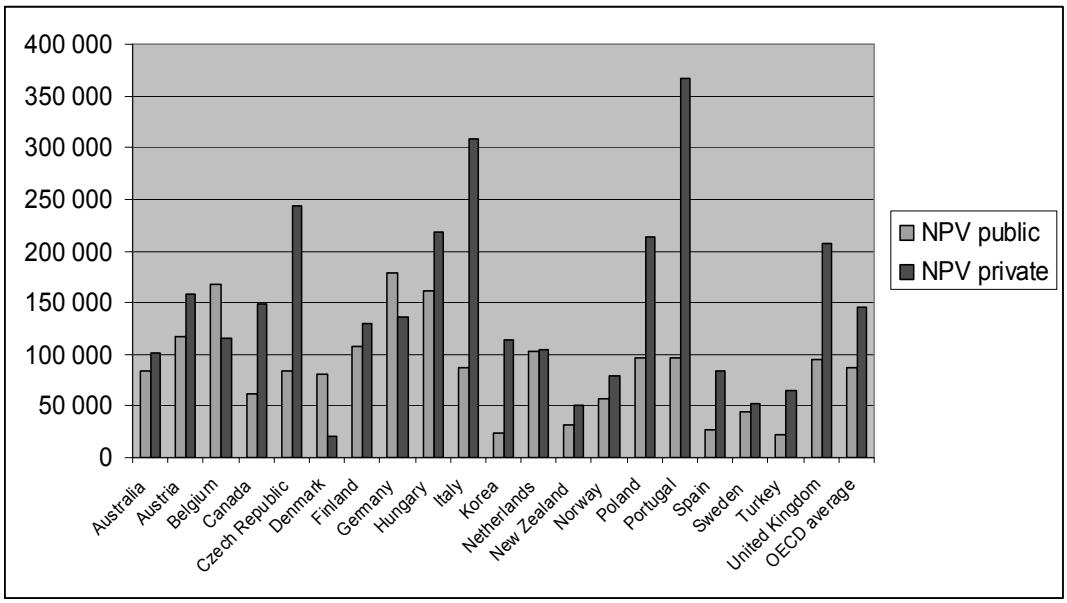
$$\ln w(s, x) = \alpha 0 + \rho s\, s + \beta 0 x + \beta 1 x^2 + \varepsilon$$

where s denotes years of schooling, x is experience (Folloni-Vittadini, 2010).

Another economist, Psacharopoulos (1994), has found out that the rate of return is positive for all types of education but the most for primary and secondary education, rather than tertiary education.

The empirical analysis of the 2010 edition of *Education at a Glance* shows that public resources invested in education ultimately pay off in even greater tax revenues. On average across OECD countries, a man with a tertiary education will generate an additional 119,000 USD in income taxes and social contributions over his working life compared to someone with an upper secondary level of education. Even after subtracting the public expenses spent to educate an individual, the remaining 86,809 USD is almost three times the amount of public investment per student in tertiary education. The chart below depicts the net present value (NPV) for selected OECD countries for tertiary education.

Figure 2: Public and private NPV in selected countries for tertiary education in dollars (male)[1]



Source: OECD - Education at a Glance, 2010

In most countries, the private net present value is higher than the public net present value, with the exceptions being Denmark, Germany and Belgium. Some policy makers like using this as an argument for transferring the costs of education from the public sector to the private sector, e.g., by introducing tuition at public schools. Overall, the net present value for both the private and public sectors is positive, regardless of the country, and ranged from 20,867 USD private net present value in Denmark to 366,728 USD private net present value in Portugal. This analysis provides support for both private and public investing in tertiary education and highlights the positive aspects of education in terms of forming the human capital.

The preceding cost-benefits analysis has provided sufficient evidence of the economic rentability of investment in tertiary education across OECD countries as both public and private net present values are positive. For these reasons, individuals should be motivated to bear costs in the present in order to increase their productive capacity and incomes in the future, just as government should motivate individuals to study.

3. Analysis of the increased tertiary attainment for the European Union countries

In this context, the European Strategy Europe 2020 set up one of its main goals for EU27 countries as follows: to increase the educated population so that it reaches 40% of

[1] The NPVs of females display similar results, but lie significantly below those of men.

tertiary educated people aged 30-34 by 2020. The more educated population should bring EU countries many positives on both private and public level.

Despite of the main goal of Europe 2020, several countries do not cope with this target in their national programs perhaps due to the fact that their current tertiary attainment is at a much lower level. (Seventeen countries have their national targets at the same level or above the Europe 2020 headline target but the remaining 9 countries set up the national target at a lower level (Note: UK did not specify the National Reform Program)).

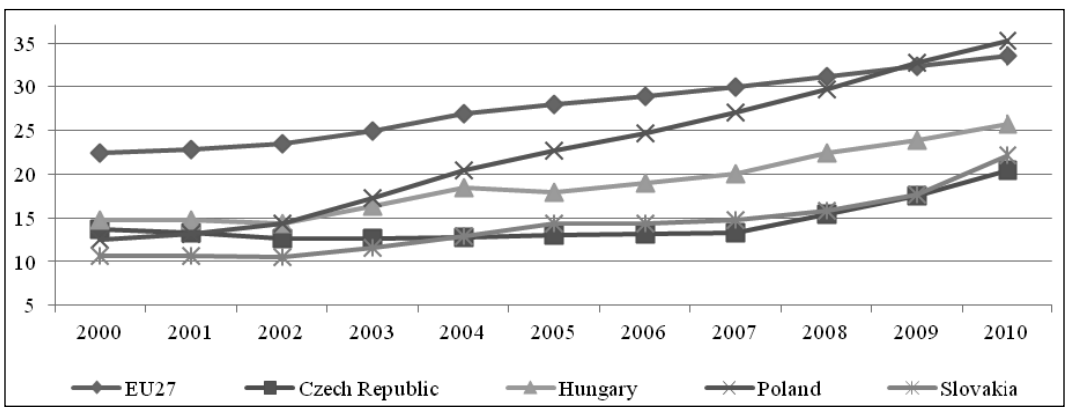
Table 1: National targets of EU27 countries in terms of tertiary attainment

T	E	G	Y	Z	E	K	E	L	S	I	R	U	E	T	T	U	V	T	L	L	T	O	E	I	K
8	7	6	6	2	2	0	0	2	4	2	0	0,3	0	6	0	0	4	3	0	5	0	6,7	0	0	0

Source: Europe 2020 at http://ec.europa.eu/europe2020

The following table indicates the percentage of the tertiary educated people aged 30-34 for the time period of 2000-2010 for EU27 average and Central European countries.

Figure 3: The percentage of tertiary educated people aged 30-34: selected countries



Source: own computation based on the date from Eurostat.

It is obvious that all observed countries' tertiary attainment is at a lower level than both the Europe 2020 target and their national targets; however, all of them have an increasing slope. There is likelihood that if such an increase continues, most of the EU27 countries will be able to reach the target of Strategy Europe 2020 and therefore, have more educated population.

Before we examine the positive and negative impact of increased tertiary attainment on an example of Slovakia, we try to examine the relationship between tertiary attainment and several other factors including the GDP per capita.

Relationship Between Tertiary Attainment and other selected Indicators: correlations and causalities

The impact of such an increased tertiary attainment should have – in regards to the previously described benefits of education – positive impact on several other factors such as GDP per capita. Also, with the increased tertiary attainment, it is expected that the R&D expenditure (expressed as a percentage of GDP) rises and the quality of tertiary educational system in a given country improves.

In the following section of our paper, we try to verify these relationships:

- the tertiary attainment is positively correlated with the GDP per capita of a country,
- the tertiary attainment is positively correlated with the R&D expenditure,
- the tertiary attainment is positively correlated with the quality of tertiary educational system in a given country (using academic rankings as a proxy for measuring the quality of tertiary education in a given country)[2].

The correlation among these indicators is presented in Table 2. Data is extracted from several international databases (Eurostat, OECD Education at a Glance database, the web sites of academic rankings) and serve as a base for constructing the panel data for the period of the years - 2003, 2005, 2007 and 2009 - for EU27 countries in addition to Switzerland, Norway, the United States and Japan. We decided to use the panel data analysis in order to obtain more reliable results by analyzing observations on multiple phenomena observed over multiple times in multiple countries. In this work, only correlation (R) of above 0.5 is determined to be an indicator of a strong correlation between the indicators: if a correlation of above 0.5 is found (whether positive or negative), it indicates that there is a strong relationship between selected knowledge economy indicators and tertiary educational indicators. The advantage of the correlation analysis is that, unlike the regression analysis, it shows how those variables affect each other regardless of the direction. On the other hand, it does not suffice in determining whether there is a cause-and-effect link between the variables (it would instead be determined by regression analysis at the later stage of this paper). At this stage, the correlation analysis suffices as we are interested in testing whether there is a correlation of any kind in between selected two variables and if so, how strong.

[2] The quality of education is difficult to be measured. Since the statistics rating the tertiary educational system of a given country are not available, we used the reputable academic rankings as a proxy for the quality of education. For the sake of our analysis, we used the Academic Ranking of World Universities (ARWU) and Times Higher Education Ranking (THE) and calculated the percentage of universities ranked in ARWU and THE by country.

Table 2: Correlations between selected indicators (panel data)[3]

	R&D	GDPCAP	TERAT	ARWU
GDPCAP	0,516			
TERAT	0,502	0,518		
ARWU	0,394	0,252	0,138	
THE	0,433	0,281	0,275	0,929

Source: Eurostat, OECD, web sites of ARWU and THE.

The correlation matrix reveal a strong correlation between the tertiary attainment and the GDP per capita of a country (correlation coefficient of 0.518) suggesting that the increased tertiary attainment could increase the productivity of a country and furthermore its GDP (even though at this stage we cannot determine which indicator is the dependent variable and which indicators are the independent variables).

There seems to be a strong correlation (correlation coefficient of 0.502) between the tertiary attainment and the R&D expenditure (R&D) which may mean that with increased number of universities and tertiary students, the government spares more of its GDP on R&D.

Unexpectedly, the correlations between the tertiary attainment and Percentage of universities ranked in Academic Ranking of World Universities by country (ARWU) or Percentage of universities ranked in Times Higher Education by country (THE) have not been confirmed (correlation coefficient of 0,138 and 0,275) suggesting that the countries with higher percentage of tertiary educated people do not necessarily have higher representation of their universities in the international rankings.

Since the quality of universities is what really matters, the question we pose at this moment is to what extent the selected indicators (tertiary attainment, GDP per capita, R&D expenditure in % of GDP and tertiary expenditure) affect the quality of universities (using the Academic Ranking of World Universities and Times Higher Education ranking as a proxy for quality)[4]. In order to examine these hypotheses, a simple regression analysis has been performed.

[3] R&D – R&D expenditure (both public and private expressed as % of GDP)
GDPCAP – GDP per capita
TEREX – Public expenditure per student, tertiary (% of GDP per capita)
TERAT – Tertiary educational attainment, age group 30-34 as a share on total population age group 30-34
ARWU – Percentage of universities ranked in Academic Ranking of World Universities by country
THE – Percentage of universities ranked in Times Higher Education by country

[4] There is likelihood that these indicators positively affect the success of universities to place highly in the academic rankings. Our expectations are that the higher the tertiary expenditure per student/GDP per capita/R&D expenditure/tertiary educational attainment of a country, the higher the country's chance to succeed in the academic rankings. The regression analysis does not include other indicators to avoid a multicollinearity.

Hypotheses:

H_0: there is not enough evidence to confirm the relationship between the success of universities to score well in the international rankings (as dependent variable) and tertiary expenditure per student, GDP per capita, R&D expenditure in % of GDP and tertiary educational attainment (as independent variables).

H_1: the success of universities to score well in the international rankings is dependent on tertiary expenditure per student, GDP per capita, R&D expenditure in % of GDP and tertiary educational attainment.

Regression analysis has been performed for the period from 2002 to 2006 for EU27 countries and the US and Japan (but only for those countries for which the data across all variables was available[5]) using Excel. In the first case, the dependent variable is the percentage of universities ranked in Academic Ranking of World Universities by country (ARWU) and the independent variables are tertiary expenditure per student, GDP per capita, R&D expenditure in % of GDP and tertiary educational attainment. In the second case, the dependent variable is the percentage of universities ranked in Times Higher Education by country (THE) and the independent variables remain the same as in the first case. Since there is a time lag in between the changes in the dependent variables, and their effect on the dependent variable, we considered t+3 in the case of dependent variables.

Table 3: Regression results for Academic Rankings (OLS)

Variable	ARWU coefficient	THE coefficient
constant	0,30902 (0.54)	-0,85999 (-1.01)
TEREX	-0,05067 (-3.3)***	-0,03463 (-1.52)
GDPCAP	0.00014 (4.51)***	0,000133 (2.95)***
R&D	0,49581 (2,14)**	0,440449 (1.28)
TERATT	-0,02069 (-1,03)	0,009465 (0.32)
No. of observations	118	118
Adjusted R-squared	0,24245862	0,14142113

Source: own computation based on international databases using Excel.
Note: ** significant at 5%, ***significant at 1%.

[5] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, United Kingdom

The results of their regressions indicate the following:

The overall explanatory power of the model (expressed by adjusted R^2) is higher in the case of ARWU being the dependent variable (adjusted $R^2 = 24.25\%$) than in case of THE (adjusted $R^2 = 14.14\%$).

In ARWU regression, there are three independent variables that are statistically significant – tertiary expenditure per student, GDP per capita, and R&D expenditure in % of GDP. The statistical significance of each variable is high as indicated by respected t-statistics. These results show that countries with higher GDP per capita and higher R&D spending are more successful in the world's 500 academic ranking compiled by ARWU (expressed as a percentage of successful universities of a certain country on the total number of universities in the ranking). Unexpectedly, the regression results also show that the tertiary expenditure per student is statistically significant but negative. The tertiary attainment has turned out to be statistically insignificant.

In THE regression, there is only one independent variable that is statistically significant – GDP per capita. This result shows that countries with higher GDP per capita are more successful in the world's 200 academic ranking (expressed as a percentage of successful universities of a certain country on the total number of universities in the ranking). The other three variables (tertiary expenditure per student, tertiary attainment, and R&D expenditure in % of GDP) are statistically insignificant and tertiary expenditure is even negative.

From our results, we can infer that the GDP per capita play the most crucial role from all observed variables in determining the quality of universities as defined by ARWU and THE in addition to the R&D expenditure in % of GDP in the case of ARWU (which is understandable since ARWU uses all research-based indicators).

Even though our regression show more the relationships and not the causality, we can infer that the tertiary attainment (age group 30-34 as a share on total population age group 30-34) is not significant for the success to place highly in the academic ranking. With such an unexpected finding, we further explore the positive and negative impact of increased tertiary attainment on an example of one EU27 country – the Slovak Republic.

Furthermore, we suggest examining other areas related to this study – such as the role of subject or interviewing graduates which, due to the limitations of this paper, has not been performed in this study.

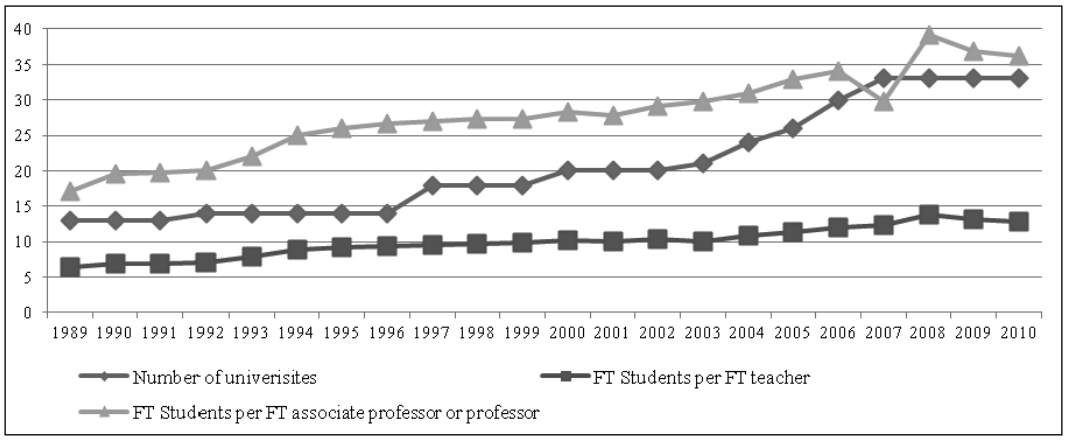
4. Analysis of the increased tertiary attainment for Slovakia

4.1 General information of the Slovak higher education

Slovak higher education has a relatively long tradition dating to 1919 when the first university – Comenius University – was established in the former Czechoslovakia. The second wave of the development of tertiary education was evident in the 1950s and 1960s when the percentage of the tertiary educated workforce in Slovakia reached over 3% (in Czech Republic it was 3.4%). The third period of development was after November 1989 (Verejná politika, 2002). Our further analysis concentrates on this latest period.

The following chart presents the number of universities in Slovakia as well as the number of students per teacher and the number of students per associate professor or professor.

Figure 4: Core data of Slovak higher education system (years 1989-2010)



Source: own computation based on data from the Statistical Office of the Slovak Republic and the Institute of Information and Prognoses of Education in Bratislava (UIPS, 2011).

It is evident that the number of universities grew rapidly – in 1989 there were only 13 universities, whereas in 2010 there were 33 universities. The 34th and 35th were established in 2011. The number of students grew at an even higher rate – in 1989 there were 51,299 full time students whereas in 2010 the number exceeded 139,716 (UIPS, 2010). The increase in the number of students naturally transfers into a higher number of graduates and a more educated workforce at the later stage. Considering the benefits of education as outlined before, such rapid growth in tertiary education among the Slovak population should be viewed very positively.

Enlarging the number of tertiary graduates is greatly supported by the European Union and Slovak government as is clear from Europe 2020 and the Slovak National Reform Program. More specifically, as was previously stated, one of the Europe 2020 headline targets is to have the share of people aged 30-34 completing the third level education reach at least 40% by 2020. The previous Slovak Ministry of Education established its target at the same level in the Slovak National Reform Program, thus 40% (Europe 2020).

In 2010, 22.1% of people aged 30-34 in Slovakia had attained tertiary education; therefore, Slovakia at a substantially lower level than both the Europe 2020 target and most of the selected countries. Even though Slovak tertiary attainment is relatively low compared to the other EU countries, it is worth stating that the increase in Slovak tertiary attainment for the period of 2000-2010 was one of the most rapid: tertiary attainment increased 2.08 times in Slovakia whereas the average increase in the EU27 countries was 1.5. Only Poland, Malta, and Luxembourg had a higher increase in tertiary attainment in

the observed time frame (Eurostat, 2012). If such increase continues, there is a probability that the Slovak tertiary attainment will reach the Europe 2020 headtarget of 40%.

In regards to the benefits described earlier in the paper, such an increase should be very prosperous for the country, especially when the unemployment rates are taken into account[6].

On the top of that, the salaries of tertiary graduates are much higher to the salaries of high school graduates which has a positive impact on the individuals but also on the society in terms of collecting larger amounts of taxes paid[7].

4.2 Return on investment in the Slovak Republic

The Slovak Republic is not included in the previously mentioned OECD Education at a Glance study but this deficiency has been, to some extent, compensated for by the analysis of the Slovak Financial Policy Institute (IFP), which estimated the net present value of Slovakia using the OECD methodology. According to the analysis of IFP, the public net present value of a tertiary educated male in Slovakia is 94,903 USD, and the private net present value of a tertiary educated male is 240,994 USD (IFP, 2011). In this regard, a significant observation can be made: the private net present value for a Slovak male is the fourth highest among OECD countries (only Portugal, Italy and the Czech Republic have higher NPVs)[8].

The IFP also provides an analysis of the private internal rate of return of Slovakia and compares it with the other OECD countries. Its findings are rather positive as the private IRR for a tertiary educated male in Slovakia (22%) is much higher than the average IRR of the OECD countries (12%). In fact, the Slovak IRR is the highest after the IRR of the Czech Republic (IFP, 2011). In this context, Belovicsová (2010) suggests increasing the expenditure on Slovak tertiary education and proposes that students bear more significant costs. She views the increased spending on tertiary education as a must to enhance Slovak tertiary education in the knowledge economy.

4.3 Problems accompanying the increase of tertiary educated people for Slovakia

In the previous section, we have described the benefits of increased education and pointed at a fact that Slovak tertiary attainment is on a rise. In this section, we analyze the negative side of the increased tertiary educated workforce. We base our analysis on the theoretical background as well as faculty and employers views on the current Slovak higher education.

In spite of the obvious benefits of the increased tertiary attainment for Slovakia, it

[6] In Slovakia, the unemployment rate of university graduates is 5.1 (master's degree) whereas the unemployment rate of high school graduates is 13.1 (Eurostat, 2010).

[7] In Slovakia, the average annual earning of a tertiary graduate was 8,304 euros in 2002 whereas the annual earning of a high school graduate was 4,739 euros (Eurostat, 2010).

[8] The private net present value for a Slovak female is the fifth highest from the OECD countries.

also brings many problems, especially due to the fact that the increase has been very rapid. Besides the need for increased government spending, it also presents a challenge for the universities to handle such a massive increase of students (the fourth highest in the EU27; Eurostat 2012), a challenge that universities have been unable to overcome as many authors (Kureková, 2010; ARRA, 2011; Ministry of Education, 2009; and others) refer to a decline in the quality of Slovak higher education. In this matter, several observations are to be made.

First, the increase in the numbers of teachers, associate professors and professors (in the period of 1989-2010) did not keep up with the increase in the student population (Chart 4, UIPS, 2010) and, as a result, the student-teacher ratio has doubled. The increase of over 100 percent more students per teacher in 2010 compared to 1989 is likely to mean 100 percent more workload for tertiary teachers and general staff. On the other hand, Slovak higher education teachers face approximately the same student-teacher ratios as many other countries in the OECD. In Slovakia, the average student-teacher ratio for tertiary education in 2009 was 15.6 students per teacher compared to the OECD average of 14.9 and EU21 average of 15.5 (OECD Education at a Glance, 2011). Palaščáková's (2008) survey reveals that teachers rate the student-teacher ratio as the most significant quality indicator in tertiary education and therefore they may be discontented with the increased number of students per teacher.

Second, the funding for both tertiary education and research has been declining in the last decade, which is generally claimed to be a significant cause of the deterioration of Slovak universities (Palaščáková, 2008; Čaplánová, 2007; and others). Public expenditures on tertiary education, as a percentage of GDP, dropped from 4.18% in 1999 to 3.62% in 2007 (Eurostat) and, similarly, the expenditure per tertiary student (% of GDP per capita) dropped from 32.9% in 1999 to 24% in 2005 (World Bank). The low funding of tertiary education is one of the reasons that negatively influences the quality of tertiary education.

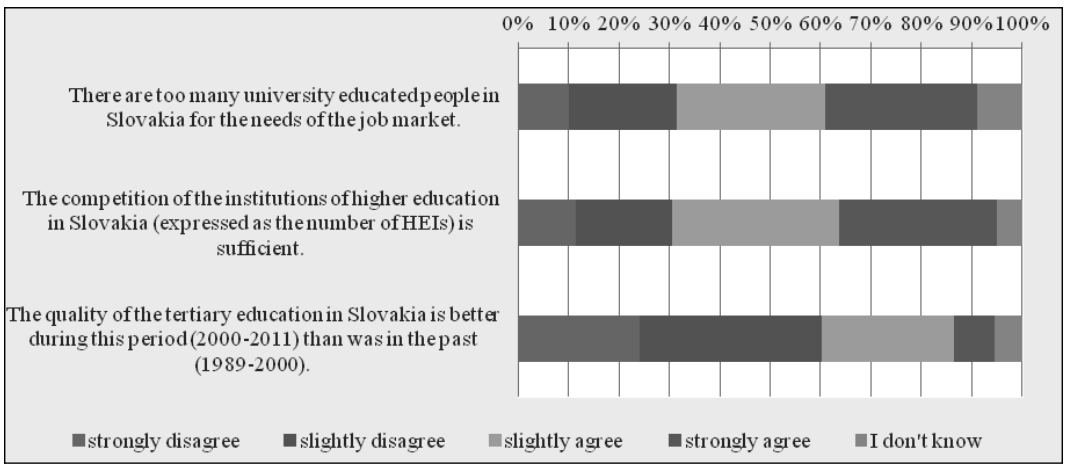
Third, despite of the increased tertiary education within the last decade, none of the Slovak universities has succeeded in placing in the reputable academic rankings – ARWU and THE – which suggests that the quality of Slovak tertiary education is lagging behind its quality.

Last, the results of our teachers' and employers' surveys that we conveyed in the period of April 2011-June 2011 are rather critical of the increased numbers of students and HEIs in Slovakia[9]. 59% of teachers (sample of above 1,300) and 64.5% of employers

[9] The electronic survey among the academic staff (called the "teachers" herein), students and employers in order to gather the opinions of people who are the most involved in the education process. The questionnaire was distributed by email to more than 7,818 teachers employed at Slovak universities and more than 9,020 students studying at the Slovak universities with the response rate of 20.23% in case of teacher respondents and 15.61% in case of student respondents. The relevant population was obtained from public data, Institute of Information and Prognoses of Education in Bratislava which reports that there are 12,908 teachers employed at HEIs in Slovakia and approximately 221,669 students studying at HEIs in Slovakia (UIPS, 2010). Email addresses were collected from the Websites of universities. In the body of the email, the recipients were guided by the link to the electronic survey placed on the portal www.surveymonkey.com.This paid

(sample of above 250) think that *'there are too many university educated people in Slovakia for the needs of the job market*' and 64% of teachers think that *'the competition of the institutions of higher education in Slovakia (expressed as the number of HEIs) is sufficient.'* Obviously, Slovak teachers and employers share a different opinion than government officials and believe that the number of tertiary educated people is sufficient. Therefore, the target of Europe 2020 that 40% of 30-34 year-olds have a tertiary education does not seem to be supported by people who work most closely with education. What's even more alarming is the fact that both teachers and employers express dissatisfaction with the quality of Slovak higher education. Only 34% of teachers agree that *the quality of tertiary education is better now than in the past*. In terms of employers' responses, 41.6% of them agree with the statement that *University alumni are better prepared to succeed in the job market nowadays than they were in the past* and only 39% agree that *their employees with university education are more productive than their counterparts with high school education*.

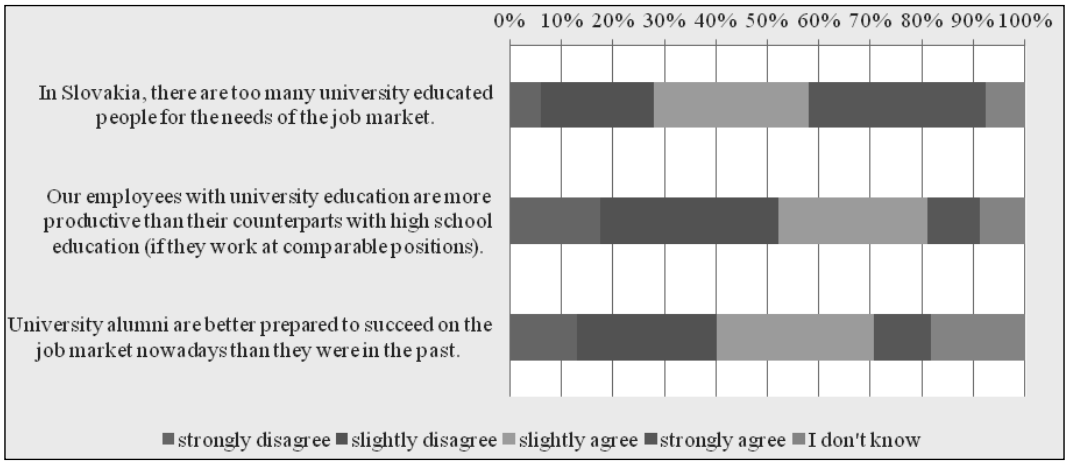
Figure 5: The results of teachers' survey regarding the numbers of students and the quality of tertiary education in Slovakia



Source: own survey (1387, 1395 and 1404 respondents respectively).

service (if more than 10 questions are posed) played a vital role in collecting 1,582 teachers' responses and 1,408 students' responses. Most Slovak universities were included in the survey with the exception of a few private universities due to the fact that the email addresses of the teachers of private universities are generally not listed on their Websites (the list of universities is provided in the later stage). Nonetheless, not all respondents answered all questions in the survey, which explains the variation in the number of responses for a particular question. Also, a few completed surveys had to be ignored since the respondents did not belong to the observed category (e.g. a student stated that he attends University of Cambridge or a teacher stated that he no longer works at the institution of higher education). The surveys also provided demographic information which can be crucial in determining whether the sample can be considered representative of the population of teachers and students.

Figure 6: The results of employers' survey regarding the numbers of students and the quality of tertiary education in Slovakia



Source: own survey (279, 274 and 274 respondents respectively).

This section provided us with many negatives of the increased tertiary education. It is evident that the increase of tertiary educated people does not seem to be supported by people who have the most to say about the education.

Also, the quality of tertiary education seems to be negatively affected which supports our hypothesis that 'a rise in tertiary attainment has not been accompanied with a rise in quality education in Slovakia'. This is in line with the results of our regression analysis which does not confirm the strong relationship between the tertiary attainment and the quality of tertiary education.

On the top of that, the unemployment of young people in Slovakia has recently been on the rise and the jobless rate among young people in Slovakia was the fifth highest in the European Union in November 2012 (Eurostat, 2012). Sadovská, the analyst of Postova banka added that problems might emerge from the poor links between the education system and the job market (Spectator, 2012).

5. Conclusion

Based on our previous analysis, Slovak higher education does seem to have more pressing problems with its quality rather than quantity. The plan is that there will be 40% of tertiary educated people aged 30-34 in Slovakia in 2020 which would be in line with the Europe 2020 headline target. There is no doubt that this target is important for the development of human capital in terms of a knowledge economy and if achieved, it would bring many positives to Slovakia and other EU countries that achieve it. On the other hand, as our analysis proves, there are many negatives of such a rapid increase in the tertiary attainment such as increased student-faculty ratio, insufficient funding and most important,

the fact that the quality of Slovak higher education is often rated as deteriorating. For these reasons, we dare to critique the Europe 2020 headline target of increased tertiary attainment (as well as the National Program Reform) and instead lean towards a lower increase on the educated workforce with an emphasis on the quality of the higher education.

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