Journal of Social and Economic Statistics

Vol. 3, No. 2, Winter 2014

INEQUALITIES IN THE EUROPEAN UNION LABOUR MARKET. AN ANALYSIS FOCUSED ON VULNERABLE GROUPS*

Gina Cristina DIMIAN[a]

Abstract

The main aim of the paper is to explore the dynamics of unemployment in recent years with a focus on so-called vulnerable groups on the labor market: young, older and persons with low education. For achieving this objective European Union countries were grouped into two categories starting from the four social models highlighted by Boeri (2002): Nordics, Anglo-Saxon and Continental, on the one hand, the Mediterranean and Central and Eastern European countries on the other. Using Okun Law model, the dynamic version, we tested the hypothesis that for the countries in the second category and the vulnerable groups, in recent years the unemployment rate has been influenced to a greater extent by the economic growth, directly related to the economies' ability to create new jobs or to maintain the existing ones.

Keywords: Labour market, Vulnerable groups, GDP growth, Okun Law model, Inequalities
JEL Classification: E24, F40, J64

Author's/Authors' Affiliation

[a] **Ph.D. Lecturer**, The Bucharest University of Economic Studies, Department of Econometrics and Statistics

* A version of the paper was presented at The Eight International Conference on Applied Statistics, Bucharest, 2014; the authors thank participants for their useful comments.

1. Introduction

The crisis that began in 2007-2008 had dramatic consequences on the labor market because of the large number of jobs destroyed. In terms of the economies structure most affected by the downturn consequences were construction and financial sectors.

The main challenges for the European countries seem to be, on the one hand creating new jobs or restoration of those destroyed and, on the other hand, reducing mismatches between existing jobs and labour force qualifications.

In the most recent presentation of the latest features of the European Union labour market EUROSTAT reports on the year 2013 (Teichgraber, 2013) point out to some worrying facts: unemployment remains on an increasing trend (0.9 million unemployed more than 2012), employment is relative stable (64.1%, as in 2012) and disparities among Member States continued to grow (for example, the difference between the youth unemployment rate is more than 40 percentage points between Greece and Germany).

The situation of the European labour markets economic structure can be interpreted in the same key of the maintaining differences. In 2012, there was a gap of over 27 percentage points in terms of the employed persons share in agriculture between Romania (29%) and countries like Malta, Luxembourg, United Kingdom, Belgium and Germany.

Regarding the share of employed persons in industry, Czech Republic and Slovakia were situated at a distance of about 25 percentage points from Luxembourg (12.7%), while in terms of market services the gap was of about 14 percentage points between Cyprus (48%) and Poland (34.1%), and in the non-market services of nearly 27 percentage points between Luxembourg (42.6%) and Romania (15.8%).

Similar differences were recorded in 2012 in terms of skill level and type of qualification: the largest share of skilled non-manual workers recoded Luxembourg (57.8%) and the lowest Romania (22.4%).

The situation was reversed in what concerns the share of skilled manual workers Romania having a share of 49.5% and Luxembourg 13.6%. In terms of the share of persons with elementary occupations Cyprus registered the highest percent of 17.1 while Sweden and Czech Republic the lowest: 5.1% and 5.4%.

Given that unemployment is at high levels or even on an increasing trend in some countries and the potential of raising the number jobs is limited, a problem relative easier to solve is that of structural unemployment.

This phenomenon of structural unemployment is very pronounced in countries like Spain and Greece, followed by Portugal, Latvia, Slovakia and Ireland where in 2013 the non-

accelerating wage rate (%) of unemployment (NAWRU) was closer to 15% and almost 10 percentage points above the values recorded in countries like Netherlands, Luxembourg and Austria.

In the second quarter of the year 2012, job vacancy rate ranged from 2.5% and over in countries such: Malta, Germany and Belgium to 0.5% in Poland, Italy, Latvia and Portugal. Most of the EU countries show low vacancy rates and either low unemployment rates (Denmark, Czech Republic, Romania, Cyprus, Slovenia, Italy, Poland and France) or high unemployment rates (Hungary, Bulgaria, Slovakia, Lithuania, Ireland, Portugal and Latvia). Only in some of them low rates of unemployment coexist with high rates of vacancies (Malta, Germany, Austria, Sweden, Belgium, Finland and UK) and a country experienced both low unemployment and vacancies (Luxembourg).

Regarding mobility rate, Romania exceeds 12% of working-age population of country of citizenship compared with under 2% in Spain, Germany, France, Sweden, Czech Republic, Denmark an UK.

The next section concentrates on the analysis of the recent trends in unemployment rates for the labour market categories with a focus on discrepancies between groups of countries. Section 3 presents the data and models applied in order to test the hypothesis that for the countries in the second category and the vulnerable groups, in recent years the unemployment rate has been influenced to a greater extent by the economic growth. Section 4 explains the results of the estimated models. The main conclusions are subject of section 5.

2. Descriptive statistics

Researchers concerned with analyzing the latest developments of the labour market in the context of overcoming the economic crisis drew attention to two sources of very high unemployment rates: shortfall of the aggregate demand and increasing mismatches. Some groups of people proved more affected than others by unemployment spells and inequalities between countries have increased.

To highlight just how big these inequalities are European Union countries have been grouped into two categories (denoted in this paper EU-11 and EU-17) based on the four social models highlighted by Boeri (2002): Nordics (Denmark, Finland, Sweden and Netherland), Anglo-Saxon (Ireland and UK) and Continental (Austria, Belgium, France, Germany and Luxembourg), on the one hand, the Mediterranean (Greece, Italy, Spain and Portugal) and the new waves of entries (Bulgaria, Czech Republic, Estonia, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia) on the other.

Regarding the overall unemployment rate for both EU-11 and EU-17 a period of significant reduction in disparities within the two groups in 2006-2008 was followed by a period of increase during the economic crisis, faster for the second group of states.

Thus, in EU-11, in 2000 the lowest unemployment rate of 2.4% was recorded by Luxembourg and the highest of 11.2% by Finland. In 2013, the unemploymen rate in Austria, Luxembourg and the Netherlands was the lowest of around 5%, while in Ireland it was double, 13.3%.

The disparities between these countries in terms of overall unemployment rate fell to 5 percentage points in 2008 and after an increase during the crisis to around 11 percentage points it started to decline and reached 8.3 percentage points, in 2013 (Figure 1).

For the EU-17, in 2000 the general unemployment rate ranged from a minimum of 4% in Portugal to a maximum of 19.1% in Slovakia. Portugal has experienced the fastest annual growth rate of approximately 12%, while the most significant decrease of 3.5% experienced Poland. In 2013, Greece and Spain exceeded 25% in terms of the unemployment rate, while the lowest value was recorded for Malta 6.5%. This situation made the disparities in this group of countries to substantially increase reaching over 21 percentage points in 2013 (Figure 1).

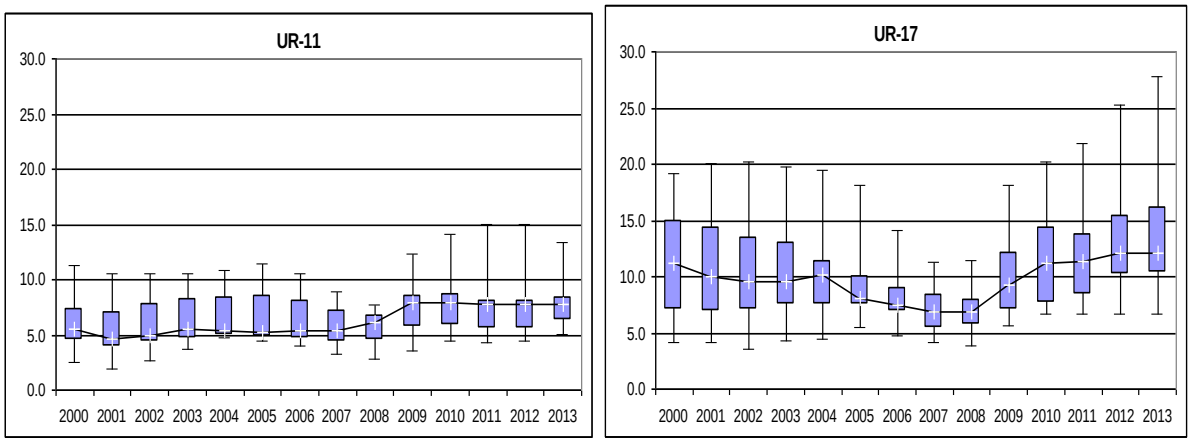

Figure 1. Box plots of unemployment rate in EU-28 countries (2000-2013)

Regarding young people, the unemployment rate among these persons exceeds the general unemployment rate both as level and as disparities within the EU-11. The peak of the period 2000-2013 was reached in 2012, when Ireland recorded a youth unemployment rate of 30.4%, and the difference between the unemployment rate in Germany of 8.1% and that of Ireland was close to that recorded for 2000 (22.3 percentage points compared with 23.1 in 2000) (Figure 2).

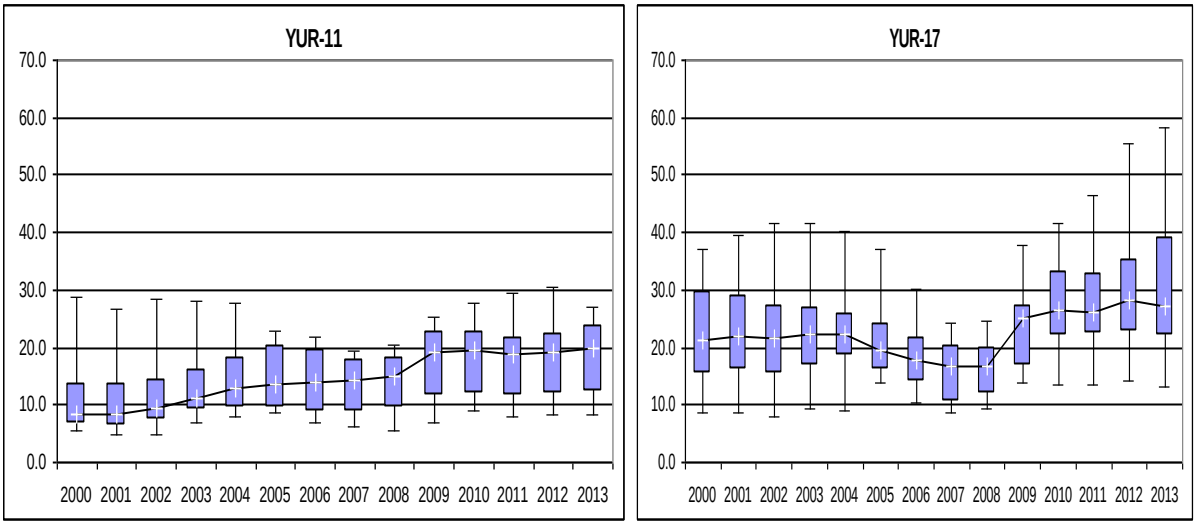

Figure 2. Box plots of youth unemployment rate in EU-28 countries (2000-2013)

In EU-17, youth unemployment rate is much higher compared to the other group of countries. Including differences within these countries have increased significantly in recent years. The most important decline in disparities was recorded in 2008, when the difference between the highest and the lowest youth unemployment rate reached 15.5 percentage points. In 2013 this difference was 45.3 percentage points, between 13.0% in Malta and 58.3% in Greece. The most important rise in youth unemployment was recorded in Portugal, a growth rate of 12.5% annually (Figure 2).

In the EU-11, during the analyzed period, the median unemployment rate among older persons was lower than the general unemployment rate, the situation of this category being quite stable during the crisis. In 2000, for example the lowest unemployment rate was recorded by Netherlands (1.9%), while the highest by Germany (12.7%), a 10.8 percentage points differences between the two countries. In 2013, the minimum unemployment rate has increased, but the disparities between countries have declined to 7.1 percentage points, the difference between Austria' older unemployment rate (3.5%) and Ireland's (10.6%) (Figure 3).

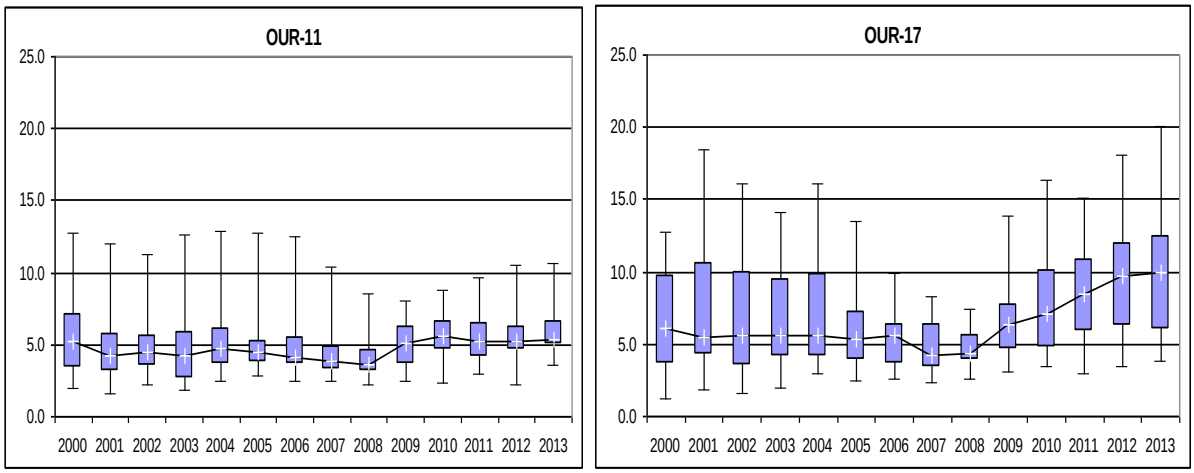

Figure 3. Box plots of older persons' unemployment rate in EU-28 countries (2000-2013)

Contrary to the first group of countries, in the EU-17 both the minimum and maximum unemployment rate of the older persons have increased in the crisis, even though they remained below the general rate of unemployment. If in 2000 they ranged between 1.1% in Romania and 12.7% in Slovakia, a difference of 11.6 percentage points, in 2013 this difference increased to 16.3 percentage points between Romania (3.7%) and Spain (20%) (Figure 3).

As in the case of young people the persons with low education experience a much higher unemployment rate, i.e. double the general unemployment rate. In EU-11 group, the median unemployment rate of the period 2000-2013 increased from 8.4% in 2000 to 14.4% in 2013. The difference between the countries with the highest unemployment rates and those with the lowest remained relatively high. In 2013 this difference declined and reached 12.4 percentage points because the lowest unemployment rate rose to 9.8% in Austria compared to 22.2% in Ireland (Figure 4).

In the group of 17 countries, in addition to the group of 11, the disparities between countries are much higher. Throughout the analyzed period it remained 35 or over 35 percentage points between countries such as Portugal, Romania and Cyprus (the lowest rates) and Slovakia (the highest rate of over 40%) (Figure 4). The highest growth rate of the period 2000-2013 was recorded by Portugal (12% annually).

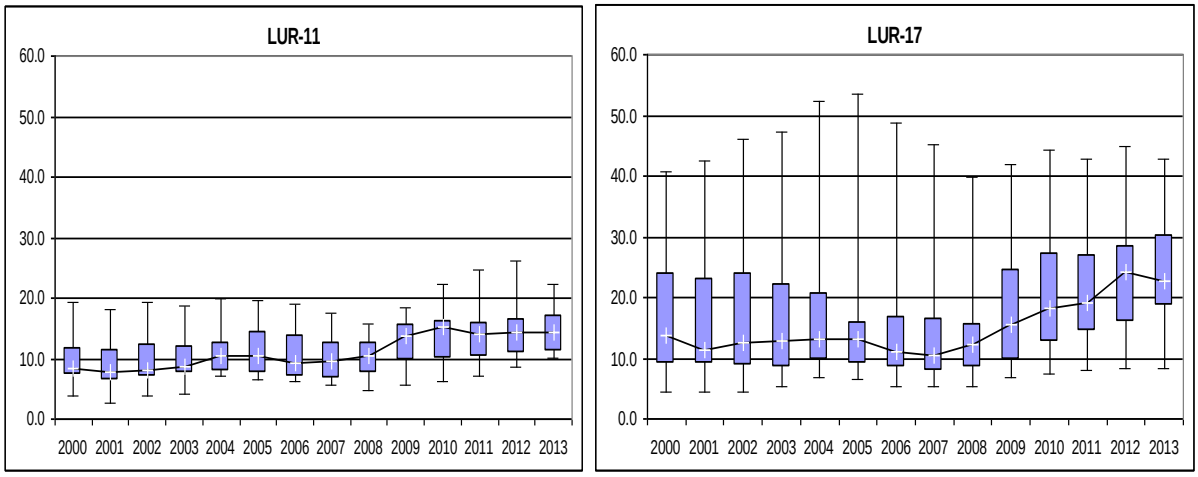

Figure 4. Box plots of low educated persons' unemployment rate in EU-28 countries (2000-2013)

3. Data and models

The main aim of the paper is to measure the impact of GDP growth on unemployment with emphasis on vulnerable groups and to evaluate the differences between the two groups of countries denoted in this paper EU-11 and EU-17.

The economic literature focussed on the problem of unemployment and GDP growth emphases two ways in which the relationship between the two indicators can be described, function of the research questions (Barreto and Howland, 1993):

1. $f(U) = \alpha + \beta f(GNP)$

when the question is 'Given a certain level of GNP, what level of unemployment should one expect under the economic conditions prevailing during the sample period?'

2. $f(GNP) = \gamma + \theta f(U)$

when the question is 'Given a certain level of unemployment, what level of GNP should one expect under the economic conditions prevailing during the sample period?'

Moreover, the first relationship can be analyzed in different versions (Knotek, 2007):

- The difference version: $\Delta U_t = \beta_0 + \beta_1 g_t + \varepsilon_t$

where U_t represents the unemployment rate at time *t* and g_t the real output growth.

- The gap version: $U_t = \beta_0 + \beta_1 (output\_gap) + \varepsilon_t$

where output_gap represents the gap between potential and actual output.

- The dynamic version: $\Delta U_t = \beta_0 + \beta_1 g_t + \beta_2 g_{t-1} + \beta_3 g_{t-2} + \beta_4 \Delta U_{t-1} + \beta_5 \Delta U_{t-2} + \varepsilon_t$

For achieving the purpose of this paper Okun's law, i.e. the dynamic version of the regression model was applied:

$$\Delta U_t = \beta_0 + \beta_1 g_t + \beta_2 \Delta U_{t-1} + \varepsilon_t,$$

The analysis is based on two indicators (Smith, 2010):

$g^* = -\beta_0 / \beta_1$
(the rate of GDP growth that maintain the unemployment rate stable).

$\theta = \beta_1 /(1-\beta_2)$
(the measure of the long run effect of GDP growth).

Starting from this general model and using a panel data consisting of the 28 European Union countries and 14 years, which sources is the EUROSTAT database nine regression models have been estimated.

Three regressions are conducted having as dependent variables general unemployment rate (in first order differences), first for all 28 European Union countries and then separately for two groups: EU-11 (Denmark, Finland, Sweden, Netherland, Ireland, UK, Austria, Belgium, France, Germany and Luxembourg) and EU-17 (Greece, Italy, Spain, Portugal, Bulgaria, Czech Republic, Estonia, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia) .

Chow Breakpoint test has been computed in order to test if there are significant differences between the two groups of countries:

$F = \frac{RSS_1 - (RSS_2 + RSS_3)}{(RSS_2 + RSS_3)} \cdot \frac{[n - 2(k+1)]}{k+1}$, where restricted RSS_1 from model 1 and unrestricted RSS_2 and RSS_3 from models 2 and 3 are residual sum of squares, n total number of observations and k the number of explanatory variables.

The next six equations have as dependent variables: youth unemployment rate, older persons' unemployment rate and low educated unemployment rate, all of them estimated for both EU-11 and EU-17 countries.

4. Results

In order to test the hypothesis that for the countries in the second category (EU-17) and the vulnerable groups, in recent years the unemployment rate has been influenced to a greater extent by the economic growth nine regression models have been estimated. First model concentrates on the impact of the GDP growth on unemployment dynamic for all the 28 European countries while the second two use data for groups of countries: EU-11 and EU-17.

All three models are valid and regression coefficients are significant (F-statistic is in order: 255.7, 48.1 and 185.4). The highest adjusted R-squared was obtained for the second group of countries and the M3 model explains 63% of the change in unemployment versus around 40% for M2 model and almost 60% for M1 model (Table 1).

The coefficients of the variable *annual growth rate* demonstrates that the highest short run effect of the GDP growth on unemployment dynamic was experienced by the second group of countries (-0.318 versus -0.203). At the same time, the first group of countries (the developed ones) has been the subject of a faster adjustment process (the highest coefficient of the *lagged dependent variable*, of 0.331) (Table 1).

Table 1: Panel country analysis for general unemployment

Dependent variable **Δu**	**M1 (total)**	**M2 (EU-11)**	**M3 (EU-17)**
Constant	0.697*** (0.066)	0.415*** (0.070)	0.876*** (0.100)
The annual growth rate	-0.288*** (0.016)	-0.203*** (0.024)	-0.318*** (0.021)
Lagged dependent variable	0.280*** (0.035)	0.331*** (0.061)	0.246*** (0.044)
Country random effect	YES	YES	YES
Period random effect	NO	NO	NO
Observations	364	143	221
Adjusted R-squared	0.584	0.399	0.630
F-statistic	255.694	48.131	185.376
Durbin-Watson stat.	1.994	1.940	2.049
RSS	428.061	76.563	335.184
Growth (g*)	2.420	1.441	4.315
Theta (θ)	-0.400	-0.303	-0.422

Regression coefficients: * significantly different from zero at the 0.1 level of significance;

** significantly different from zero at the 0.05 level of significance;

*** significantly different from zero at the 0.01 level of significance (standard errors are in brackets)

In order to keep the rate of unemployment stable, the rate of growth (g*) of the first group of countries should be 1.441%, while for the second group 4.315%. In addition economic

growth has a higher long run effect for developing countries (EU-17), theta index having the value -0.422. Moreover, Chow Breakpoint test has the value 4.728 and demonstrates that there are significant differences between the two groups of countries analysed.

With regard to vulnerable category of labour market participants, the six models of regression estimated separately for the two groups of countries demonstrate that economic growth influenced to a greater extent unemployment rate dynamic in developing countries and for young and low educated unemployed. Adjusted R-squared for these categories is around 50%. For these categories and countries the economies should grow at a pace of over 3% in order to maintain unemployment constant (g* is 3.221 for young, 3.291 for old and 3.234 for low educated unemployed) (Table 2).

Table 2: Panel country analysis for vulnerable groups

Dependent variable **Δu**	**M1 (young-11)**	**M2 (young-17)**	**M3 (old-11)**	**M4 (old-17)**	**M5 (low-11)**	**M6 (low-17)**
Constant	1.020*** (0.186)	2.201*** (0.249)	0.206*** (0.074)	0.757*** (0.138)	0.413*** (0.107)	1.575*** (0.205)
The annual growth rate	-0.393*** (0.063)	-0.677*** (0.052)	-0.128*** (0.026)	-0.230*** (0.027)	-0.251*** (0.026)	-0.487*** (0.041)
Lagged dependent variable	0.110* (0.067)	0.132*** (0.051)	0.215*** (0.071)	0.095* (0.060)	0.341*** (0.061)	0.190*** (0.052)
Country random effect	YES	YES	YES	YES	YES	YES
Period random effect	NO	NO	NO	NO	NO	NO
Observations	143	221	130	208	156	221
Adjusted R-squared	0.207	0.522	0.174	0.293	0.454	0.460
F-statistic	19.499	119.088	14.556	43.632	65.485	94.557
Durbin-Watson stat.	1.949	2.166	2.215	2.427	2.482	2.041
Growth (g*)	2.595	3.251	1.609	3.291	1.645	3.234
Theta (θ)	-0.442	-0.780	-0.163	-0.254	-0.381	-0.601

Regression coefficients: * significantly different from zero at the 0.1 level of significance; ** significantly different from zero at the 0.05 level of significance; *** significantly different from zero at the 0.01 level of significance (standard errors are in brackets)

The fastest adjustment process was experienced by the elderly and the unemployed with low education in EU-11 (the coefficients of the lagged dependent variables were: 0.215 and 0.341), while the long run impact of growth was greater for young and low educated in EU-17 (theta was -0.780 and -0.601) (Table 2).

5. Conclusions

The main objective of this paper was to evaluate the impact of economic growth on unemployment in the EU countries divided into groups according to specific social models with emphasis on vulnerable groups in the labour market: the young, the elderly and people with low education levels.

Studies conducted by Eurostat showed that although in many countries economic growth resumed and unemployment situation has stabilized yet the level that unemployment reached became worrying. In addition, we can expect that the rebalancing of the labor market to be realized much later than the economic recovery, given the fact that during the crisis a huge number of jobs were lost. The EUROSTAT researchers also draw attention on unprecedented disparities growth between the EU countries and even within countries.

Thus, in terms of the labour market situation in the European Union we can speak of 'a union of diversities' and in this case labour market policies promoted at European level must have their foundation in the local conditions and to start from the specific needs of each country.

The state of the labour market in developed countries requires an education system adapted to the demands of the labour market in order to reduce mismatches while in developing countries there is a need of an integrated plan to modernize the economy so that to create jobs not only more numerous, but also of higher quality.

References

- Barreto, H., Howland, F. (1993). *There are two Okun Law relationships between output and unemployment*. http://web.ntpu.edu.tw/~tsair/2Research/Papers/okun/There%20are%20two%20Okun's%20relationship.pdf
- Boeri, T. (2002). *Let Social Policy Models Compete and Europe Will Win*. Paper presented at a Conference hosted by the Kennedy School of Government, Harvard University, 11–12 April.
- Dimian, G.Ch., Ileanu, B., Jablonsky, J. and Fabry, J. (2013). *Analysis of European Labour Market in the Crisis Context. Prague Economic Papers*, **22**(1), pp. 50–71.
- Eurostat (2012). *Skill mismatch and labour mobility*.
- Greene W. (2005), *Économétrie*, 5 édition. Pearson Education France, in French language, pp. 283-285.

- Gujarati, D.N., Porter, D.C. (2009). *Basic econometrics*. Mc Graw-Hill International Edition, pp. 606.
- Knotek, E.S. (2007). How useful is Okun Law? *Economic Review*, Federal Reserve Bank of Kansa City, QIV, pp. 73-103.
- Nickell, S., Nunziata, L., Ochel, W., Quintini, G. (2002). *The Beveridge Curve, Unemployment and Wages in the OECD from the 1960 to the 1990s*. Centre's Labour Markets Programme, http://www.nuffield.ox.ac.uk/users/nickell/papers/TheBeveridgeCurve.pdf'.
- Smith, J.C. (2012). *UK unemployment dynamics during the financial crisis. Unemployment and mismatch in the UK*. *Chief Economists'Workshop: "Labour market dynamics during the financial crisis: puzzles for policymakers"*, Bank of England, 22 May 2012.
- Smith, R. (2010), *Okun's Law*. Applied Statistics and Econometrics, Birkbeck February 2010.
- Teichgraber, M. (2013). *Labour market and Labour force survey (LFS)*. European Union Labour force survey - Annual results 2013.
- Teichgraber, M. (2013*). Labour force survey overview 2012*. Statistics in focus 14/2013.
- Wooldridge, J.M. (2009). *Introductory Econometrics: A modern Approach*. Hardcover.