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TERTIARY EDUCATION: WHERE TO? AN ANALYSIS AT THE REGIONAL LEVEL IN ROMANIA

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Abstract:
Education, alongside of employment, research and innovation, climate change and energy, and combating poverty are the fundamental directions of action within the framework of the Europe 2020 strategy. Though still before 1990, Romania has granted very high attention to this area, unfortunately, next years have marked a series of regressions which led to alarming increases in dropout rates. In 2002, the rate of persons who leave early systems of education and vocational training between the ages of 18 and 24 recorded in 2002 a level of 23%. On the other hand, the economic crisis has had a strong impact on this indicator. If in the period 2003-2008 it had fallen to 15.9%, in 2013 was 17.3%, the 2020 target is 11.3%. Based on these observations, the paper analyzes the evolution of tertiary education in Romania, at the regional level in the period 2003-2013 and the ways that it is influenced by the evolution of gross domestic product in developing regions in Romania.

Key words: dropout, econometric model, Romania, tertiary education.

JEL classification: C320, I250, I290, R110

1. INTRODUCTION

Until 2013, according to the International Standard Classification of Education (ISCED 97), tertiary education was by level 5, and access to it was a condition of completion of upper-secondary education. Regarding the structure of tertiary education, there were two categories: short cycle (the duration of studies was 2-3 years and at the end of study finalized with the graduation diploma) and long-cycle (the duration of studies was 4-6 years and at the end of study finalized with the Bachelor's degree).

After 2013, according to the International Standard Classification of Education (ISCED 2011) tertiary education contents and academic education license with durations of studies by 3-4 years (level 6), academic education license with durations of studies by 5-6 years (level 7) and higher education with doctoral studies and postdoctoral (level 8). Although in UE28 is acting towards convergence in all fields, in education, in Romania still exists some particularities (Enăchescu and Zaharia, 2013) also related to the development and implementation of ICT in education (Enăchescu, 2014) and other sectors (Zaharia et al., 2010)

In the Europe 2020 Strategy, the target for tertiary graduation rates is 40%. For many European countries, included Romania this target is very difficult to achieve. The tertiary graduation rate has to be increased by more than 20% by 2020, which means more than doubling the number of tertiary graduates in just one decade. (Roth and Thum, 2010).

Low graduation rate of tertiary education and dropout produce serious consequences, easy to predict, such as: unemployment, poverty, low quality of life.

Dropout is determined by a variety of factors and it should be analyzed by two points of view, firstly from the individual perspective of dropping out (such as motivation, etc.) and secondly from the institutional perspective (Rumberger, 2001).

Dropout from learning is not only (or perhaps mainly) the result of academic weakness. Unforeseen financial difficulties may play a role in many cases, particularly when brought on by such factors as tuition fee increases or a downturn in the economy (with less student employment opportunities). In such circumstances, the availability of student loans (for tuition fees or for living expenses, as appropriate) may be important in mitigating potential student dropout. (Ziderman, 2013).

Another aspect to be considered in analysis of tertiary education is the migration for education. Within the last years, an ever higher number of youngsters started migrating – at least temporarily – to finish their studies. These international students are not always considered migrants, in the formal sense of the word, but they do have a significant social and economic impact, not only in the countries they leave behind, but also in the ones where they study. In many cases, this migration for education is also a prelude for longer trips abroad or even permanent emigration. (Pociovălşteanu, 2012). Half of all incoming students from inside the European Higher Education Area choose United Kingdom, Germany, France and Austria as their study destination. (Nicolescu, 2014)

In elaborating this study, the research method used was the quantitative method, based on linear multi-factor econometric model. (Zaharia and Gogonea, 2008).

Econometric analysis aims to identify a functional relation between percentage of total population for age 18 to 24 years which early leavers from education and training, percentage of population aged 25-64 with tertiary education and GDP per capita, at regional level in Romania.

The main problems pursued in analysis are: estimation of parameters of the model, the quality of the estimate, the verification of the hypothesis, quality of prediction, the choice of the best model and parametric and nonparametric correlations. In the analysis, as IT support, were used SPSS and Excel (Oprea and Zaharia, 2011) and were used the official data series provided online by the Eurostat on the above-mentioned indicators, for the period from 2003–2013, and for the following economic development regions of Romania: North West, the Central Region, North-East, South-East, South-Muntenia, Bucharest-Ilfov, South-West, West.

The Evolution of Territorial Distribution on the Population with Tertiary Education

In the period 2003-2013, the percentage of population with tertiary education in the total population aged 25-64 years have been upward trends, both in Romania and in the four Macro-regions. Average annual increases have ranged from 0.49 percentage points in Macro 2 and 0.76 percentage points in Macro 3, average annual growth in Romania was 0.61 percentage points (Fig. 1).

In the same period, at the level of EU-28, the average annual growth rate was 0.77 percentage points, with 0.16 percentage points more than in Romania. These evolutions have made that the gap between Romania and EU-28 in this area to grow up from 11.2 percentage points in 2003, to 12.8 percentage points in 2013. It is also pointed out that in none of macro regions haven't recorded growth which leading to convergence towards the EU average.

Regarding the evolution of the gender of the population with tertiary education, in the period under review recorded some differences.

The share of population with tertiary education, the male population, increased by an annual average values between 0.37 percentage points in Macro 2 and 0.57 percentage points in Macro 3. With the exception of Macro 2, both in the other macroregions and in Romania the gap average from UE28 has continued to increase. Noting that, in 2009, with the exception of Macro 4, there has been a stagnation and even regression (Macro 1) of share of male population with tertiary education. This is a consequence of the outbreak of the economic crisis which has led to unemployment and reducing the incomes of households. Also, the percentage of the female population with tertiary education in the total female population aged 25-64 years has registered

increases. Their annual average values have evolved between 0.60 percentage points in Macro 2 and 0.96 percentage points in Macro 3.

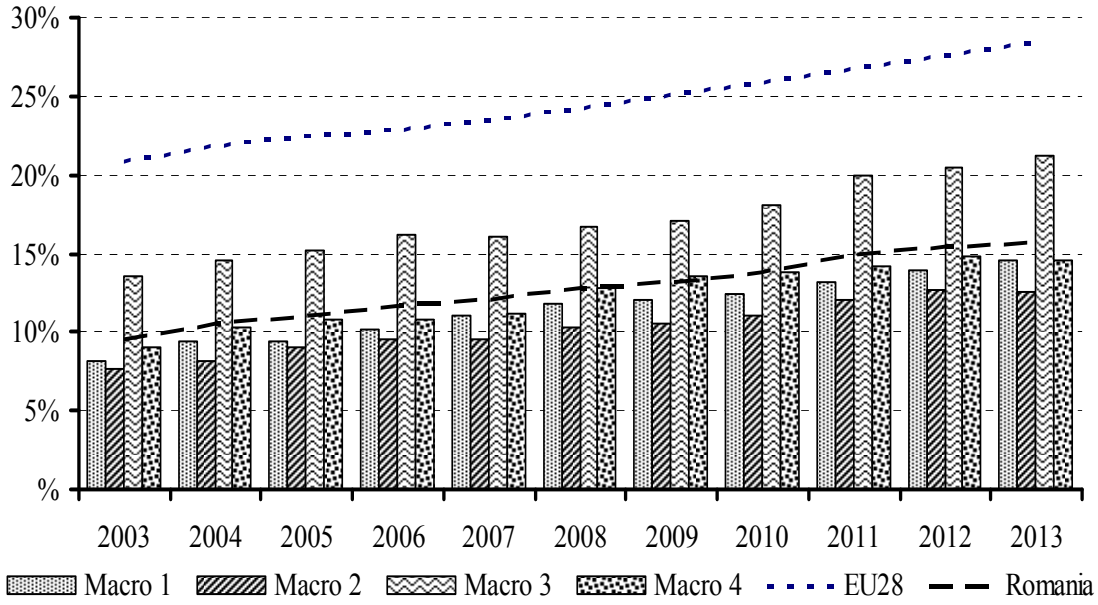

Figure 1 - Population aged 25-64 with tertiary education attainment at Macro level

Source: own construction based on Eurostat data series: http://ec.europa.eu/eurostat/data/database, Population aged 25-64 with tertiary education attainment by sex and NUTS 2 regions [edat_lfse_11], accessed on 15.02.2015

Comparing the annual average increases of persons with tertiary education in the male population, respectively the female population, results that increases recorded by the share of tertiary education in the female population is higher than those recorded in the case of the male population. If until 2008, the share of male population with tertiary education was higher than that of the female population, starting 2009 the places are change Thus, at the level of Romania in 2003, 10.3% of the male population aged 25-64 years have tertiary education, while the female population share was 9.1%, in 2013 the share of female population with tertiary education reaches 16.4%, and the share of the male population reaches only 14.9%.

In Romania, this change of places occurred since 2009 and it could be a consequence of the decline in the standard of living due to the breakout of the economic crisis. But on the other hand, considering the fact that this phenomenon has been posted at EU-28 level since 2006 and continues to increase (in EU-28, the difference between the share of the female population with tertiary education and the share of male population increasing from 0.1 percentage points in 2006 to 2.9 percentage points in 2013), this phenomenon is also the consequence of increasing the role of the female population in the EU countries.

In the period 2003-2013, the evolution of population aged 25-64 with tertiary education attainment at development region levels recorded both similarities and differences. Of course, the largest share of the population aged 25-64 with tertiary education was recorded throughout the period, in Bucharest-Ilfov region where their share has increased from 22.6% in 2003 to 33.3% in 2013, the biggest increase recorded by 2011, with 2.8 percentage points from the previous year.

Also, in 2008 the share of population aged 25-64 with tertiary education exceeds the average value of the EU-28 with 4.7 percentage points, and with 16.5 percentage points, the value of this indicator registered in Romania. After 2011, the intensity of increase has decreased so that in 2013, the share of population aged 25-64 with tertiary education in Bucharest-Ilfov region was with 4.8 percentage points over the average EU-28 and with 17.6 percentage points above the average recorded in the country.

In the others seven development regions of Romania (Fig. 2), evolutions have been more modest. The values recorded in these were far below the average of both EU-28 as well as below

the average recorded in Romania. So in 2013, the biggest gap was recorded in the regions North-East and South-Muntenia (-13.6 percentage points compared to the average registered in EU-28 and -2.4 percentage points compared to the average registered in Romania), and in 2013, the last place was occupied by South-Muntenia region (-16.6 percentage points compared to the average registered in EU-28 and -3.8 percentage points compared with the average registered in Romania).

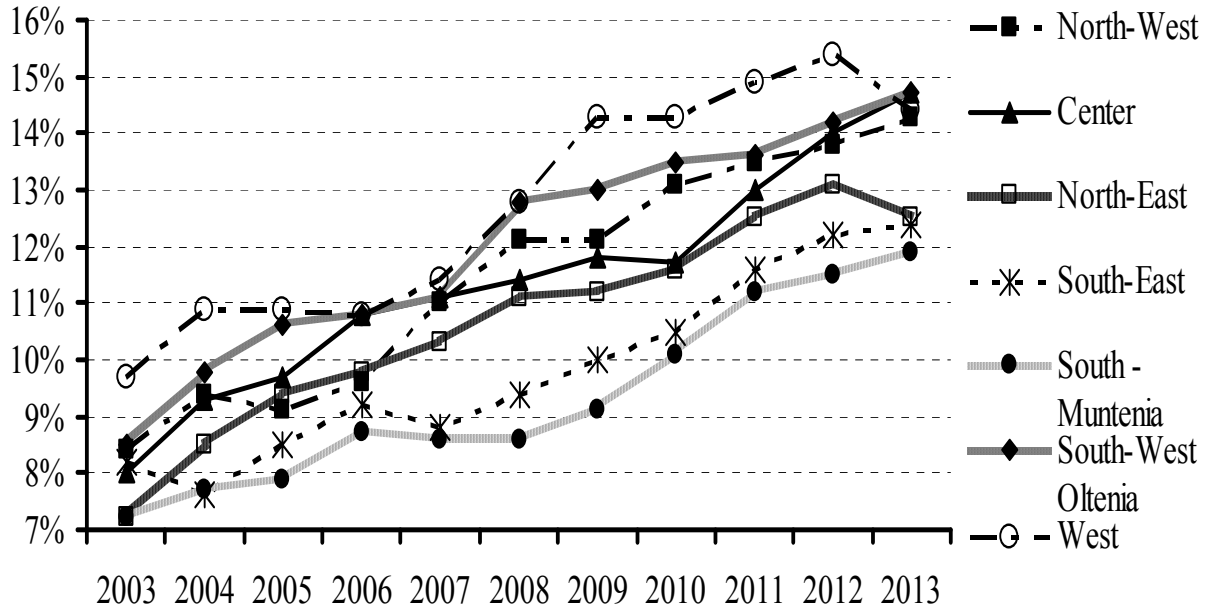

Figure 2 - Population aged 25-64 with tertiary education attainment at development region levels without Bucharest-Ilfov region

Source: own construction based on Eurostat data series: http://ec.europa.eu/eurostat/data/database, Population aged 25-64 with tertiary education attainment by sex and NUTS 2 regions [edat_lfse_11], accessed on 15.02.2015

Economic evolutions from the period 2003-2013 have influenced the evolutions of share population aged 25-64 with tertiary education in the seven regions causing periods of convergence and periods of divergence. Thus, if in 2003 differences between the highest and the lowest share was 2.5 percentage points, in 2006 this difference drops to 2.1 percentage points, and in 2009 to 5.2 percentage points, the highest value recorded in the West Region by 14.3% , and the lowest in South-Muntenia region by 9.1% . In 2013, the gap was reduced to 2.8 percentage points, the biggest values registering in the South-West Oltenia and Center regions (14.7%), and lowest in South-Muntenia region 9.1% (11.9 percent).

Analyzing the evolutions of the shares population aged 25-64 with tertiary education it can observed a grouping of the seven regions into two groups. The first group includes the North-West, Center, South-West Oltenia and West regions, with the values of the shares of the population aged 25-64 with tertiary education ranging from 14.3% to 14.7%. The second group includes the Moldova and Eastern of Muntenia regions (North-East, South-East and South-Muntenia) with the values of the shares of the population aged 25-64 with tertiary education between 11.9% and 12.5%.

Regarding the shares of male population and female population with tertiary education regions by the regions, in generally remains the trend highlighted above regarding gap of share of male population with education tertiary by the female population with tertiary education. Exception makes the West region where, throughout the period under review, the share of male population with tertiary education to exceed the value recorded by the female population. Thus, while in EU-28, at the level of Romania and in all other regions the differences between shares of male population and female population with tertiary education were negative; in the West region the

difference was by 2 percentage points (15.5% for the male population and 13.5% of the female population).

2. EVOLUTIONS OF DROPOUT RATE

Percentage of population from 18 to 24 years which early leavers from education and training to the total population in the period 2003-2008 had a downward trend, approaching the average of EU-28 (Fig. 3). If in 2003 in Romania, the percentage population from 18 to 24 years which early leavers from education and training was 22.5%, with 6.1 percentage points, in 2008 it reduced to 15.9%, with 1.2 percentage points than EU-28 average.

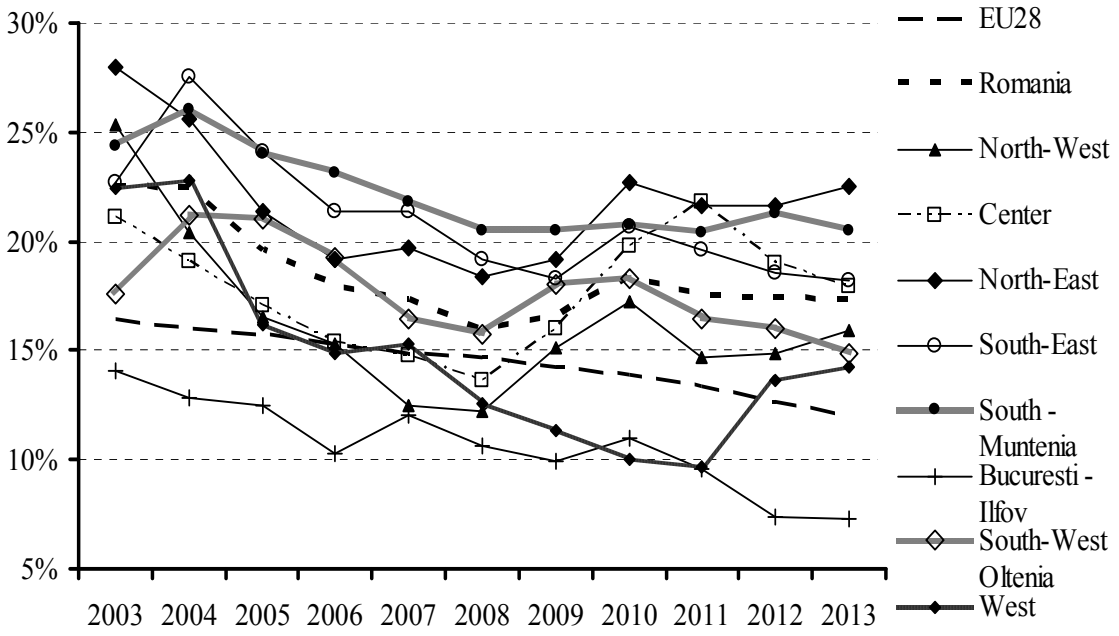

Figure 3 – Evolution of percentage of total population from 18 to 24 years which early leavers from education and training by NUTS 2 regions.

Source: own construction based on Eurostat data series: http://ec.europa.eu/eurostat/data/database, Early leavers from education and training by sex and NUTS 2 regions [edat_lfse_16], accessed on 27.02.2015

The most significant decreases of percentage of total population from 18 to 24 years which early leavers from education and training in the period 2003 - 2008, over the average decrease at Romania level, were registered in the regions of North-West (from 23.3% to 15.9%), the West (from 22.4% to 12.6%), the North-East (from 28.0% to 18.4%) and Center (from 21.1% to 13.6 %). However, in 2008, in four of the eight regions of Romania the percentage of total population from 18 to 24 years which early leavers from education and training, was over EU-28 average with the values between 5.8 percentage points in South-Muntenia region and 1.0 percentage points in South-West Oltenia.

Unfortunately, in the period 2008-2013, in most regions appear negative phenomena which lead either to the decrease of the rate reduction the percentage of total population from 18 to 24 years which early leavers from education and training, either its increases. In 2013 compared to 2008, in EU-28 the percentage of the total population from 18 to 24 years which early leavers from education and training, decreased by 2.8 percentage points. Compared to this evolution, with the exception of the Bucharest-Ilfov region where the decreases was 3.3 percentage points, in all other seven regions have registered unfavorable evolutions in comparison with the EU average. The most unfavorable evolutions were registered in the Center, North-East and North-West regions, where in 2013 the percentage of the total population from 18 to 24 years which early leavers from education and training, reaching 17.9%, 22.5% and respectively 15.9%. On the other hand, although in the

South-East region the percentage of total population from 18 to 24 years which early leavers from education and training, decreases with 1.0 points, this was 18.2 percent, over average of EU-28 (12.0%) and over average of Romania (17.3).

The evolution of the percentage of total population by gender from 18 to 24 years which early leavers from education and training, record some differences. In comparison with the values recorded for the total population aged 18-24 years, in 2008 the percentage of male population which early leavers from education and training, was under the average EU-28 in five regions (North-West Center Bucharest-Ilfov South-Muntenia West, and West), while the percentage of female population which early leavers from education and training, was below the average EU-28 in only four regions (North-West, Center, Bucharest-Ilfov and West). Comparing the percentages of male and female populations of which early leavers from education and training, at level of EU-28, the corresponding percentages of male population are higher than those recorded by the female population.

In Romania, except Bucharest-Ilfov region where recorded an evolution similar to the Europe, in the other regions differences are both positive and negative, being determined primarily by characteristics of economic evolutions in each region. A special situation is recorded in South-West Oltenia region where the whole period under review, the percentages of female populations which early leavers from education and training, is significantly higher than the corresponding male population. Thus, in 2003 the percentages of female populations which early leavers from education and training was 21.2%, compared with 13.8% for the male population, values recorded in 2008 was 18.8% respectively 12.6%, and in 2013 the percentages of female populations which early leavers from education and training was 16.0% compared with 13.9% for the male population.

3. CORRELATIONS AND IMPLICATIONS

The percentage of total population from 18 to 24 years which early leavers from education and training is an important indicator in evaluating the place occupied by Romania between countries of EU-28. Till now, values recorded are far from the 2020 target (11.3%).

Starting from the above observations and conclusions and as the evolution of GDP per capita in the period 2003-2011 were tested two hypotheses: on the one hand the existence of correlations between percentage of total population from 18 to 24 years which early leavers from education and training, percentage of population aged 25-64 with tertiary education and GDP per capita, on the other hand the existence of a functional relation between these. The significance level was $\alpha = 0.05$, corresponding to a probability of 95%. For testing the existence of correlations between the three variables, the hypotheses were:

H0: No significant dependence between parameter values

H1: Between percentage of total population from 18 to 24 years which early leavers from education and training, percentage of population aged 25-64 with tertiary education and GDP per capita there are significant correlations.

Testing the null hypothesis (H0) was carried out from three rows of 72 registered values of the indicators analyzed in period 2003-2011 in the eight development regions. The results are presented in table 1. Both values corresponding nonparametric correlations (Kendall and Spearman) and the Pearson correlations indicate the inverse strong relations between percentages of total population from 18 to 24 years which early leavers from education and training (E_L), percentage of population aged 25-64 with tertiary education (T_E) and GDP per capita.

Taking into account the fact that all values of bilateral test (SIG. 2-tailed) are lower than the significance threshold result that the null hypothesis (H0) is rejected and accepted alternative hypothesis (H1): between the percentage of total population from 18 to 24 years which early leavers from education and training (E_L), percentage of population aged 25-64 with tertiary education (T_E) and GDP per capita there are significant correlations.

Table 1 Correlation between variables E_L, T_E and GDP

		Pearson			Kendall			Spearman		
		E_L	T_E	GDP	E_L	T_E	GDP	E_L	T_E	GDP
E_L	Value	1			1			1		
	Sig.(2-tailed)	0.000			0.00			0.00		
T_E	Value	-0.714	1		-0.609	1		-0.779	1	
	Sig.(2-tailed)	0.00	0.00		0.00	0.00		0.00	0.00	
GDP	Value	-0.734	-0.892	1	-0.619	0.621	1	-0.789	-0.796	1
	Sig.(2-tailed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: own assessments using SPSS

For testing the existence of a functional relation between the percentage of total population from 18 to 24 years which early leavers from education and training (E_L) and percentage of population aged 25-64 with tertiary education (T_E) and GDP there is a significant functional relation has been chosen the model:

$$E\_L = a_0 + a_1 \cdot T\_E + a_2 \cdot GDP + \varepsilon \quad (1)$$

The hypotheses of the test were:

H0: There aren't significant functional dependencies between the parameter values E_L, T_E and GDP.

H1: Between the parameter values E_L, T_E and GDP there is a significant functional dependence characterized by the model (1)

Taking into account the fact that the Bucharest-Ilfov region presents a series of particularities, statistical significance testing of the model (1), was carried out in two variants. In the first variant (Variant A) have been taken into account the values of the three parameters recorded during the period 2003-2011 in all 8 regions. In the second variant (Variant B) have been removed parameter values, E_L T_E and GDP, values recorded in Bucharest-Ilfov region resulting in three data series of 63 submissions. The results are presented in Table 2.

Taking into account the Significance values F (6.64E-13 variant A and 6.53E-14 for variant B) much lower than the significance threshold chosen ($\alpha = 0.05$), result that the null hypothesis (H0) is rejected and accepted alternative hypothesis (H1): between E_L T_E values, and GDP there is a significant functional dependence described by model (1).

Table 2 Comparison between the performances of A and B variants of the model (1)

Variant A: 8 regions					
Multiple R	**R Square**	**Std.Err**	**Observations**	**F**	**Significance F**
0.74590	0.55637	3.13867	72	43.26873	6.64E-13
	Coefficients	t Stat	P-value	Lower 95%	Upper 95%
a_0	24.70210	26.69542	4.28E-38	22.85612	26.54809
a_1	-0.23464	-1.63452	0.106704	-0.52104	0.051742
a_2	-0.00073	-2.68099	0.009175	-0.00127	-0.00019
Variant B: 7 regions (without Bucuresti-Ilfov region)					
Multiple R	**R Square**	**Std.Err**	**Observations**	**F**	**Significance F**
0.79780	0.63650	2.53119	63	52.53113	6.53E-14
	Coefficients	t Stat	P-value	Lower 95%	Upper 95%
a_0	33.75014	18.15863	4.65E-26	30.03233	37.46795

a_1	-0.84116	-3.46870	0.00097	-1.32623	-0.35609
a_2	-0.00141	-4.21800	0.00008	-0.00208	-0.00074

Source: own assessments using SPSS and Excel (Data Analysis)

Taking into account the values of Multiple R and Std.Err, result that Variant B offers a better approximation of dependence of E_L and factorial variables T_E and GDP. This conclusion is underlined by the fact that, in the case of the variant A, the coefficient a1 corresponding variable influence T_E (percentage of population aged 25-64 with tertiary education) on E_L (percentage of total population from 18 to 24 years which early leavers from education and training), for the selected significance threshold, is not statistically significant (P_value=0.106704>0.05) and, in consequence, can not be taken into account.

On the other hand, taking into account the above observations, we believe that the model Variant B is the one that can be taken into account to describe the functional relation between percentage of total population from 18 to 24 years which early leavers from education and training and the factorial variable percentage of population aged 25-64 with tertiary education and GDP.

In these circumstances, with a probability of 95%, can be considered that an increase of 1 percentage point of percentage of population aged 25-64, with tertiary education, will cause a decrease of percentage of total population from 18 to 24 years, which early leavers from education and training, with a value between 0.35 and 1.32 percentage points. Also, GDP per capita growth with 1000 euro can lead to reduced percentage of total population from 18 to 24 years which early leavers from education and training with values between 0.74 and 2.08 percentage points.

4. CONCLUSIONS

Economic evolutions in the period 2003-2013 influenced the evolutions of shares of population aged 25-64 with tertiary education in the seven regions causing periods of convergence and divergence of these. In seven of the eight development regions of Romania, the ratio between the male population and female population with tertiary education is the same as in the EU: the share of female population with tertiary education in the total female population aged 25-64 years is higher than share of male population with tertiary education in the total male population aged 25-64 years. The exception is the West development region where, in the entire analyzed period the share of male population with tertiary education is higher than that of the female population.

In the period before the economic crisis, the share of the population from 18 to 24 years which early leavers from education and training in the period 2003-2008 had a downward trend closer to the average for the UE28. Unfortunately, the economic crisis has not only stopped the process, but reversed its trend of development. Thus, while in 2013, compared to 2008, in the UE28, the share of total Population from 18 to 24 years which early leavers from education and training, decreased by 2.8 percentage points, with the exception of the Bucharest-Ilfov region, all the other seven development regions were recorded unfavorable developments. The most unfavorable developments were recorded in the regions Center, North-East and North-West. So far, the values recorded by the share of the population from 18 to 24 years which early leavers from education and training are relatively far from the 2020 target, which for Romania is 11.3%.

The model estimated in this study shows the influence of the percentage of total population from 18 to 24 years which early leavers from education and training on the factorial variable percentage of population aged 25-64 with tertiary education and the influence of GDP per capita on percentage of total population from 18 to 24 years which early leavers from education and training. During the period analyzed, the functional connection between them is significant. Under these conditions, with a probability of 95% can be considered both increasing share of population aged 25-64 with tertiary education, as well as, the GDP per capita led to the reduce of share of total population from 18 to 24 years which early leavers from education and training, with significant value. Correlated increase in the level of education and in the standard of living of the population in all development regions of Romania, especially in disadvantaged areas constitute important strands.

Also, proper sizing of funds for education, and more attention of the legislative and executive powers for education are imperative

The results obtained can be used as decision support for decision-makers.

The analysis can be improved by taking into account other influencing factors such as financing of education, small values of this are often among the causes of dropout. This is a future research direction for the authors.

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