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CONTENTS

THE UNEMPLOYMENT RATE AMONG HIGH-EDUCATED PEOPLE FROM ROMANIA. A REGIONAL APPROACH

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Abstract

Given the difficulties on Romanian labour market related to the insertation of high-educated people, the main aim of this research is to explain the unemployment rate in the Romanian regions in different periods, conditioned by the data availability: 1993-2017 and 2005-2017. The results based on panel data indicated that there is a negative correlation between the number of unemployed people and number of faculties. On the other hand, the number of available jobs is positively correlated with the number of unemployed people. Even if a part of graduates integrated on labour market, there are still available jobs and still unemployment among high educated people. The emigration process also influences the tensions on Romanian labour market.

Keywords: unemployment, jobs, faculties, graduates.
JEL classification codes: C51, C53.

1. INTRODUCTION

The Romanian economy shows a steady deficit of labor force and a rise in the number of emigrants. Howevwe, the unemployment rate continues to be raised, because an important workforce source is not used (Burghelea, 2012). At European level, there is an approach that places migration among the determinants of sustainable development (European Commission, 2016).

Difficulties in the labor market also affect older young people aged between 25 and 29, who find it more difficult to find a job adapted to their qualifications (Bell and Blanchflower, 2011). The problems faced by young people on the labor market,

as well as higher education graduates in general, have negative consequences on the standard of living, the family environment and the national or international communities they are part of. The most significant effects of unemployment are: the risk of poverty and the inability to play an active role in the development of society, aspects which hinder social development and sustainable development in general (Naroş, 2018).

The main coordinates for an effective policy framework follow a new model for increasing the employability of young people. The professional profile and professional skills reduce incompatibility with national labor demand. The pattern of today's graduates' professional profile reflects a continuous downward trend in education for the labor market (Vasile et al., 2008, 2009, 2011). A flexible labor market-oriented curriculum and a reorganization of the graduates' structure by occupations and occupational groups could contribute to a more efficient and quicker insertion into the labor market. Investing in education and lifelong learning must continue to use structural funds as a source of funding and promote entrepreneurship.

Career and working conditions could contribute to the gradual reduction of the external mobility of young seeking employment (Vasile, 2013, Vasile et al., 2013). If more young people prefer the school-work transition and end up in acceptable jobs, more jobs have to be created. This implies tackling the economic and political barriers to economic growth and job creation and being sure that there are the suitable jobs for candidates to absorb young people accessing the labour market (Abbott and Teti, 2017). It is necessary to reform educational curricula and pedagogue if the young people are employable, but without jobs (Young and Muller, 2014). The people should prove the skills and knowledge that employers are looking for (Holloway et al., 2018).

The objective of this research is to explain the number of unemployed with higher education at the level of Romania's regions in order to identify the difficulties encountered by graduates seeking employment, the efficiency of reforms to support their better insertion into the labor market and recommendations for a higher rate of absorption of these graduates into the labor market. Preparing graduates to integrate them into the labor market is a priority not only for university management but also for policy makers and employers whose efforts can go towards the development of common policies for the training of graduates of higher education.

2. DATA

From the Tempo data base of the National Institute of Statistics data concerning the following variables were recorded for the period 1993-2017 for the eight regions of Romania (North-West, Center, North-East, South-East, South-Muntenia, Ilfov, South-West Oltenia, West): the number of unemployed with higher education, the number of graduates, the number of teaching staff in higher education and the number of faculties.

For the period 2005-2017 data is also taken from the Tempo database of the National Institute of Statistics on the number of job vacancies for persons with higher education according to the major occupation groups. Data is only available from 2005 and is obtained through the vacancy job Survey. The analysis takes into account new jobs, paid jobs and soon to be vacant jobs, for which the employer looks for a suitable candidate and takes action in order to fill the position immediately or in the near future.

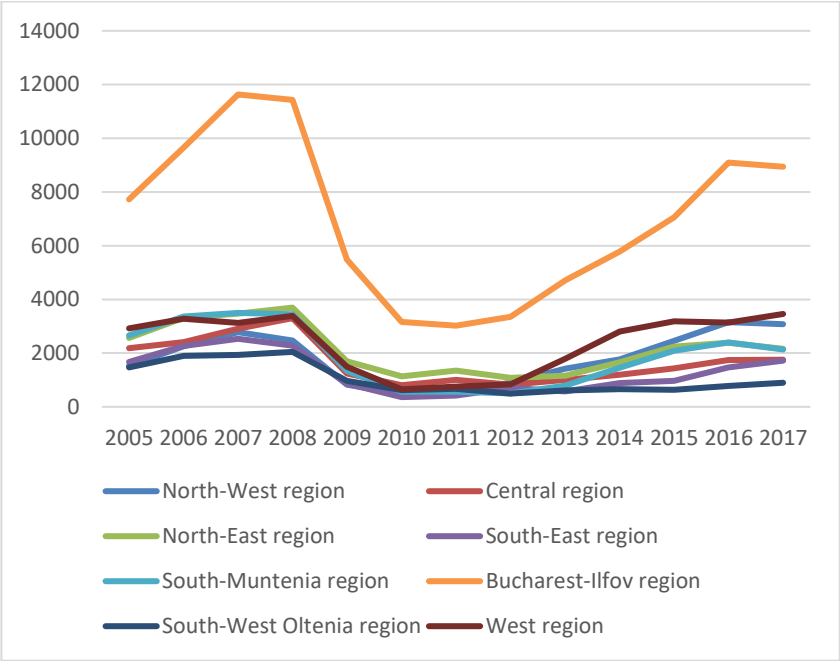

Figure 1. *Evolution of the number of vacancies for university graduates in the regions of Romania during 2005-2017*

As can be seen from Figure 1, the Bucharest-Ilfov region is the one that provides the most vacant jobs for people with higher education, reaching a maximum level of jobs in 2007, which means 1.5 times more jobs than in 2005. After 2007, the indicator shows a downward trend reaching the minimum level in 2011.

3. METHODOLOGY

As we have regional data for the number of unemployed with university studies, the number of jobs for people with higher education, the number of faculties, the staff of the teaching staff and the number of graduates graduating from 1993-1997, we will use a panel-like approach: panel pattern with random effects and homogeneous panel model.

The simple linear regression model associated with panel data has the form:

$$y_{it} = \alpha + \beta x_{it} + e_{it} \quad (1)$$

$i = 1, 2, ..., N$ indices for cross-sections (individuals, households, companies, regions, countries ...)
$t = 1, 2, ..., T$ indices for time points
α şi β- model parameters

The y_{it} and x_{ij} variables measure the recording of a phenomenon in unit i at time t. The model may contain several explanatory variables (Simionescu, 2013).

e_{it} - variable of discrepancy (deviation)

$$e_{it} = \mu_i + \eta_t + v_{it} \quad (2)$$

- μ_i estimates the unbeatable unidirectional cross-sectional effect and does not change over time: estimates the effect on the dependent variable of variables not included in the model in unit i (the specific cross-sectional effect);
- η_t estimates the temporal specific effect, does not change in the transverse structures: estimates the effect on the dependent variable of variables not included in the model at time t (fixed effect over time);
- v_{it} - the error variable (residual discrepancy) is variable between both the transverse units and the time.

The fixed-effect model assumes- μ_i and η_t that the fixed parameters are not correlated with the errors and have the null value. Estimation method: least squares method, after adding dummy variables for each transverse unit i and for periods t (less a transverse unit and a period if the model already includes a constant) (Simionescu, 2013).

The Random Random Model - μ_i, η_t and v_{it} are random, independent, mean null variables with standard deviations σ_μ, σ_η, σ_v, non-autocorrelated, are not heteroscedastic. The model is used when the transverse units are randomly chosen from a population.

Solving methods are varied, depending on the type of model selected (least squares simple (OLS) or generalized GLS), the generalized moment method (GMM), the maximum fidelity method (MLM), the SUR method, etc.

4. EMIPIRICAL ANALYSIS

All of the common unit panel roots (Levin, Lin & Chu), or individual panel roots (Augmented Dickey-Fuller (ADF) - Fisher, Phillips-Perron (PP) - Fisher) are, in general, values of the statistics calculated below the 10% threshold. It is therefore admitted that there are no arguments for accepting the non-stationarity assumption (root unit) for the data series of all variables.

First of all, we analyze the link between *the number of unemployed with university studies and the other variables*, starting from a flat-panel model with fixed effects:

$$SOM_{it} = c_i + \alpha X_{it} + e_{it} \quad (3)$$

where

SOM_{it} – the number of unemployed with university studies in section (region) i, year t (t = 1993, ..., 2017)

X_{it} – the explanatory variables in the model

c, α – model coefficients

e_{it} – the error in the regression equation.

Several models are being constructed and, finally, valid models are selected with statistically significant parameters associated with the explanatory variables considered.

Only one valid model has been identified that explains the number of university graduates (the number of unemployed with higher education ?) according to the number of faculties. The model solution is the following (Table 1):

Table 1. *Fixed-effect model for explaining the number of unemployed with higher education at regional level in Romania between 1993 and 2017*

variable	coefficient	standard error	t-calculated	prob.
C	3518.744	136.4069	25.79594	0
FACULTIES?	-4.619197	1.598303	-2.890064	0.0043
individual fixed effects				
NORTH-WEST--C	-1346.165			
CENTRE--C	-1214.602			
NORTH-EAST--C	724.8449			
SOUTH-EAST--C	162.1409			
SOUTH-MUNTENIA--C	-914.9652			
BUC-IF--C	2291.418			
SOUTH-WEST--C	1170.314			
WEST--C	-762.9664			

Source: own processing in EViews

A model with random effects was also estimated (Table 2):

Table 2. *Random effects model for explaining the number of unemployed with higher education at regional level in Romania in the period 1993-2017*

variable	coefficient	standard error	t-calculated	prob.
C	3531.153	507.5805	6.956835	0
FACULTIES?	-4.604112	1.597153	-2.882699	0.0044
individual random effects				
NORTH-WEST--C	-1336.31			
CENTRE--C	-1207.236			
NORTH-EAST--C	698.8868			
SOUTH-EAST--C	145.9173			
SOUTH-MUNTENIA--C	-912.619			
BUC-IF--C	2237.258			
SOUTH-WEST--C	1134.618			
WEST--C	-760.5155			

Source: own processing in EViews

The Hausman test for the Random-Random panel model rejects the hypothesis of a correlation between random effects and idiosyncratic error: the Hausman test statistic value, 0.0619, is less than the critical value associated with the χ^2 distribution with 1 degree of freedom for the significance level 5% (the threshold is 3,841). In this case, the grade I error risk is 80.34%, much higher than the standard threshold of 5%. So, the model with random random effects is correct and, unlike the model with fixed specific effects, has the advantage of superior consistency of estimators (Jula D. and Jula N.-M., 2014). The results of the Hausmann test are shown in Appendix 1.

The coefficient that ensures the link between *the number of unemployed with university studies and the number of faculties* is negative and significantly different from zero, which shows, in the mentioned hypotheses, the existence of a link between the variables analyzed: the increase in the *number of faculties* is statistically associated with the decrease of the number of unemployed with higher education. This result may suggest that the expansion of the educational offer also increases the number of university graduates and the number of existing faculties is sufficient to

provide graduates with the labor market insertion. In other words, a higher level of education offers even more opportunities for employment in the labor market, even if the workplace is not always in the same field as the graduated faculty, as Teichler and Kehm (1995), Schomburg and Schomburg Teichler (2007) observed. On the other hand, emigrants with higher education who prefer a job in more developed countries to a higher salary should not be neglected and they are not considered among the unemployed in Romania. Finding a suitable job after graduating does not only depend on the candidate's personal characteristics but also on the field of study. Thus, Salas-Velasco (2007) has shown, based on empirical data, that expertise in health, computers, business and architecture greatly increases the possibilities for quick employment. On the other hand, there are also students in Romania who are employed during university, so that at the end of the studies they already have a job and a certain experience.

The random effects model is re-evaluated for the period 2005-2017, obtaining the same negative correlation between the number of unemployed and the number of faculties (Table 3). The results in Eviews are presented in Annex 2.

Table 3. *Homogeneous panel model to explain the number of unemployed with higher education at the level of Romania's regions by number of faculties (2005-2017)*

variable	coefficient	t-calculated	prob.
Constanta	3458.941	6.922827	0.0000
Faculties?	-4.213309	-2.144585	0.0345

Source: own processing in EViews

Another model is being built for the period 2005-2017, but besides the number of faculties, the number of job vacancies for people with higher education is shown as an explanatory variable (Table 4).

Table 4. *Homogeneous panel model for explaining the number of unemployed with higher education at the level of Romania's regions according to the number of faculties and the number of vacancies (2005-2017)*

variable	coefficient	t-calculated	prob.
Constanta	2773.869	9.774702	0.0000
Faculties?	-5.442115	-1.874088	0.0639
Jobs?	0.314749	5.767839	0.0000

Source: own processing in EViews

Only a homogeneous panel model explaining the number of unemployed according to the number of faculties and the number of jobs was valid, the coefficients being significant at a significance level of 10%. As has been done in the

previous model, the number of unemployed correlates negatively with the number of faculties. As the number of faculties increased with one unit, the number of unemployed fell by almost 5 persons. On the other hand, the number of vacancies for people with higher education correlates positively with the number of unemployed with higher education. In the three-unit increase in the number of jobs for university graduates, the number of unemployed increased on average by one unemployed person between 2005 and 2017. This result reveals that although some of those who graduated from univeristy have integrated into the labor market, vacancies remain. It is possible that the unemployed with higher education who remained unemployed despite the availability of vacancies, are specialized in fields of activity where no jobs are available. Another explanation may be linked to the fact that the unemployed with higher education have refused to get hired because the salaries offered for vacancies did not meet their expectations or were refused to employment because their expertise was not at the required level.

CONCLUSIONS

Random-pattern models and the homogeneous panel model for the period 2005-2017 suggest that part of the higher education graduates have integrated into the labor market, but there are vacancies that could not be filled by the unemployed, maybe due to the fact that they had studies in fields other than those for which employees were required. In this context, it is necessary to implement several programs aimed at better insertion in the labor market, especially for higher education graduates. Some suggestions in this regard are provided by Pisică et al. (2012) that emphasize the need to reduce employment in the informal sector and provide incentives for motivating young people to work legally: reducing barriers to employment related to work experience and the period reduction of administrative costs and procedures, efficiency of bureaucracy, especially for SMEs, diminishing labor market rigidities by encouraging fixed-term contracts, temporary employment, individualized work program). Several actions should be pursued: to develop a culture of lifelong learning and to make the way education is provided and certified more flexible, as well as to provide a sufficient material basis, linked to labor market requirements to support quality in education.

Providing educational programs in line with labor market requirements will increase competitiveness and economic progress and, at the same time, reduce youth unemployment. Adequate response to labor market demands requires the implementation of enhanced and upgraded study programs.

Appendix 1

Fixed-effects and random-effects models

Dependent Variable: UNEMPLOYED?
Method: Pooled EGLS (Cross-section random effects)
Sample: 1993 2017
Included observations: 25
Cross-sections included: 8
Total pool (unbalanced) observations: 192
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3531.153	507.5805	6.956835	0.0000
FACULTIES?	-4.604112	1.597153	-2.882699	0.0044
Random Effects (Cross)				
_1--C	-1336.310			
_2--C	-1207.236			
_3--C	698.8868			
_4--C	145.9173			
_5--C	-912.6190			
_6--C	2237.258			
_7--C	1134.618			
_8--C	-760.5155			

	Effects Specification		
		S.D.	Rho
Cross-section random		1383.461	0.6967
Idiosyncratic random		912.7352	0.3033

	Weighted Statistics		
R-squared	0.042096	Mean dependent var	424.4238
Adjusted R-squared	0.037054	S.D. dependent var	928.4955
S.E. of regression	910.5582	Sum squared resid	1.58E+08
F-statistic	8.349738	Durbin-Watson stat	1.235631
Prob(F-statistic)	0.004306		

	Unweighted Statistics		
R-squared	0.010622	Mean dependent var	3173.531
Sum squared resid	4.38E+08	Durbin-Watson stat	0.444655

Dependent Variable: UNEMPLOYED?
Method: Pooled Least Squares
Sample: 1993 2017
Included observations: 25
Cross-sections included: 8
Total pool (unbalanced) observations: 192

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3518.744	136.4069	25.79594	0.0000
FACULTIES?	-4.619197	1.598303	-2.890064	0.0043
Fixed Effects (Cross)				
_1--C	-1346.165			
_2--C	-1214.602			
_3--C	724.8449			
_4--C	162.1409			
_5--C	-914.9652			
_6--C	2291.418			
_7--C	1170.314			
_8--C	-762.9664			

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.655437	Mean dependent var	3173.531
Adjusted R-squared	0.640374	S.D. dependent var	1522.017
S.E. of regression	912.7352	Akaike info criterion	16.51651
Sum squared resid	1.52E+08	Schwarz criterion	16.66920
Log likelihood	-1576.585	Hannan-Quinn criter.	16.57835
F-statistic	43.51345	Durbin-Watson stat	1.276771
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Pool: POOL01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.061956	1	0.8034

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
FACULTIES?	-4.619197	-4.604112	0.003673	0.8034

Appendix 2

Dependent Variable: UNEMPLOYED?
Method: Pooled EGLS (Cross-section random effects)
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (unbalanced) observations: 100
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3458.941	499.6429	6.922827	0.0000
FACULTIES?	-4.213309	1.964627	-2.144585	0.0345
Random Effects (Cross)				
_1--C	-1478.324			
_2--C	-673.1866			
_3--C	430.2923			
_4--C	79.92076			
_5--C	-902.5879			
_6--C	2353.351			
_7--C	930.6823			
_8--C	-740.1488			

	Effects Specification	
	S.D.	Rho
Cross-section random	1329.208	0.7370
Idiosyncratic random	794.0006	0.2630

Weighted Statistics			
R-squared	0.045192	Mean dependent var	520.8178
Adjusted R-squared	0.035449	S.D. dependent var	806.2461
S.E. of regression	790.6414	Sum squared resid	61261154
F-statistic	4.638409	Durbin-Watson stat	1.254343
Prob(F-statistic)	0.033717		

Unweighted Statistics			
R-squared	0.021541	Mean dependent var	3117.490
Sum squared resid	1.95E+08	Durbin-Watson stat	0.393450

Dependent Variable: UNEMPLOYED?
Method: Pooled Least Squares
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (unbalanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3439.098	170.6017	20.15864	0.0000
FACULTIES?	-4.189789	1.967152	-2.129876	0.0359
Fixed Effects (Cross)				
_1--C	-1500.869			
_2--C	-674.0233			
_3--C	459.8290			
_4--C	99.98332			
_5--C	-909.1948			
_6--C	2441.369			
_7--C	976.9077			
_8--C	-745.7951			

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.712582	Mean dependent var	3117.490
Adjusted R-squared	0.687315	S.D. dependent var	1419.930
S.E. of regression	794.0006	Akaike info criterion	16.27773
Sum squared resid	57369766	Schwarz criterion	16.51220
Log likelihood	-804.8867	Hannan-Quinn criter.	16.37263
F-statistic	28.20151	Durbin-Watson stat	1.339568
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Pool: POOL01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.055720	1	0.8134

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
FACULTIES?	-4.189789	-4.213309	0.009928	0.8134

Cross-section random effects test equation:

Dependent Variable: UNEMPLOYED?
Method: Panel Least Squares
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (unbalanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3439.098	170.6017	20.15864	0.0000
FACULTIES?	-4.189789	1.967152	-2.129876	0.0359

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.712582	Mean dependent var	3117.490
Adjusted R-squared	0.687315	S.D. dependent var	1419.930
S.E. of regression	794.0006	Akaike info criterion	16.27773
Sum squared resid	57369766	Schwarz criterion	16.51220
Log likelihood	-804.8867	Hannan-Quinn criter.	16.37263
F-statistic	28.20151	Durbin-Watson stat	1.339568
Prob(F-statistic)	0.000000		

Dependent Variable: JOBS?
Method: Pooled Least Squares
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (unbalanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
_1--FACULTIES_1	17.88610	6.157171	2.904922	0.0046
_2--FACULTIES_2	14.62914	5.426915	2.695664	0.0084
_3--FACULTIES_3	20.93034	5.847218	3.579538	0.0006
_4--FACULTIES_4	13.34104	6.229585	2.141562	0.0349
_5--FACULTIES_5	21.39344	7.272903	2.941527	0.0041
_6--FACULTIES_6	72.02358	6.794573	10.60016	0.0000
_7--FACULTIES_7	15.71252	9.815198	1.600836	0.1128
_8--FACULTIES_8	26.15823	7.617989	3.433745	0.0009

R-squared	0.236299	Mean dependent var	2418.940
Adjusted R-squared	0.178191	S.D. dependent var	2255.088
S.E. of regression	2044.320	Akaike info criterion	18.16014
Sum squared resid	3.84E+08	Schwarz criterion	18.36855
Log likelihood	-900.0068	Hannan-Quinn criter.	18.24448
Durbin-Watson stat	1.580861		

Dependent Variable: UNEMPLOYED?
Method: Pooled Least Squares
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (balanced) observations: 104

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2373.070	183.8299	12.90906	0.0000
JOBS?	0.309851	0.056211	5.512291	0.0000

R-squared	0.229522	Mean dependent var	3119.375
Adjusted R-squared	0.221968	S.D. dependent var	1437.697
S.E. of regression	1268.137	Akaike info criterion	17.14753
Sum squared resid	1.64E+08	Schwarz criterion	17.19838
Log likelihood	-889.6715	Hannan-Quinn criter.	17.16813
F-statistic	30.38535	Durbin-Watson stat	0.629418
Prob(F-statistic)	0.000000		

Dependent Variable: UNEMPLOYED?
Method: Pooled Least Squares
Sample: 2005 2017
Included observations: 13
Cross-sections included: 8
Total pool (unbalanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2773.869	283.7804	9.774702	0.0000
FACULTIES?	-5.442115	2.903874	-1.874088	0.0639
JOBS?	0.314749	0.054570	5.767839	0.0000

R-squared	0.271951	Mean dependent var	3117.490
Adjusted R-squared	0.256939	S.D. dependent var	1419.930
S.E. of regression	1223.994	Akaike info criterion	17.08717
Sum squared resid	1.45E+08	Schwarz criterion	17.16532
Log likelihood	-851.3583	Hannan-Quinn criter.	17.11880
F-statistic	18.11636	Durbin-Watson stat	0.620779
Prob(F-statistic)	0.000000		

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