Economic and social factors influence on unemployment in Romania at the local level

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Abstract

This study attempts to identify economic factors which influenced the number of unemployed people in each county of Romania, registered at National Employment Agency, in 2014. At the level of administrative units we considered a series of statistical indicators characterizing economic activity such as the number of active local units, number of employees, earnings obtained by employees as well as social indicators such as the resident population, the number of people who complete some form of education, social protection expenditure for unemployed people. The lack of jobs according to training and expectations of the population leads to migration of the population from one area to another which can lead to temporarily or permanent changes of residence. Thus, labor force migration can be a factor of influence of employment in the area of migration, but can generate unemployment in the area of origin.

Keywords: *unemployment, number of employees, regression models.*

JEL CODES: J64, J65, J69

1. Introduction

The labor market is subject to various economic and social factors, acting together, making it difficult to identify those that are important. Statistical indicators that can be used to characterize the labor market are those related to employment, earnings, labor force cost, productivity and unemployment. They are among the main topics of social and political debate in the European Union. One of the statistical indicators included in the Europe 2020 Strategy is the employment rate which should reach the value of 75% for the 20-64 years old people. This objective analysis leads to vacancy phenomenon and its causes belong. Thus, it is important to determine the factors that significantly influence unemployment and creating models that can be used later predictions of sizes for quantifying this phenomenon.

Many economists have tried to correlate over time indicators of unemployment with other economic indicators. Research conducted by Tony Lancaster and Stephen Nickell (1979) led to the idea that as unemployment benefits grow the chances that they engage fall. In 1997, Bertil Holmlund presented a study that demonstrated there is a positive relationship between the natural rate of unemployment and the "generosity" of the insurance system. Lucio Baccaro and Diego Rei (2005), using an econometric model, concluded that trade union density is strongly correlated with unemployment. Other economists took into account the age structure of the population and level of professional training. Thus, Paul Gregg (2001) conducted research on the causes what makes a person become unemployed and concluded that a person who has been unemployed around the age of 23 years, will have this experience by the age of 33 years. Structural changes in the economy of a country can generate imbalances in the labor market. Reduction of the activities in agriculture and industry together with an increased level of activities in trade and services result in a change of the workforce structure in order to fill the new jobs. Education institutions must change their educational offer to form people able to meet the new requirements of the labor market.

2. Considerations on unemployment in Romania, at the local level

In 2014, only 17 counties have registered an unemployment rate lower than the national unemployment rate. On the first 5 places were ranked Ilfov (1.5%), Timis (1.6%), Bucharest (2.0%), Cluj (2.8%) and Arad (2.8%). With an unemployment rate nearly double the national average, counties Mehedinti, Teleorman and Vaslui ranks last three places. Analyzing in terms of the number of registered unemployed, on the places with the lowest values are the following counties: Ilfov, Tulcea, Caras Severin, Timis and Covasna. Here, there are almost 5% of the total unemployed in Romania. Opposite, there are the counties Buzau, Teleorman, Galaţi, Bucharest and

Dolj, which comprises 20% of all unemployed people. Over 50% of the unemployed are registered in 14 counties (4 counties are in the South Muntenia Region and 4 of the North East Region).

Noting levels achieved by the proposed indicators (number of registered unemployed, number of active local units, number of employees, resident population, graduates, expenditures for unemployed social protection), we can highlight a few things about the situation within each region of Romania.

So, in the North - West Region, Cluj County stands with an unemployment rate of 2.8%. This rate ranks it on fourth place compared to the other counties. But, the large number of registered unemployed positions him to middle ranking. There is still on the 4th place, taking into account the size unemployed social protection expenditure. After the Bucharest Municipality, herein there are the most active local units. The 83 active local units with 250 employees and over, ranked this county on third place in terms of this indicator. These local units include 4.35% of total employees in Romania. With a sufficiently developed school system, in this county have graduated almost 5% of total national graduates.

In Central Region, Brasov County is positioned in the first half for all the analyzed indicators. Of the total resident population aged 15-74 years, over 40% is the employees which are working in the 18372 active local units in the county. In 2014 graduated 14811 persons, occupying only 12th place in the ranking.

In North East Region, Iasi County ranks third in terms of the resident population aged 15-74 years. The share of employees is only 26.3%. Here graduated 5.78% of total national graduates. Of these, 25% have finished high school or vocational schools. With an unemployment rate of 11.4%, Vaslui is last place in the country, in the active local units in the county working only 19% of the people aged 15-74 years.

With over 35% of the resident population aged 15-74 years employed in the more than 21000 active local units, Constanta County has one of the lowest rates of unemployment. Here, 20253 people have completed various levels of education, of which 43% have finished high school, vocational schools, post-secondary and foreman schools.

In counties in South Muntenia unemployment rate is over 5%. After the capital Bucharest, in Prahova County is the largest spending sums on social protection for the unemployed.

The large number of unemployed from South West Oltenia, makes all counties in the region have unemployment rates higher than the national level (value of 5.4%). Although it concentrates 2.58% of all employees in Romania, Dolj county experiencing a high rate of unemployment of 9.4%.

Western Region provides jobs for 10% of employees in Romania and almost half are employed in Timis county. Of the four counties, only Hunedoara County has an unemployment rate higher than the national value.

3. Identifying determinants of unemployment

In 2014 were 1.5575 billion lei spent on social protection for the unemployed. Approximately 50% of this amount were granted in the form of unemployment benefits persons registered with the National Agency for Employment (NAE). The other 50 percent includes amounts awarded to stimulate active measures to decrease the number of unemployed. To the previous year, there is an increase in the ratio of expenditure with vocational training and an increase the share of payments to stimulate employers hiring from disadvantaged unemployed category.

Correlating the number of unemployed with expenditures for unemployed social protection, Spearman coefficient (-0,66) showed a reverse link with medium intensity. Testing correlation coefficient resulted a value of 5.52, which is higher than $t_{40, 0.05}$=1,684, which validate the correlation coefficient. Thus, we can say that with increasing costs of social protection for the unemployed, the number of registered unemployed should decrease. This can be explained by the existence in legislation of the active measures to decrease unemployment, such as: the amounts granted to the employers who employed graduates of educational institutions, for indefinite duration; incentives for unemployed getting employed before expiring their unemployment period (the amounts paid to complete salary income); the amounts granted as credits to the small and middle enterprises to create new jobs; and s.o.

Analyzing the influence of social protection expenditure on the number of unemployed by linear regression method, the result leads to a different conclusion, as can be seen in Table 1.

Table 1. Regression of the unemployment on social protection expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXP	0.000117	2.92E-05	4.020032	0.0003
C	7031.712	1282.002	5.484948	0.0000
R-squared	0.287758	Mean dependent var		11389.00
Adjusted R-squared	0.269952	S.D. dependent var		5192.748
S.E. of regression	4436.833	Akaike info criterion		19.67972
Sum squared resid	7.87E+08	Schwarz criterion		19.76246
Log likelihood	-411.2741	Hannan-Quinn criter.		19.71005
F-statistic	16.16065	Durbin-Watson stat		2.136412
Prob(F-statistic)	0.000250			

Unlike the first step, regression coefficient of equation is positive. This, reveals that an increase in spending on social protection for the unemployed leads to an increase in the number of registered unemployed. The value of this coefficient is very low, it means that the influence is small, which is supported by the high value of the free term.

Therefore, they were looking for other influential factors, such as population aged 15-74 years residing in each county. On 1st July 2014, the resident population aged 15-74 years in Romania was 13876341 people, down 9.6% from the previous year. Nearly 10% are in Bucharest. The following counties are far from the capital. The second and third counties, Prahova and Iasi, have a population less than 250 000 persons compared with the resident population in the capital. On the last places are Covasna, Tulcea, Ialomita Salaj, those having a population under 200 000 people. Applying the method of linear regression between the number of unemployed and the resident population aged 15-74 years, it led to the idea of the existence of a direct link between the two variables, as shown in Table 2.

Table 2. Regression of the unemployment on resident population

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POP	0.014397	0.003715	3.875232	0.0004
C	6632.356	1408.925	4.707388	0.0000
R-squared	0.272958	Mean dependent var		11389.00
Adjusted R-squared	0.254782	S.D. dependent var		5192.748
S.E. of regression	4482.694	Akaike info criterion		19.70028
Sum squared resid	8.04E+08	Schwarz criterion		19.78303
Log likelihood	-411.7060	Hannan-Quinn criter.		19.73061
F-statistic	15.01742	Durbin-Watson stat		2.061011
Prob(F-statistic)	0.000386			

Another variable that can influence the number of unemployed it could be the number of active local units, which are in local territory. In 2014, there were 521 381 active local units nationwide, over 4.5% more than in 2013. Again, Bucharest Municipality is first place in the ranking of counties, concentrating over 20% of active local units. Number of active local units in the following 5 counties Cluj, Timis, Constanta, Brasov and Ilfov, is lower by 2000 units compared to the number of units operating in capital. Of the 1779 local units large having 250 or more employees, 403 were in Bucharest. Calculating Spearman coefficient for the 42 counties ($r = -0,6238$), we find that the number of active local units does not seem to influence significantly the unemployment.

But, shows that the two variables have contrary developments: increasing the number of local units, the number of unemployed decrease. Parametric correlation performed in all counties does not reflect an inverse relationship, although tests would indicate a valid model as a whole (Table 3).

Table 3. Regression of the unemployment on active local units

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ALU	0.104328	0.046711	2.233500	0.0312
C	10093.89	959.8592	10.51601	0.0000
R-squared	0.110884	Mean dependent var		11389.00
Adjusted R-squared	0.088656	S.D. dependent var		5192.748
S.E. of regression	4957.221	Akaike info criterion		19.90153
Sum squared resid	9.83E+08	Schwarz criterion		19.98427
Log likelihood	-415.9321	Hannan-Quinn criter.		19.93186
F-statistic	4.988524	Durbin-Watson stat		2.052915
Prob(F-statistic)	0.031175			

Often, unemployment occurs due to a lack on labor market of those persons qualified for the available jobs. Thus, the number of graduates may be an indicator that can influence the size of unemployment. In 2014, over 550 000 students have graduated from different levels of education. Of these, 76% have graduate pre-universitary education level. Ranking the counties by number of graduates, the first places are counties which are university centers: Bucharest, Iasi, Cluj and Timis. If ranked the counties according to the number of graduates from high school, vocational high school and foremen, Bucharest and Iasi County remain on the first two places. Applying the ranks method for the number of registered unemployed and the number of graduates, it was obtained the Spearman coefficient equal with -0.57 and t_{calc}=4,39 (t_{calc}>t_{tab}). Thus we can say that there is a reverse medium intensity link between the two variables. Applying linear regression method, the link is confirmed (Table 4), but these two variables have the same sense of evolution. This can happen when, after graduating, young people turn to the labor market and they can't find a job, for various reasons.

Table 4. Regression of the unemployment on number of graduates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRAD	0.210459	0.060712	3.466515	0.0013
C	8595.823	1074.844	7.997276	0.0000
R-squared	0.231017	Mean dependent var		11389.00
Adjusted R-squared	0.211792	S.D. dependent var		5192.748
S.E. of regression	4610.178	Akaike info criterion		19.75637
Sum squared resid	8.50E+08	Schwarz criterion		19.83911
Log likelihood	-412.8837	Hannan-Quinn criter.		19.78670
F-statistic	12.01673	Durbin-Watson stat		2.040150
Prob(F-statistic)	0.001274			

4. Applying multiple regression method to estimate the number of unemployed

The phenomenon of unemployment is not under the influence of separate factors of economy and then, multiple regression method is a method commonly used. Considering that between the number of unemployed and the following external factors: resident population aged 15-74 years, expenditure for unemployed social protection, active local units and the number of graduates, there is a linear relationship, stated the following multifactor regression equation:

UNEMPL= 0,00018*EXP+0,04*POP - 0,49* ALU - 0,04* GRAD - 661,97 (1)

Table 5. Multiple regression model 1 estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ALU	-0.486816	0.106535	-4.569546	0.0001
POP	0.035886	0.014233	2.521356	0.0161
EXP	0.000182	6.27E-05	2.903008	0.0062
GRAD	-0.038495	0.228492	-0.168475	0.8671
C	-661.9740	2192.470	-0.301931	0.7644

R-squared	0.566397	Mean dependent var	11389.00
Adjusted R-squared	0.519521	S.D. dependent var	5192.748
S.E. of regression	3599.434	Akaike info criterion	19.32628
Sum squared resid	4.79E+08	Schwarz criterion	19.53315
Log likelihood	-400.8520	Hannan-Quinn criter.	19.40211
F-statistic	12.08290	Durbin-Watson stat	1.913065
Prob(F-statistic)	0.000002		

The coefficient of variable expenditure for unemployed social protection is very small, leading to the idea that this factor can be eliminated from the analysis. The growth of the resident population seems to lead to increase in unemployment, while increasing the number of active local units lead to a decrease the number of unemployed by labor absorption. The model explains only in proportion of 56,6% the variation of the number of unemployed in counties. The variable Durbin Watson (1,91) is within the range for which we accept the hypothesis of of residual variable uncorrelation (for n=42, k=4 d2=1,72). F test validate the model as a whole. The chosen model explains only 56% of the variation of endogenous variable, so we propose a new model to include a factor related to population migration.

Migration to a higher standard of living, which implies a better paid job, access to a higher level of education, a higher level of health services make the population of Romania to migrate or people from other countries to reside in various counties. Taking into account three factors analyzed above: active local units, resident population aged 15-74 years, expenditure for unemployed social protection and adding migration balance after residence it was obtained following equation:

UNEMPL=0,04*POP+0,000152*EXP - 0,43*ALU - 0,23*MIGR - 841,95 (2)

Table 6. Multiple regression model 2 estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ALU	-0.425311	0.121046	-3.513625	0.0012
POP	0.035893	0.009520	3.770094	0.0006
MIGR	-0.234121	0.235466	-0.994287	0.3265
EXP	0.000152	6.77E-05	2.252083	0.0303
C	-841.9506	1884.475	-0.446783	0.6576

R-squared	0.577357	Mean dependent var	11389.00
Adjusted R-squared	0.531666	S.D. dependent var	5192.748
S.E. of regression	3553.653	Akaike info criterion	19.30068
Sum squared resid	4.67E+08	Schwarz criterion	19.50755
Log likelihood	-400.3143	Hannan-Quinn criter.	19.37651
F-statistic	12.63610	Durbin-Watson stat	1.996350
Prob(F-statistic)	0.000001		

Though not all of the variables pass t-test ($t_{0,05,38}$=2,03), model bring a plus in explaining the variation of unemployment by the increasing coefficient of determination. Thus, the four exogenous variables explaine 57% of variation the number of unemployed persons. Also in this case, the Durbin Watson test statistics (1,99) is within the range for which we accept the hypothesis of residual variable uncorrelation.

The two models identifies some of the factors that influence the number of unemployed. Analysis can be directed to factors that are components of those identified, for example: active local units by industry, components of expenditure for unemployed social protection and so on.

5. Conclusions

Unemployment is a phenomenon that is important both at the macroeconomic level, but also at the individual level. The lack of jobs, lack of interest of creating specialists for areas with shortage of staff, of providing attractive salaries lead to imbalances in the labor market. In Romania, the legislation provides a series of active measures to encourage the reduction of unemployment phenomenon, such as: payments for training, payments to boost graduate employment, payments to unemployed people who find themselves job, payments to be granted in the form of loans of small and medium enterprises to create new jobs, etc. Analyzing the share of expenditures for training of unemployed, only Bucharest and Brasov County have a higher share (12%, respectively 8%, in 2014), the remaining counties paying less than 2%. The share of expenditures that lead to new jobs, the retraining of the unemployed are smaller than expenditure on unemployment benefits in all counties in Romania. Thus, in the future, it is necessary to create a favorable socio-economic climate in order that these active measures produce a more powerful effect.

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