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## EFFECTS OF EMPLOYMENT STRUCTURE CHANGES ON REGIONAL PRODUCTIVITY DISPARITIES IN ROMANIA

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# EFFECTS OF EMPLOYMENT STRUCTURE CHANGES ON REGIONAL PRODUCTIVITY DISPARITIES IN ROMANIA

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**Abstract:** *The sustained economic growth in 2000-2008 in Romania was accompanied by an oscillating employment rate between 58-59% in the same period and by improvement of the overall labor productivity. The unprecedented reduction of labor force participation in some regions was strongly determined by the decline in agricultural employment, negative net migration, as well as increase of social protection. These combined processes were mainly induced by Romania's integration to the EU allowing higher labor force mobility and by social policy measures. In addition, there are longer lasting structural influences, such as the demographic and educational composition of employment. The paper aims at measuring the cross-regional variation of employment by age structure and education levels in Romania and their contribution to regional differences in productivity compared to the most developed region - Bucharest-Ilfov (NUTS2 level). The differences regarding these structures and their changes in the last decade explain partly the territorial polarization of development, which is expected to increase under the impact of the economic crisis.*

**Key words:** employment rates, education levels, age structure, regional disparities

## 1. Introduction

Regional disparities in labor productivity explain basically the divergent development path of regions. The specialization of regions in traditional activities, such as subsistence agriculture, keeps a higher employment rate, but low productivity. The literature in the field of labor market processes refers to education as a source of productivity increase and changes of employment by age groups.

In a comparative study of 21 countries, Treiman and Yip (1989) found that education was a stronger determinant of occupational status in more industrialized countries. This is connected to the idea that any investment in human capital will increase the productivity of the individual. Based on this connection, education may be used as a source of information and/or a source of productivity enhancement to their prospective employers (Clark, 2000). The educational qualifications enable employers to use educational attainment as reliable information when recruiting workers. But education may actually contribute to productivity increase only if it responds to the requirements of the labor market. There is also the over-education argument which suggests that industrialized societies and individuals invest too much in education leading to a surplus of workers with high educational qualifications. When in work, the young and the lower educated have lower productivity (Boulhol, 2009). Therefore the structure by age and education can also affect the average labor productivity.

The measurement of labor market health by the unemployment rate and the degree of labor force utilization by the employment rate must take into consideration realities: hidden unemployment, increasing shift from full-time to part-time employment, as well as the proportion of people who are employed in non-standard forms of employment, temporary migration flows etc.

The highly aggregate nature of statistics regarding employment and unemployment at national level masks important differences between regions and social groups. The analysis at regional level of the employment of less educated people comprises one the important aspects concerning regional disparities in economic well-being. It is frequently observed that the low-wage regions are characterized by comparatively high unemployment rates. Further, high-wage regions tend to have a higher share of high-skilled individuals and induce a brain drain out of poorer regions. Recent studies argue that if the skill premium rises with a smaller aggregate labor supply due to outmigration, medium ability workers now acquire skills, even if they do not plan to migrate (Eggert, Krieger&Meier, 2010).

Regions belonging to the same country can have different employment patterns. The reduction of labor force participation in some regions in Romania was strongly determined by the decline in agricultural employment, negative net migration, as well as increase of social protection. These combined processes were mainly induced by Romania's integration to the EU allowing higher labor force mobility and by social policy measures.

## **2. Data and methodology**

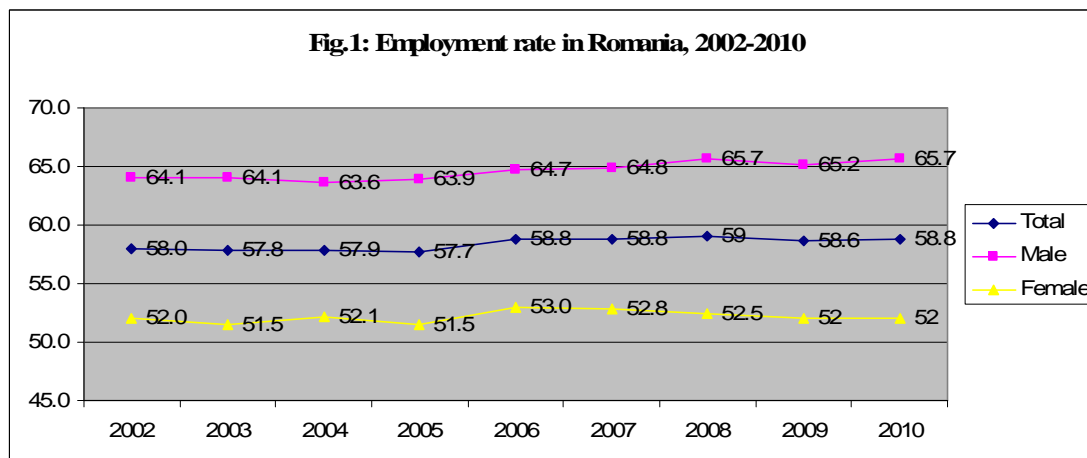
The data regarding employment structures, migration and productivity used in this article are from the Romanian Statistical Yearbook - time series 1990-2009 and the Household Labor Force Survey in 2002 and 2009. Beginning with 2002, the data are not comparable with data series of previous years, because of revised definitions used. In addition, the regional GDP is available only for the period 2003-2008. Therefore the main regional analysis is restricted to the period 2003-2009. This period is quite short but relevant for structural changes, since the pre and post-accession to the European Union were marked by significant changes in the education structures and migration flows, as well as by the effects of the crisis. We used data classified by educational level (tertiary, medium and low), by age group (10-years intervals). The employment rate is the ratio between employed persons and total population aged 15-64 years. The workers comprise all types of employment, including wage and salary earners and the self-employed.

In order to study the regional structural disparities regarding education we used the model inspired from Perry-weighting method (Perry, 1970) and the measurement of the effect of population structure on labor utilization (Boulhol, 2009).

## **3. Employment trends in Romania**

In Romania the total civil employment (end of year) has gradually decreased from 9023 thou persons in 1997 to 8238 thou persons in 2004 and then increased again to 8747 thou persons in 2008. The employment rate decreased by 3.5 percentage points in the period 1997-2001. After 2000, the employment rate oscillated between 58 - 59%, by having similar trends for men and women (fig.1). The total employment rate

is still much lower than the EU27 average of 65.9% in 2008 and has a significant deviation from the goal of the Europe 2020 Strategy regarding the labor market, which is the 75% of the 20-64 year-olds to be employed.



Source: Romanian Statistical Yearbook - time series 1990-2009

In the period 2000-2009 the employment in agriculture in Romania decreased by 41.1%, which is an extraordinary degree of change in such a short period. Other EU countries with a high share of agriculture in GDP had also a decreasing trend in the same period, but with a much lower variation. This massive reduction of employment in agriculture in a rather short time points to initially high level of over-employment.

But the reduction of labor input was accompanied by the reduction of the utilized agricultural area. Thus the productivity in agriculture had not continuous increase as it was expected, but mainly annual fluctuations determined by the variation of the agricultural production, in strong connection to the weather instability. Since the productivity level has not significantly improved and is not following an upwards stabilized trend, young people are rather prepared to shift to non-agricultural activities in rural areas or to migrate out of the rural area.

Romania has experienced changes in education. The higher educational system expanded significantly in the last two decades. Differences between older and younger cohorts in educational attainment at lower and higher education are large. The temporal trends show changes of occupational structures by educational level. In the period 2002-2009 the employment at tertiary level increased from 10.4% to 15.4% from the total employment, while the employment with low educational level decreased from 30.3% to 24.9% (table 1).

**Table 1: Employment by education level in Romania, 2002, 2008 and 2009**

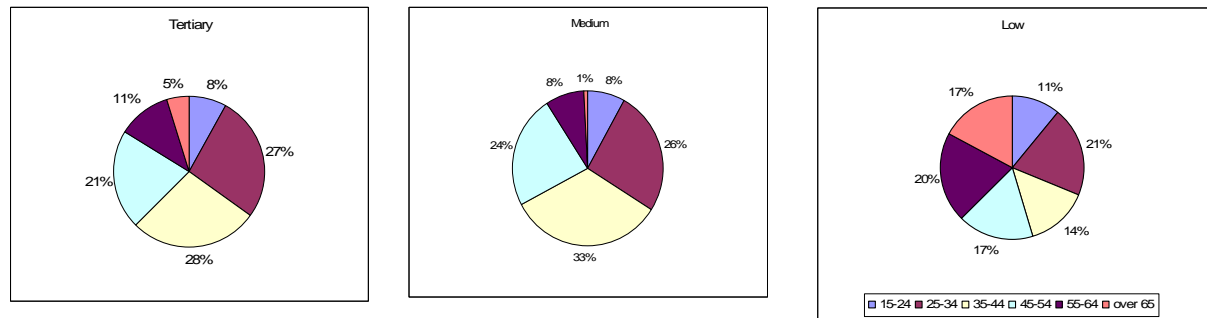
- %-

	2002	2008	2009
Total employment	100	100	100
of which, by education level:			
Tertiary	10.4	14.8	15.4
Medium	59.3	60.7	59.7
Low	30.3	24.5	24.9

Source: Romanian Statistical Yearbook 2003, 2009 and 2010

Employed people with tertiary education are predominantly from the younger generations, while persons of 55-64 and over with tertiary education represent only 16%. On the other hand, employment with low education includes 37% of people aged over 55 years (fig.2).

**Fig.2: Employment structure, by educational level and age group in Romania in 2009**

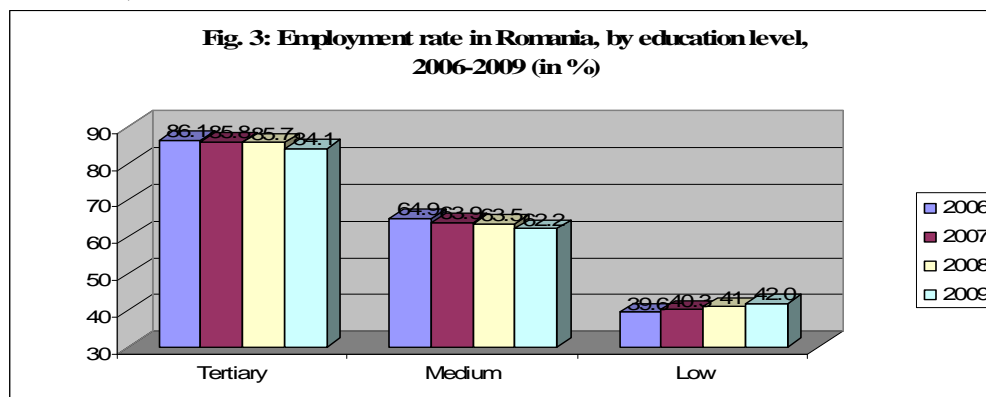


Source: Romanian Statistical Yearbook 2010

People with tertiary level of education are highly motivated to search for a work place and have the best chance to find one. Therefore the employment rate was about 84-86% in the period 2002-2009 in this case, which is much higher than for the other two groups. It is however remarkable that there is a trend of increasing employment rate of the group with lower education (fig.3). This is in accordance with the results of a recent World Bank calculations, which shows that among the EU10 countries in 4Q 2010, Romania has an unemployment rate of low-skilled persons under 10%, while in all other EU10 countries it is over 20% (The World Bank, 2011).

The employment rate of less than 45% for the low education level is however an incomplete information. The first reason is that part of the low skilled persons work in the informal economy, which is a reality also in other post-transition countries (Cichocki&Tyrowicz, 2010). The necessity to declare the activity in order to have access to structural funds (especially in agriculture) is reflected in the official increasing group specific employment rate. The second reason is that the employment rate is calculated for the working age population 15-64 years, but in agriculture still work people over 65 years, which in some regions specialized in agriculture represent 8-9% of the total employment.

The economic crisis in 2009 has affected the employment of people with tertiary education, as well as those with medium education.



Source: Romanian Statistical Yearbook - time series 1990-2009

## 5. Structural changes of employment by education level and age group – a regional analysis

The analysis of the cross-regional variation of employment takes into consideration the eight development regions from Romania: North-West, Center, North-East, South-East, South-Muntenia, Bucharest-Ilfov, South-West Oltenia and West (Appendix).

In 2009 the highest employment rate was 62.8% in Bucharest-Ilfov region. In this region 20.6% of the population aged 15-64 years represents employed persons with tertiary education and only 5.3% with low education.

The composition of employment rate in the other regions shows that the employment with medium education level has a rather similar share compared to Bucharest-Ilfov region, but significant differences regarding superior and low education. During the period 2003-2009 these differences have increased. It is remarkable that all regions have improved the component with superior education and lost some of the low education component. The regions South-West Oltenia and North-West have also a decline of the component with medium education level, in close connection to the emigration flows from the western part of the country.

**Table 2: Composition of employment rate\*, by region and education level in Romania, in 2009**

Development regions	Share of employment in total working age population 2009				Changes to 2003			
	Total 15-64 years	Level of education			Total 15-64 years	Level of education		
		Superior	Medium	Low		Superior	Medium	Low
North - West	55.1	8.5	34.6	12	-2.1	2.7	-0.2	-4.7
Center	55.0	8.6	38.8	7.6	-0.1	3.2	0.3	-3.5
North - East	60.8	7.6	34.4	18.8	1.9	3	0.6	-1.8
South - East	55.7	7	35.6	13.1	-0.3	1.7	1.1	-3.1
South - Muntenia	60.6	6.8	38.9	14.9	2.1	1.8	0.5	-0.3
Bucharest - Ilfov	62.8	20.6	36.9	5.3	6.8	6.1	1.8	-1.1
South - West Oltenia	60.4	9.1	35.4	15.9	-1.8	3.4	-4.7	-0.5
West	58.3	10.3	38	10	1.4	3.7	1.5	-3.7

\* Share of employed persons in total population aged 15-64 years (%)

Source: own calculations based on data from the Romanian Statistical Yearbook 2009, National Institute of Statistics

This paper focuses on the effect of population structure on labor utilization by using the analysis of the consequences of aligning the structure of the working-age population (15-64 years) in each region with that of Bucharest-Ilfov, while keeping both group-specific employment rates at their current levels. The total employment rate gap of region  $k$  vis-à-vis Bucharest-Ilfov region can be broken down in two components:

- 1) the “structure” component due to differences in working-age population structure and
- 2) the “performance” component reflecting the employment performance within groups as follows:

$$ER\ gap_k = ER_k - ER_{Buc} = \sum_i (S_{i,k} - S_{i,Buc}) * ER_i + \sum (ER_{i,k} - ER_{i,Buc}) * S_{i,Buc}$$

where:

- $ER_{i,k}$  = employment rate
- $S_{i,k}$  = share of group  $i$  in 15-64 years old population
- $i$  = the level of education
- $k$  = the region
- $Buc$  = Bucharest-Ilfov region.

The “structural” component measures the difference between a region’s total employment rate and the one that would obtain if this region had Bucharest population structure while keeping its own group-specific employment rates. Conversely, the “effective performance” component measures group-specific employment-rate differences vis-à-vis the Bucharest-Ilfov region, weighted by the share of each group in the total working-age population.

The analysis refers to the year 2008, as the last year of the sustained economic growth period and 2009, as the first year of economic crisis. The population structure  $S_{i,k}$  is actually the share of employment with education level  $i$  in total working age population (15-64 years), for each region. A better measure would be the share of population with education level  $i$  in total working age population, but data will be available only from the 2011 population census in Romania.

The first observation refers to the large gap between the seven regions and B-I region for both components. The “structure” component shows the largest difference regarding superior education level, while keeping its own group-specific employment rates (table 3). This type of gap had only a slight decrease in 2009 for the tertiary and medium level and increase for the low level. This is in accordance with the increase of low level employment rates (fig.3) while some of the higher education employed persons were released. The “performance” component shows a much larger gap, since Bucharest-Ilfov region has the highest employment rate for the superior education group (89.6%) and the lowest for the low education group (28.2%). The performance component of medium education level has radically changed in 2009, because all regions had a decline in the employment rate of this group, except Bucharest-Ilfov.

**Table 3: Change in labor utilization when aligning the structure of the working age population by level of education with that of Bucharest-Ilfov region**

Education level	2008			2009		
	Structure component	Performance component	Total	Structure component	Performance component	Total
Tertiary	-75	-714.3	-789.3	-71.8	-626.2	-698
Medium	25.5	-48.4	-22.9	21.1	-561	-539.9
Low	24.5	446.1	470.6	27.6	411.6	439.2

Source: own calculations based on data from the Romanian Statistical Yearbook 2009 and 2010

The structure of employment by age group is also significant for shaping the employment characteristics (table 4). From the total working age population (15-24 years) the employed of the youngest age group (15-24 years) have the highest share in the poor regions specialized in agriculture: North-East 6.3%, South-Muntenia 5.9% and South-West Oltenia 5.2%. In the best developed regions (Bucharest-Ilfov and West) this age group is less represented, since young people are predominantly enrolled in education systems.

**Table 4: Composition of employment rate\*, by region and age groups in Romania, in 2009**

Development regions	Share of employment in total working age group 15-64 years in 2009						Changes to 2003			
	Total 15-64 years	Age groups					Total 15-64 years	Age groups		
		15-24	25-34	35-49	45-54	55-64		15-24	25-34	35-64
North - West	55.1	4.4	15.9	16.1	12.4	6.3	-2.1	-2.5	-1.2	1.6
Center	55.0	4.4	16.5	16.0	12.5	5.5	-0.1	-1.2	-0.1	1.2
North - East	60.8	6.3	16.1	17.1	12.9	8.4	0.8	-1.5	-1.9	4.1
South - East	55.7	4.8	15.2	16.1	13.0	6.6	-0.3	-1.7	-1.0	2.5
South - Muntenia	60.6	5.9	16.2	17.9	12.8	7.7	2.1	0	-1.5	3.5
Bucharest - Ilfov	62.8	3.9	20.8	18.6	14.0	5.5	6.8	-1.3	2.2	5.9
South - West Oltenia	60.4	5.2	15.0	17.1	13.9	9.1	-1.8	-1.1	-2.9	2.2
West	58.3	4.2	16.4	17.4	14.0	6.3	1.4	-1.5	-0.8	3.7

\* Share of employed persons in total population aged 15-64 years (%)

Source: own calculations based on data from the Romanian Statistical Yearbook 2009, National Institute of Statistics

The outstanding position of Bucharest-Ilfov region is also determined by the high share of employed persons of age 25-34 years in total working age group (15-64 years): 20.8% in 2009. This share has increased by 2.2 percentage points compared to 2003, while in all other region this age group registered a decline. It is also remarkable that the persons employed at age 55-64 years have a lower share compared to the other regions (except region Center). The detailed data by 10-years intervals are not available for 2003 for the group 35-64 years. However this group has increased its contribution to the general employment rate in all regions.

The connection between education level and age of employment, on one side, and economic performance on the other side can be demonstrated by comparing the composition of employment rate with the labor productivity at regional level (table 5).

**Table 5: Productivity\* gap of regions, Bucharest-Ilfov region =100%**

	2003	2008	Changes 2008 to 2003
North-West	46.2	40.6	-5.6
Center	53.0	44.3	-8.7
North-East	33.2	26.0	-7.2
South-East	43.8	38.2	-5.6
South Muntenia	38.1	34.9	-3.2
Bucharest-Ilfov	100	100	0
South-West Oltenia	36.7	31.9	-4.8
West	55.7	47.8	-7.9

\* Productivity is calculated as regional GDP/capita



The poorest regions are North-East, South-Muntenia and South-West Oltenia, with labor force predominantly specialized in agriculture (according to the location quotient). They have a relative high total employment rate, with a comparatively higher contribution of low educated people of age over 55 years to the employment rate. The best developed region is Bucharest-Ilfov, with labor force predominantly specialized in services and constructions, has the highest employment rate and a significant contribution of younger and higher educated persons.

The other four regions have an intermediate position. However, the gap in economic performance between Bucharest-Ilfov region and all the other regions is significant and has increased in the period 2003-2008. The capital city Bucharest plays the role of a development pole, by attracting the most dynamic and educated part of the labor force.

## **6. Conclusions**

Romania experienced changes of the employment structures both as a result of the post-transition to the market economy and of the integration process to the European Union. The sustained economic growth during the period 2000-2008, as well as the unprecedented possibilities to migrate to western European countries, have changed the behavior of individuals. The main findings of the paper refer to the following:

- Bucharest-Ilfov region is the main attraction pole for young and for educated labor force searching for higher income. This is mainly due to the role of the capital city Bucharest, which concentrates a high share of services, including services within the central administration of the country demanding for high qualification.
- The less developed regions have labor force predominantly specialized in agriculture. The massive decrease of employment in agriculture had not a significant effect on labor productivity in agriculture. Young people tend to leave these regions, while elderly people replace them as a result of internal urban-rural migration process. If elderly people benefit from social protection they work in the subsistence agriculture or become inactive population.
- The increasing gap between Bucharest-Ilfov and all the other regions can be explained also by the unequal evolution of employment by education level and age group. Education in Romania still plays a role of source of productivity.

The role of development pole is potentially specific to other large cities in Romania, which could contribute to the reduction of regional disparities.

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**Appendix: The map of Romania and the borders of the counties and regions**

