
STRUCTURE AND OCCUPATION OF THE LABOR FORCE. METHODS AND MODELS OF ANALYSIS

PhD Professor Constantin ANGHELACHE

Academy of Economic Studies, Bucharest, „Artifex” University of Bucharest

PhD Professor Gabriela Victoria ANGHELACHE

Academy of Economic Studies, Bucharest

PhD Candidate Ligia PRODAN

„Dimitrie Cantemir” Christian University of Bucharest

PhD Senior Lecturer Alexandru MANOLE

„Artifex” University of Bucharest

Abstract

This paper presents the author's view on some analysis methods applicable to the labor market of Romania, focusing on problems such as structure and occupation. The first part is dedicated to a synopsis on the population and labor force indicator's evolution, while further analysis is performed by using a dedicated system of indicators, a multi-factorial regression model and the method of rankings and relative distance.

Key words: *labor, occupation, unemployment, regression, social assistance*

Occupied population includes all persons – both employed and free lancers – who perform a productive activity within the production limits in the European Accounts System (SEC).

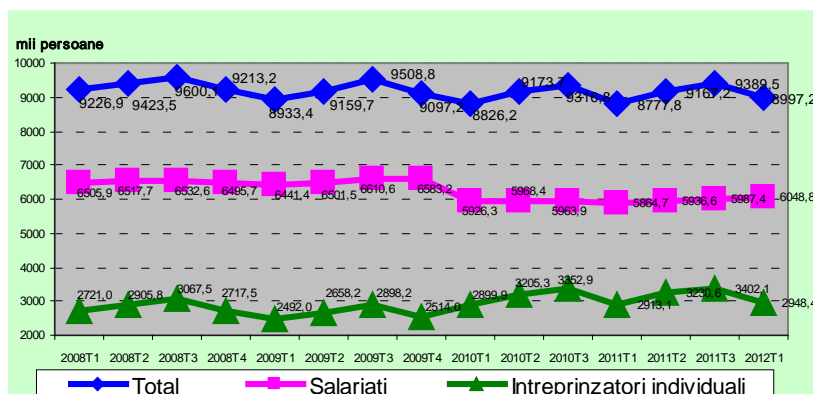
The occupied population was 9,6 million persons during QIII 2008 and 9,5 million in QIII 2009, to reach, during QIII 2010 a level of 9,1 million persons.

In 2012, during the 1st trimester, total occupied population was 8,99 million persons, of which 6,049 million employees and 2,948 million free lancers.

The number of employees shows a level oscillating between 6,4 million in the 1st trimester of 2009 and 6,6 million during the 3rd trimester of 2009, and 6,5 million in QII 2010 and 5,9 million in QII 2011, reaching the level of 6,1 million in QI 2012.

Evolution of the number of employees and individual entrepreneurs, by trimesters, between 2008-2012

Figure 1



The occupied population according to SEC methodology is known as the sole indicator that emphasizes the human potential of occupied labor force that can be used to determine the social productivity of labor as ratio between the GDP and the occupied population.

The evolution of the labor productivity is, within this series, consistently fluctuant (in QIII 2008 it was 10,7%), to constant reductions starting in the 1st trimester of 2009 until the 1st trimester of 2010. A recovery to a positive trend was recorded, of 1,6% in the 2nd trimester of 2010 as against the previous year, and a level of 1,9% in the 3rd quarter of 2010 as against the same trimester of 2009.

In 2011 and during the first six months of 2012, productivity did not manifested significant oscillations, a reduced level being recorded.

Real productivity per hour marks mainly the same evolution as the real productivity per occupied individual.

In this context, according to the European Accounts System (1995 edition), employees hold a weight of some 70% of the occupied population.

By branches of activity, the greatest weight is held by agriculture, 27,6%, followed by industry, 22,5% and transports, 21%.

In 2011, Romania, with an occupation ratio of 60,7% - was placed amongst the countries with values below UE27 average (for which the value of the indicator was 64,5%). The highest values of the occupation ratio were recorded, in 2011, in: Holland (76,3%), Denmark (74,1%), Sweden (72,9%), Austria (71,4%) and Germany (71,0%).

In Europe, the most significant decreases in 2011 as against 2010 were

recorded in: Estonia (-3,9 p.p.), Lithuania (-3,3 p.p.), Bulgaria (-3,0 p.p.) and Latvia (-2,1 p.p.).

In 2011, in Romania, the weight of employees in total working-age occupied population was 66,1% - one of the most reduced in Europe (second to the last position, after Greece). Meanwhile, the weight of non-employees in agriculture (mainly free lancers and family non-remunerated workers) was 26,2% - the highest in Europe.

The increase of occupation in 2011 from the previous periods occurred on the background of transition towards agriculture, phenomenon which is visible from:

- Decrease of employees' weight (by 2,1 p.p. lower 2011 than in 2010);

- The increase of the non-employees' weight in agriculture (mainly free lancers and family non-remunerated workers): by 3,0 p.p. as against 2008 and by 1,8 p.p. as against 2009.

According to the provisional results of the Labor Force Inquiry (AMIGO), in 2011, the employment ration of the working age population was 60,5%; growing by +0,3 p.p. from the end of 2010.

Regarded through the prism of distribution by development regions, the lowest occupation ratio was recorded in the Center region (53,2%) and the highest in the North-East region (65,3%). Occupation ratios above the average per country (60,1%) were recorded only in two regions where the agricultural sector is significant - North East (65,3%) and South Muntenia (63,2%), and also in Bucharest Ilfov (62,8%) where labor force is absorbed by the services sector. The highest growths, established on chain-based indices, were recorded in the regions North East and South Muntenia, and the highest decreases were observed in Bucharest Ilfov and South West Oltenia.

The budgetary sector was characterized during the period 2009 - 2012 by continuous decreases of the employee's effective. The most accentuate decreases were recorded in 2010 and during the first nine months of 2011.

The effective of employees at the end of 2011, belonging to the budgetary sector, reached some 947 thousand persons, continuing the decrease trend. In the public administration, there were 199,0 thousand persons, in education, 371,4 thousand persons, and the health and social insurance sectors, 357,8 thousand persons.

Comparatively to the end of 2010, the effective of employees decreased by 59 thousand persons. Of these, some 40% came from the public administration sector, and 60%, in almost equal quotas, from education, respectively health and social insurance activities.

As for the evolution of average net monthly salary gains, during the

period 2009 - 2011, these were characterized, mainly, by decreases from one period to another, excepting the months in which they were granted, according to national law, annual and occasional bonuses, sums from other funds.

Following the application of legal provisions (Law 118/2010 regarding some necessary measures to re-establish budgetary equilibrium), of reduction by 25% of salary rights of budgetary personnel, during QIII 2010 the lowest values were recorded for the net average salary gain of the latest years: public administration, 1404 lei, education 1063 lei, and health and social insurance 1036 lei.

The effect of economic crisis was felt in the labor force demand in the budgetary sector. In 2011, the lowest values of the vacant jobs were recorded, since 2005 until today, in public administration and health and social insurance sectors.

Comparing against the previous year, in 2011, the rate of vacant jobs decreased in the health and social assistance sector (by 0,20 percentage points), in the public administration sector (by 0,11 percentage points), while in the educational sector, an increase was recorded (by 0,12 percentage points).

The decrease of vacant jobs was more present in health and social assistance sectors (by 2,53 percentage points), followed by the public administration (by 0,67 percentage points), while in education the vacant jobs ratio remained unchanged (0,26%).

In 2011, little above 10% of the total vacant jobs were recorded in each of the following sectors: public administration (2,7 thousand vacant jobs), respectively health and social assistance (2,4 thousand vacant jobs), and for the educational sector the demand for jobs was some one thousand.

In comparison with previous periods, in health and social assistance sectors, the most significant decrease of the number of vacant jobs was recorded: by 7,8 thousand vacancies, that is more than two thirds (67,5%) of the number of vacant jobs that decreased within an year across the national economy, that is by 0,8 thousand vacancies from the previous quarter.

In the public administration, in 2010-2011, the number of vacant jobs decreased by 0,7 thousand, and from 2009, by 2,2 thousand.

In the educational sector, a slight increase of the demand for jobs from the previous year can be observed, subsequent to the beginning of the new school year.

The number of posts occupied in the budget sector, according to the Ministry of Public Finances, was in December 2011 1190,5 thousands, a decline from the previous periods.

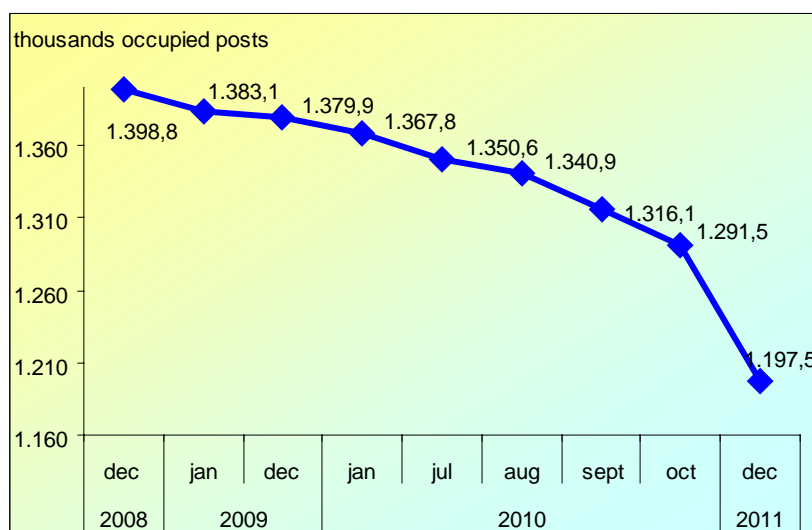
Also, as effect of the OUG no. 48/2010 for the modification and completion of some normative in the health sector aimed towards

decentralization, since August 2010, some hospitals from the Ministry of Health's own network passed into the health network of the local public administration authorities, the effect being the transfer of the number of occupied jobs from the central administration to the local one.

A direct consequence of the economic crisis, the decline of the number of employees emphasized across the period 2009- June 2012.

Monthly data related to the effective of employees and average gross and net salary gains are aggregated on the homogenous activity of the units; this means that for the units that run more (secondary) activities along the principal one, secondary activities are included, each of them, on economic activities, according to the proper Classification of Activities in the National Economy Rev.2.

Evolution of the number of occupied posts in the budgetary sector during the period December 2008 – December 2011



Data source: National Institute of Statistics.

To measure the degree of non-occupation for the labor force, statistical indicators in absolute value are used – *Number of unemployed* along with relative measures – *Unemployment ratio*.

- *Level of unemployment* in absolute value is reflected by the *Number of unemployed BIM* and by the *Number of recorded unemployed*.

- The BIM unemployed (standard definition of unemployment).
- The number of recorded unemployed is represented by all persons registered at the offices for labor force employment (regardless if they receive unemployment fee or not). This indicator is emphasized at national, department, regional level, per genders, age groups, education level, categories of unemployed (fee or no fee), per month, trimester and year.

- *The Unemployment ratio* represents the ratio, expressed as percentage, between the number of unemployed and the active population. Currently, three types of unemployment ratio are calculated, depending on the data source, definition and periodicity:

- BIM unemployment ratio, source – AMIGO inquiry, quarterly and annual periodicity;

- Recorded unemployment ratio, administrative source - National Agency for the Occupation of the Labor Force, monthly periodicity;

- Harmonized unemployment ratio, mixed source, AMIGO and administrative, monthly and annual periodicity.

For all EU member states **harmonized unemployed ratio** is calculated, on a monthly basis, by the Statistical Office of the European Commission (EUROSTAT). Data sources for the calculation of the monthly harmonized unemployment ratio: European inquiry on the labor force in households and monthly series regarding the number of recorded from national administrative sources.

To characterize the unemployment in Romania, at the national level, the BIM unemployment ratio is calculated together with the Recorded unemployed ratio.

The BIM unemployment ratio, is calculated at the national, regional, by residence environments, genders, age groups and educational levels (quarterly and annually).

$$R_{SBIM} = \frac{S_{BIM}}{P_A} 100$$

where: – R_{SBIM} – BIM unemployment ratio
 – S_{BIM} – number of BIM unemployed
 – P_A – active population.

The long-term unemployment ratio represents the report between the Number of BIM unemployed who are jobless for at least 12 months and the total active population (is expressed in percents).

$$R_{SBIM_D} = \frac{S_{BIM_D}}{P_A} 100$$

The extended long-term unemployment ratio represents the ratio between the Number of unemployed defined according to the International Labor Bureau (BIM) criteria who are jobless for at least 24 months and the total active population.

$$R_{SBIM_FLD} = \frac{S_{BIM_FLD}}{P_A} 100$$

The long-term unemployment ratio for youngsters is the report between the Number of unemployed defined according to the International Labor Bureau (BIM) criteria of age 15 – 24 years who are unemployed for at least six months and the active population in the same age group (15 – 24 years).

$$R_{STIN_D} = \frac{S_{TIN_D}}{P_{ATIN}} 100$$

The incidence of the long-time unemployment is calculated as ratio between the Number of BIM unemployed who are jobless for at least 12 months and the total Number of BIM unemployed, is expressed as percentage and measures the intensity of long-term unemployment (at least 12).

$$I_{SBIM_D} = \frac{S_{BIM_D}}{S_{BIM}} 100$$

The weight of unemployment along youngsters - the ratio between the Number of unemployed defined according to the International Labor Bureau (BIM) criteria of age 15 – 24 years and the total Number of youngsters in the same age group (15 – 24 years); is expressed in percents and measures the dimension of unemployment among youngsters.

The Gender difference of the unemployment is defined as the difference between the Ratio of BIM unemployment for women and the Ratio of BIM unemployment for men, expressed in percents, and measures the gender disparities of unemployment.

$$ER_{SBIM_G} = R_{SBIM_F} - R_{SBIM_B}$$

The Difference of unemployment between residence environments – is the difference between the Ratio of BIM unemployment for urban area and the Ratio of BIM unemployment for rural zones; expressed in percents, and measures the disparities of the BIM unemployment between the two environments.

$$ERSBIM-M = RSBIM-U - RSBIM-R$$

The Variation quotient of the unemployment ratio - represents an indicator of social cohesion in the regional plan; it presents, as percentage, the differentiation degree of the BIM unemployment incidence between regions. Depending on the values acquired, the variation quotient of the unemployment ratio can be interpreted as such:

- High level, or an increase from the previous periods, it characterizes a reduced homogeneity of the population's unemployment, that is a *less than favorable situation*;

- Reduced level, or a decrease from the comparison terms used, it characterizes the increase of unemployment homogeneity, that is a *favorable situation* from the viewpoint of social cohesion.

$$V_{RSOM} = \frac{\sigma_{RSOM}}{R_{SOM}} \times 100$$

Analysis of unemployment at the level of administrative-territorial units by using the multi-factorial regression method

Multi-factorial regression can be used too for the analysis of the unemployment phenomenon at the same moment (same year), but for observations collected from the 42 territorial administrative units, realizing thus a territorial series. Results achieved can be compared and therefore emphasize the differences existing, this time from one year to another.

Influence factors on unemployment at territorial level:

- Number of high school, universities and art and craft schools graduates, balance of urban – rural migration and international migration balance – factors depending on the modification of the number of active population during the respective period at local (department) level;

- Costs of unemployed social protection, net average salary – factors related to labor force remuneration;

- Active units, from departments, in industry, construction and services - factors that describe the economic potential of the areas;

- The demographic factor, that had a significant influence (direct relationship), common to all departments, is the number of graduates;

- Another factor that has a significant influence on unemployment (it causes the latter to increase): the level of expenses with social protection in the respective year;

- The significant statistical factors at the level of departments (result encountered at the level of regions), as absorption factor of unemployed persons are the active units in constructions.

Multifactorial Regression Method - EViews

Table 1

Dependent Variable: SOMERI				
Method: Least Squares				
Sample: 1 42				
Included observations: 42				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4425.797	1155.889	3.828910	0.0005
ULAC	-9.832863	2.366141	-4.155653	0.0002
SMI	-4.150516	1.845408	-2.249105	0.0305
CHELTS	0.000173	2.80E-05	6.170917	0.0000
ULAS	0.864605	0.213097	4.057329	0.0002
R-squared	0.619129	Mean dependent var		10964.17
Adjusted R-squared	0.577954	S.D. dependent var		4695.750
S.E. of regression	3050.598	Akaike info criterion		18.99541
Sum squared resid	3.44E+08	Schwarz criterion		19.20227
Log likelihood	-393.9035	F-statistic		15.03643
Durbin-Watson stat	2.160152	Prob(F-statistic)		0.000000

Ranking and relative distance methods

At the level of development regions, analysis assumed the consideration of the following indicators: unemployment ratio, active local units in each region, on total and on activity sectors (total local active units, locale units active in industry, in constructions and services) and also the turnover achieved on each type of economic activity.

By applying the Ranking method (the sum of ranks method and the method of uniformly increasing ranks) on groups of indicators in various variants, the following results were achieved:

Hierarchy depending on the number of active units in industry, constructions and services by the method of sum of ranks, the following situation was revealed:

- On the first places, the regions Bucharest –Ilfov, North-West and Center are situated, with the most active units.
- The last place is occupied by the South - West Oltenia region.
- To be noted the fact that the Bucharest – Ilfov region and the North – West occupy the first two places for active units in industry and constructions.
- In reverse, in the field of services, a higher number of units exists in South – East (area that includes the Black Sea Shore) than in the Center region (Valley of Prahova, Braşov).

Non-parametrical correlation. The Spearman Quotient

Table 2

Region	Unemployment ratio	Rank upon unemployment ratio	Local active units	Rank upon local active units	d_i^2
NORTH-EAST	6,8	5	49331	5	0
SOUTH-EAST	6,4	4	53255	4	0
SOUTH-MUNTENIA	7,3	6	46707	6	0
SOUTH-wEST OLTENIA	7,5	8	33649	8	0
WEST	5,1	3	41818	7	16
NORTH-WEST	4	2	61073	2	0
CENTER	7,4	7	54854	3	16
BUCHAREST-ILFOV	2,4	1	103688	1	0
Total					32

$$r_s = 1 - \frac{6 \sum d_i^2}{n^3 - n} = 0,62, \quad t_{6,0,05} = 1,943$$

Data calculated in this case are equal to:

$$R^I = r_s \sqrt{\frac{n-2}{1-r_s^2}} = 1,982$$

Since

$$R^I > t_{6,0,05}$$

The linear dependency between the two data series is accepted and the value of the Spearman quotient is deemed relevant.

The method of relative distance from the maximum performance offers the following hierarchy of the regions of Romania: Bucharest – Ilfov, North – West, Center, West, South Muntenia, South – East, North – East and South – West Oltenia.

It results a hierarchy which is appropriate to the one achieved by using ranking method, for all regions at the top and the base of hierarchy.

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