
Pursuing Higher Education: Privileged or Free Access in Romania?

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ABSTRACT

The aim of this paper is to analyze whether higher education in Romania is a privilege or a level of education open to any person willing to pursue it, provided that they have specific abilities and competences. The analysis is carried out from two points of view both legislative and practical (using statistical methods). Based on the results, the paper further explores possible causes for the identified phenomena and formulates adequate policy recommendations. Data on the live births, the numbers of students, teachers and schooling units at each educational level, for the 1948-2011 period have been gathered in order to conduct the research; with regard to statistical methods, pursuing the purpose of this paper, the Engel Granger two steps methodology was employed.

Keywords: demography, education, students, life births, Engel-Granger

JEL Classification: A10

INTRODUCTION

According to Baum et.al (2013) and King and Ritchie (2013), higher education has several benefits for the individuals as well as for society; among these, most significant are: higher wages, higher employment rates, healthier life-style, less crime, political stability, faster economic growth, increased tax revenues, increased interest for volunteering. Furthermore, as McMahon (2009) emphasizes that universities play an essential role in training future researchers; thus ensuring access to higher education for all citizens is crucial in order to find talented students with high potential in the research area. St. John and Asker (2003) pointed out that social justice considering higher education area has three dimensions: access for the majority, as measured by the overall opportunities to attend college; equal opportunity to enroll, as

measured by the growing gap opportunity between minorities and majority and between low-income and high-income students; justice for taxpayers, as measured by tax expenditures per student enrolled in higher and other postsecondary education. The higher education area is particularly important because, as demonstrated by Winters (2011), colleges and universities have a high impact on the quality and quantity of the local stock of human capital.

Cepar and Bojnec (2008), using macro time data for Croatia and Slovenia, found out that there is a statistically significant correlation between the number of births and the number of students in all the educational levels: primary, secondary and tertiary. These results are consistent with those of Cheng and Nwachukwu (1997) who, using the Granger causality test, found out that the fertility rate Granger-causes the number of people who completed secondary education divided by the population aged 16-64, as well as the number of people who completed higher education divided by the working age population; in order to perform the analysis, the authors used time series from 1952 to 1994 for Taiwan.

Challenges, from the economical point of view, of access to higher education have been a major concern for many policy makers around the globe (United States Government, 2010). Mullen (2010) identified low family income, high study fees and high level of debt associated with college degrees as main economic barriers in pursuing higher education. Moreover, Brock (2010) points out that lack of financial aid and the inefficient allocation of the existing ones are significant economic barriers for students especially those belonging to certain ethnic groups.

OBJECTIVE AND RESEARCH QUESTION

This paper aims to identify if higher education in Romania is a privilege, with important social barriers, or a relatively open service, with insignificant social barriers. The author chose to analyze this issue from a demographic and legislative perspective.

More specifically, from an econometrical point of view, the long run relationship between the live births and the number of students in higher education will be tested; if a positive long run relationship will be found, then one can conclude that higher education is indeed an open service for Romanian children; otherwise, the social barriers against pursuing higher education will be analyzed and adequate policies will be formulated.

Some specific questions were formulated:

1. Are there any legislative barriers in pursuing higher education?
2. Do the live births influence the student cohorts at all educational levels?

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3. What policies are suitable in order to address possible barriers in higher education participation?

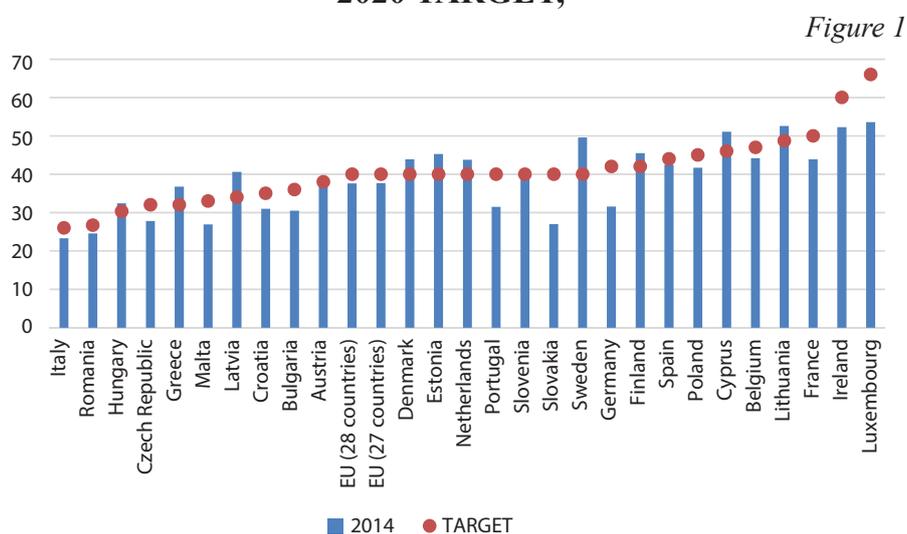
In order to address these questions, the paper is organized as follows: the first section presents higher education area with respect to the main strategies at European level in order to set up a framework for subsequent discussions; the second section presents the methodology used in order to analyze the relationship between the demographic phenomena and educational system in Romania; the third section presents the results; finally conclusions and policy recommendations are formulated.

HIGHER EDUCATION AREA – CORNERSTONE OF STRATEGIC POLICY PLANNING

Higher education area became cornerstone of strategic policy planning in the European Union with the introduction of the Bologna Process, that set up the European Higher Education Area (European Commission, 2015). The interministerial declaration, voluntarily accepted by each signing countries emphasized the importance of higher education area in achieving a stable, peaceful and democratic society (European Higher Education Area, 1999).

One of the basic policy documents considering tertiary educational attainment is Strategy Europe 2020. As one can observe from the first figure, Romania has set for itself one of the most modest 2020 targets for tertiary educational attainment, far below the 40% set for the European Union. Yet, this target should be accomplished in a sustainable way, so that graduates can easily enter the labor market. In order to do so, four key priorities have been identified: increasing quality and relevance of the learning process, adopting measures in or to increase graduates employability, adopting inclusive measures and identifying and implementing structural reforms where needed (European Higher Education Area, 2015). In order to make the Higher Education Area more inclusive, the greatest challenge is to attract disadvantaged and vulnerable groups to pursue higher educational level (European Commission, 2011).

TERTIARY EDUCATIONAL ATTAINMENT, 2014 AND 2020 TARGET,



Source: EUROSTAT

METHODOLOGY

Consequently, to answer the three questions, data for the period 1948-2011 have been gathered. Considering the educational system, the following variables are employed: the number of students for the preprimary, primary, gymnasium, high school, postsecondary, professional and higher education levels; the number of teachers and the number of schooling units for all the above stated levels. The data sources for these variables are: the Tempo Database of the National Institute of Statistics of Romania for the period 1995-2011 and the publication *Romanian Educational System in 2004* for the 1948-1994 period. With regard to demographics the live births and the rate of live births were chosen as a relevant indicators; the data sources were: The Statistical Yearbook of the Popular Republic Romania - 1960 for the 1948-1959 period and The Statistical Yearbook of Romania – 2013 for the 1960-2011 period, both provided by the National Institute of Statistics of Romania.

The answer to the first question is provided by studying the legislative framework considering higher education in Romania: Law 1/2011 (with subsequent updates) and Order of the Minister of Education and Research no.3666/2012 which legally enforces Code of students' rights and obligations.

The answer to the second question is provided by studying the

influence of the live births on the student cohorts at different levels of education using the Engel-Granger Two Step Methodology (the variables considering the student cohorts are the dependent variables). In order to achieve this, the series referring the number of students in primary education has been deferred by the number of years when normally people enter the respective level of education, as presented in the table below:

**VARIABLE DESCRIPTION; SOURCE: DESIGNED BY
THE AUTHORS**

Table 1

Variable name	Number of years deferred	Normal entrance age	Variable label
Live births	Not applicable	Not applicable	live_births
Rate of live births (live births to 1000 inhabitants)	Not applicable	Not applicable	rate_live_births
Number of students enrolled in preprimary education	0	Under 6 years	stud_preprimary
Number of students enrolled in primary education	7	7 years old	stud_pirmary_1
Number of students enrolled in gymnasium	11	11 years old	stud_gymnas_1
Number of students enrolled in high school	14	14 years old	stud_high_school_1
Number of students enrolled in professional education	14	14 years old	stud_professional_1
Number of students enrolled in postsecondary education	18	18 years old	stud_postsecondary_1
Number of students enrolled in higher education (lagged 18 years)	18	18 years old or higher	stud_higheredu_1
Number of students enrolled in higher education (lagged 19 years)	19	18 years old or higher	stud_higheredu_1_1
Number of students enrolled in higher education (lagged 20 years)	20	18 years old or higher	stud_higheredu_1_2

The methodology will be applied on non-stationary pair variables:

- First the two series should be integrated of the same order (the Augmented Dickey-Fuller test will be performed; two series are integrated of the same order if they are stationary at the same order).
- The Augmented Dickey-Fuller hypotheses are:

$H_0 =$ The data set has a unit root (is not stationary)

$H_1 =$ The data set is stationary

- Secondly, a linear combination of the series must be stationary (the Augmented Dickey-Fuller test will be performed on the residuals resulting after the linear regression between the two variables; if the residual series is stationary, at a lower level compared to the series' order of integration one can conclude that the two variables are co integrated).
- The Akaike Criterion was used in order to choose the optimum lag (from a maximum number of lags set to 10).

For the variable pairs that are stationary, the relationship was studied using the Pearson correlation coefficient provided by the SPSS 21 package. The package computes the probabilities for each coefficient; thus, if the probability is lower than 0.05, the correlation coefficient is significant. The correlation was studied for the differentiated series where possible, as these can be interpreted as increases.

Also, the Engel-Granger methodology was used in order to observe whether or not there is a long term relationship between the number of students at each educational level and the number of teachers and school units. The variables selected are employed without further adjustments. As in previous situations, in the cases where a long term relationship could not be studied, the Pearson coefficient was employed.

RESULTS AND DISCUSSIONS

First, the analysis considering the legislative framework on Romanian Higher Education Area will be presented. According to Law 1/2011 of National Education article 3, the general principles that govern national education in Romania are *the principle of fairness, according to which the access to educational opportunities is made without discrimination and the principle of ensuring equal opportunities*; furthermore, according to article 10, *in Romania, education is public property. Also, the State supports ante-preschoolers, preschoolers, pupils and students with social problems and needs, as well as those with special educational needs and grants social scholarships to school children and university students from disadvantaged families, as well as to those institutionalized, in compliance with the law*. According to the Code of students' rights and obligations article 8, *candidates from social and economic disadvantaged areas, including graduates from high schools in cities or rural areas with less than 10,000 people, may benefit from destined funded places guaranteed under the law*. As one can observe, there are legal mechanisms designed to smooth population access to higher education.

Next, the answer to the second questions is provided. Table 2 presents the results of the Augmented Dickey-Fuller test applied to the variables. As one can observe none of the series is level stationary (except of the number of students in higher education deferred by 18, 19 and 20 years and the rate of live births). Consequently, these series, with the above mentioned exceptions, are integrated of the same order, one.

AUGMENTED DICKEY-FULLER TEST PROBABILITIES VALUES FOR THE DEFERRED SELECTED VARIABLES

Table 2

Variable		P value Level	P value first difference
live_births	Trend and intercept	0.1376	0.0000
	Intercept	0.5781	0.0000
	None	0.3082	0.0000
rate_live_births	Trend and intercept	0.0259	0.0000
	Intercept	0.5747	0.0000
	None	0.1683	0.0000
stud_preprimary	Trend and intercept	0.8783	0.0263
	Intercept	0.4097	0.0091
	None	0.7301	0.0007
stud_pirmary_1	Trend and intercept	0.9776	0.1501
	Intercept	0.9954	0.1665
	None	0.1243	0.0000
stud_gymnas_1	Trend and intercept	0.5815	0.0009
	Intercept	0.9544	0.0379
	None	0.6398	0.0000
stud_high_school_1	Trend and intercept	0.5141	0.0003
	Intercept	0.2081	0.0001
	None	0.7391	0.0000
stud_professional_1	Trend and intercept	0.1527	0.0000
	Intercept	0.0369	0.0000
	None	0.2461	0.0000
stud_postsecondary_1	Trend and intercept	0.4228	0.0004
	Intercept	0.5522	0.0001
	None	0.6161	0.0000
stud_higheredu_1	Trend and intercept	0.0321	0.8100
	Intercept	0.0213	0.1773
	None	0.4091	0.0240
stud_higheredu_1_1	Trend and intercept	0,0369	0,5843
	Intercept	0,0238	0,2044
	None	0,7154	0,0253
stud_higheredu_1_2	Trend and intercept	0,0427	0,5732
	Intercept	0,0271	0,2427
	None	0,6864	0,0270

Source: designed by the authors

In Table 3, the results of the Augmented Dickey-Fuller test applied on the residual series and the coefficients of each equation are presented. As one can observe, all the resulting residuals except the ones from the last equation are level stationary. Considering the equation coefficients, in two cases they were not significant.

**AUGMENTED DICKEY-FULLER TEST P VALUE OF
THE EQUATIONS' RESIDUALS AND EQUATIONS'
COEFFICIENTS USING THE DEFERRED VARIABLES**

Table 3

Equation name (dependent variables stated first)	Augmented Dickey-Fuller test P value of the equation's residuals			Equation's Coefficient
	Trend and intercept	Intercept	None	
stud_preprimary_live_births	0.3643	0.1688	0.0216	-0.61 (not sig at 0.05 level)
stud_pirmary_1_live_births	0.0029	0.0292	0.0021	2.62 (sig. at 0.05 level)
stud_gymnas_1_live_births	0.0665	0.2696	0.0422	2.25 (sig. 0.05 level)
stud_high_school_1_live_births	0.4947	0.1988	0.0307	-0.14 (not sig at 0.05 level)
stud_professional_1_live_births	0.0581	0.0113	0.0006	0.49 (sig at 0.05 level)
Stud_postsecondary_1_live_births	0.2640	0.6085	0.1597	-0.04 (not sig alt 0.05 level)

Source: designed by the authors

There is a long term positive relationship between the live births and the number of students enrolled in primary education, as well as the number of students enrolled in the gymnasium and the professional education. These relationships are natural because the primary level and the gymnasium have always been compulsory. Moreover, before 1989, in Romania, children who did not succeed in pursuing high school usually got enrolled in the professional education. There is no long term relationship between the live births and the number of people pursuing postsecondary education. The postsecondary education offers higher skilled workforce, but it is expensive in terms of opportunity cos, as the ones who enter this stage of education are already adults and could enter the labor market.

The correlation coefficients between the rate of live births and the number of higher education students deferred by 18, 19 and 20 years are presented in the Table 4. All the coefficients are significant and negative; thus, as the number of live births increases the number of students deferred 18 years decreases. This is a strong negative correlation.

CORRELATION COEFFICIENTS BETWEEN THE RATE OF LIVE BIRTHS AND THE NUMBER OF STUDENTS

Table 4

		rate_live_births
stud_higher_edu_1	Pearson Correlation	-.669**
	Sig. (2-tailed)	.000
	N	46
stud_higheredu_1_1	Pearson Correlation	-.631**
	Sig. (2-tailed)	.000
	N	45
stud_higheredu_1_2	Pearson Correlation	-.599**
	Sig. (2-tailed)	.000
	N	44
**. Correlation is significant at the 0.01 level (2-tailed).		

Source: designed by the authors using SPSS 21

Thus, not only there is no long term positive relationship between the rate of live births and the number of students in higher education, but the negative strong correlation that could be observed suggests that there is a trade-off between the quality and quantity of the human resources. Thus, although the legislative framework guarantees the right to education, there are significant social barriers that youths have to overcome in order to receive a bachelor degree. The paper analyzes one of these many possible barriers: educational resources' accessibility in lower levels of compulsory education, required to further pursue higher education.

The paper investigates whether or not the number of students and the number of teachers and schooling units are in a long term relationship. As one can observe from Table 5, all the selected variables are stationary at the first difference.

**AUGMENTED DICKEY-FULLER TEST PROBABILITIES
VALUES FOR THE SELECTED VARIABLES**

Table 5

Variable		P value Level	P value first difference
stud_preprimary	Trend and intercept	0.8783	0.0263
	Intercept	0.4097	0.0091
	None	0.7301	0.0007
stud_pirmary_gymnas	Trend and intercept	0.9921	0.0648
	Intercept	0.5209	0.0782
	None	0.5151	0.0071
stud_high_school	Trend and intercept	0.9021	0.0000
	Intercept	0.4857	0.0000
	None	0.7591	0.0000
teachers_preprimary	Trend and intercept	0.9822	0.0119
	Intercept	0.3190	0.0111
	None	0.9005	0.0000
teachers_pirmary_gymnas	Trend and intercept	0.9994	0.0000
	Intercept	0.2360	0.1840
	None	0.6213	0.0201
teachers_high_school	Trend and intercept	0.6479	0.0009
	Intercept	0.6483	0.0002
	None	0.8636	0.0000
	Intercept	0.8502	0.0009
	None	0.9008	0.0001
units_preprimary	Trend and intercept	0.9988	0.0211
	Intercept	0.5027	0.2046
	None	0.2979	0.0278
units_pirmary_gymnas	Trend and intercept	0.8766	0.0000
	Intercept	0.9947	0.0000
	None	0.1968	0.0000
units_high_school	Trend and intercept	0.2146	0.0000
	Intercept	0.8602	0.0000
	None	0.9986	0.0000

Source: designed by the authors using SPSS 21

Next, in order to investigate the long term relationship mentioned above, cointegration relationships have been tested between the number of students and the number of teachers and schooling units at preprimary, primary and gymnasium and high school educational levels. Table 6 shows that none of the residuals are stationary; thus, there is no cointegration between the selected variables. Consequently, no long term relationship could be found between the number of students and the number of teachers at preprimary, primary and gymnasium and

high school educational levels; the same conclusion can be drawn on the number of students-number of school units variable pairs.

These findings lead to the conclusion that there is no strategy considering the number of teachers and the number of units schools linked to the number of students at preprimary, primary and gymnasium and high school educational levels. All these educational levels are compulsory in order to pursue higher education. Thus, planning resources inadequately makes attending university studies impossible for most of youths.

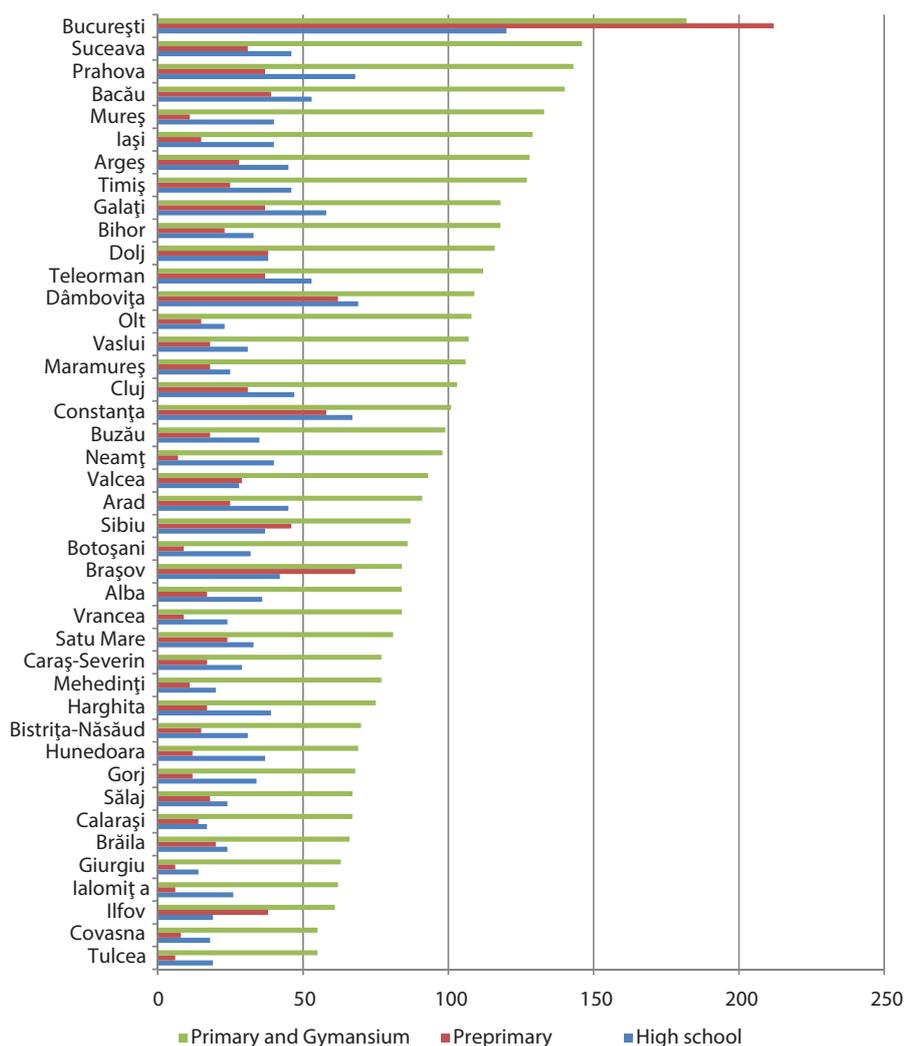
**AUGMENTED DICKEY-FULLER TEST P
VALUE OF THE EQUATIONS' RESIDUALS AND
EQUATIONS' COEFFICIENTS RESULTED FROM
THE COINTEGRATION EQUATIONS BETWEEN
THE NUMBER OF STUDENTS AND THE NUMBER
OF TEACHERS AND SCHOOLING UNITS AT
PREPRIMARY, PRIMARY AND GYMNASIUM AND
HIGH SCHOOL EDUCATIONAL LEVELS**

Table 6

Dependent variable	Independent variable	Augmented Dickey-Fuller test P value of the equation's residuals			Equation's Coefficient
		Trend and intercept	Intercept	None	
Number of teachers at preprimary level of education	Number of students at preprimary level of education	0.7325	0.8066	0.3488	0.04
Number of teachers at primary and gymnasium level of education	Number of students at primary and gymnasium level of education	0.7797	0.3649	0.0656	0.03
Number of teachers at high school level of education	Number of students at high school level of education	0.5276	0.5789	0.1446	0.04
Number of schooling units at preprimary level of education	Number of students at preprimary level of education	0.9379	0.1106	0.1038	0.01
Number of schooling units at primary and gymnasium level of education	Number of students at primary and gymnasium level of education	0.3947	0.8564	0.4111	0.002
Number of schooling units at high school level of education	Number of students at high school level of education	0.5430	0.6837	0.2043	0.0006

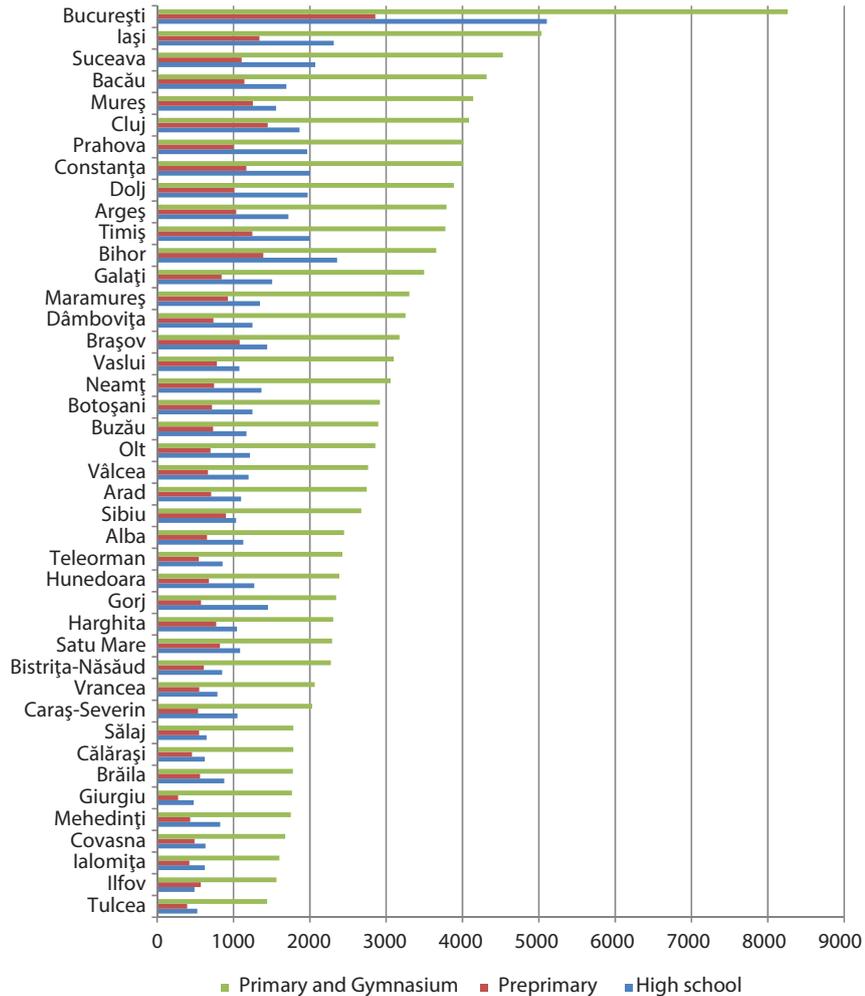
NUMBER OF SCHOOLING UNITS BY LEVEL OF EDUCATION AND COUNTY IN 2013, SOURCE: DESIGNED BY THE AUTHOR BASED ON DATA FROM TEMPO DATABASE - NATIONAL INSTITUTE OF STATISTICS ROMANIA

Figure 2



NUMBER OF TEACHERS BY LEVEL OF EDUCATION AND COUNTY IN 2013, SOURCE: DESIGNED BY THE AUTHOR BASED ON DATA FROM TEMPO DATABASE - NATIONAL INSTITUTE OF STATISTICS ROMANIA

Figure 3



The above analysis showed that there is no long term relationship between the number of students and the resources allocated at compulsory levels of education, being either preprimary, primary and gymnasium or high school. In order to make suitable and targeted policy recommendations, one should conduct a more in depth analysis of the situation of teachers and

schooling units at each county. Figures 2 and 3 above show the number of schooling units and the number of teachers, at each compulsory level preceding higher education in 2013: preprimary, primary and gymnasium, high school. As one can observe, Giurgiu, Tulcea and Ialomita show very low values for these indicators. To the author's extent no official analysis has been conducted in order to monitor the efficiency of resource allocation in these counties.

CONCLUSIONS

Conclusions of this paper may be formulated from two perspectives: legislative and practical (based on statistical findings). Firstly it has been found that there is a legal framework in place designed to provide equality of chances with regard to access to education (especially to higher education). However, this framework is certainly ineffective given that no long term relationship between the live births and the number of students in higher education; thus there is a trade-off between quantity and quality of human resources. The study emphasizes that this is due to a leak o strategy in managing resources at preprimary, primary and gymnasium and high school levels; if children cannot easily access and receive high quality education at compulsory levels, no one can ever think that higher education will flourish.

Considering all stated above, some policy recommendations are next formulated:

- Careful analysis on the number of schooling units and the number of teachers in preprimary, primary and gymnasium and high school levels of education should be conducted in all counties of Romania but especially in those counties where the values are extremely low; this is particularly important to be considered as part of the redesign in public policies needed to enhance regional development (Andrei, 2011);
- Educational resources should be equally ensured to all children in Romania so that each child can have access to compulsory education;
- The target set for 2020 should not be achieved only in terms of quantity but quality also, so that high potential researchers can be discovered.

Carreful planification within the Higher Education Area is particularly important in the context of the economic crisis and demographic trends: first, countries experiencing economic hardships are mostly affected by significant departures of their graduates; second, migration and decrease in birth rates are significantly affecting enrolments particularly for medium and small universities (Sursock, 2015). Thus, this study is particularly important

especially because the number of students cannot be sustained on the long run (Andrei et al, 2010) as the demographic decline that characterizes the 1990-2013 population is raising (Andrei et al. 2015).

Moreover, the study is important as demographic phenomena, higher education and economic imbalances such as the unemployment rate are closely interrelated (Biagi and Lucifora, 2005). Several studies point out that there is a strong relationship between unemployment rate and the number of persons attending tertiary education level: Nunez and Livanos (2010) concluded that having an academic degree is a viable solution in addressing short term unemployment at European level; Mirica (2014) points out that in Romania as the demand in higher education increases, the overall unemployment rate decreases.

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