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Original scientific paper

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**ECONOMIC GROWTH AND UNEMPLOYMENT: AN  
EMPIRICAL ANALYSIS  
(A CASE STUDY ON THE REPUBLIC OF MACEDONIA)**

**Abstract**

It is a widely accepted view in economics that the GDP growth rate increases employment and reduces unemployment. The theoretical proposition relating output and unemployment is called “Okun’s Law”. This relation is among the most famous in the macroeconomics theory and it holds for numerous countries and regions, especially for the developed ones.

This research investigates the relationship between unemployment and economic growth in the Republic of Macedonia through the implementation of Okun’s law. Using quarterly data covering the period 2005 – 2012, and time series techniques and linear regression between unemployment and economic growth, the empirical analysis shows that a rise of one percentage point of unemployment is associated with a decline of roughly 1.6 percentage points of real GDP growth. The regression also shows that only 17.2% of the changes in the GDP can be explained with the changes in the unemployment. Therefore it can be concluded that the Okun’s concept is not totally prominent for the Macedonian economy.

**Key words:** *economic growth, unemployment rate, Okun’s law, regression, employment policy*

**JEL classification:** E 24, O 01

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## **1. Reasons for unemployment**

If the labour market works as a result of the supply and demand of the labour force, than the reasons which affect both sides are leading to increase or decrease of the employment, i.e. unemployment. Their identification is significant to solve the unemployment problem and they can be divided in to two groups: demographic and socio-economic.

On the supply side of the labour force, the existing demographic conditions and movements in one country significantly influence the balance of the labour force market. The intensive natural increase of the population, thereby the increase of the working age population flow, are negatively reflecting on the unemployment. It is typical in terms of insufficient economic growth of the country, since the market does not have capacity to absorb this labour force increase. In that context, a particular problem is the young population who need longer period to get included on the labour force market, since usually these persons do not have enough experience, or do not feel the need to quickly get employed. Also, in historical view, a later more massive involvement of the women labour force has disrupted the relation between labour force supply and demand, which in some countries still has consequences.

The migration movements also are one of the reasons for increase of the unemployment, especially regionally. The migration of the population from the rural to the urban settlements leads to increase of the labour force supply in towns and to rise of the unemployment. On international level, the rise of the immigrants in separate countries of reception causes the same effect.

Large number of countries is facing intensive and uncontrollable transfer of the population from agricultural towards non-agricultural sectors. This transfer is usually a result of the inappropriate treatment of the villages and the agriculture, which is significantly affecting the increase of the labour supply in these sectors. In the transitioning countries additional reason for increase of the unemployment was inadequate ownership transformation of the enterprises, which has contributed to firing the surplus of the labour force.

On the side of the labour force demand, there are also reasons for rise of the unemployment. The meaning of the long-term implications of developmental factors should be specifically emphasized, which impacts the possibilities for greater activation of the working age population. The changes of the economic structure in the underdeveloped and the

transitioning countries are acting as a limit of the absorption power increasing with the expansion of the secondary, especially of the tertiary sector. So, in the countries with relatively high participation of the basic-raw complex and dominant presence of the labor-intensive, but not propulsive branches, solving the unemployment problem is complicating. This has negative effects on the employment, because the persons who are leaving from these sectors cannot easily adjust to the new labour force demand.

The slowed down economic growth further reduces the chances for increase of the employment and creates space for strong social tensions, which very often are extorting irrational and economically unjustifiable decisions regarding new hires. They are implicating inappropriate and irrational use of the human factor, which in combination with other production factors, among the other things, contributes to reducing the efficiency of the overall economic development.

Regarding the rational use of the labour force, as well as the problems related to solving unemployment, within the causes of such unfavorable conditions the role and influence of the economic system and the economic policy measures should be emphasized. To a large extent they are limits in creating the necessary preconditions and opportunities for appropriate and flexible solutions for intensifying the economically justified employment or for increasing the overall demand for labor.

In most of the transitioning countries the big pressure of unemployment had strong influence on disregarding the economic criteria for employment. At the same time, present socio-economic systems allowed administrative solving of the problem, thus increasing the number of oversized employees with direct and indirect consequences on achieving greater economic effects. That led to irrational use of the available labour force. As a result of these solutions, when the countries started the process of socio-economic transformation, they were faced with deepening and increasing of the unemployment problem. The privatization process led to numerous firings of the oversized employees, especially of the persons without the necessary qualifications and knowledge to start working again. It was one of the key determinants for sharp increase of the unemployment.

## **2. The relation between economic growth and unemployment**

The relation between economic growth and unemployment is defined with the Okun's law.<sup>3</sup> According to this concept, the increase of the unemployment rate for one percentage point is related with two percentage point decrease of the real GDP. Also, there are other reasons, besides the unemployment, which contribute to faster decrease or increase of GDP compared to unemployment:<sup>4</sup>

- decrease of the multiplier effect as a result of the circulation of the worker's money;
- unemployed persons can exit the workforce (they will stop looking for job) and will not be considered unemployed anymore;
- employees can work less hours;
- the labour productivity can be decreased if the employers decide to keep more workers than they really need.

Very significant implication of the Okun's law is that the increase of the labour productivity or the growth of the labour force scope can mean increase of the real output, but without decrease of the real unemployment rates, which is known as the phenomena "jobless growth".

In fact, the relationship between the economic growth rate and the unemployment rate is the growth rate of the potential output. It is a measure of the economy's capacity to produce goods and services using the available resources such as capital and labour. If the potential output level depends on the level of available capital and labor, the potential output growth rate depends on the growth rates of capital and labor. However, the contributions of capital and labor are not fixed. Any increase of the capital stock is increasing the output to the extent that the labour is able to produce. The technological progress enhances the contribution of the capital and the labor of the production. The growth of the potential output is the sum of the labor force growth and its ability to produce, or of the labor productivity.

The growth rate of the contribution of labor to the economic output is determined by the size of the population, the age distribution of the population, the share of the working-age population that is in the

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<sup>3</sup> Blinder Alan, *Is There A Core of Practical Macroeconomics That We Should All Believe*, American Economic Review, vol. 87, no. 2, May 1997, pp.240-243.

<sup>4</sup> Abel, Andrew B. & Bernanke, Ben S., *Macroeconomics* (5th ed.), Pearson Addison Wesley, 2005.

labor force (the labor force participation rate), the share of the labor force that is actually employed, and the hours worked by those who are employed. In the absence of productivity growth, as long as each new addition to the labor force is employed, growth in total output will just equal the growth in the labor force. If growth in the demand for goods and services falls below the rate of growth of the labor force, job creation will not be sufficient to accommodate additions to the labor force. The proportion of the labor force that is employed will fall, and the unemployment rate will rise.<sup>5</sup>

If demand for goods and services grows more rapidly than the labor force, some of the new jobs being created will be filled by drawing workers from the ranks of the unemployed, and the unemployment rate will fall. If there is considerable slack in the economy, and the unemployment rate is relatively high, this does not pose a problem, and moreover would be desirable. But if unemployment is already at relatively low levels, the increased demand for labor is more likely to be satisfied by pushing up wages than by reducing unemployment.<sup>6</sup>

It is very important in creating the labour market policy to determine the economic growth rate. As long as the increase of the real GDP exceeds the labour productivity growth, the employment will rise. If this increase of the employment is faster than the increase of the labour force, it will result in decrease of the unemployment rate. Depending on conditions on the labor market, it might be desirable to strive for actual economic growth at, above, or even below that rate of growth.

### **3. Employment, unemployment and economic growth in the Republic of Macedonia**

Changes in productivity growth tend not to be correlated with changes in unemployment. In the short run, a rise in productivity can produce an increase in the economic growth rate without necessarily pushing down the unemployment rate. This usually happens because the productivity growth offsets the effects of the rise in unemployment with growth of the total output.

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<sup>5</sup> Cashell W. Brian, *Economic Growth, Inflation and Unemployment: Limits to Economic Policy*, CRS Report for Congress, Congressional Research Service, November 20, 2006, p.2.

<sup>6</sup> Ibidem.

According to the data on the GDP growth rate, employment and unemployment rates for the period 1999-2012 in the Republic of Macedonia, i.e. the relation between the changes of the unemployment and economic growth, are not sufficiently expressed (Table 1).

**Table 1:**

**GDP growth rate, employment rates, unemployment rates (in %) and the percentage change in the employment and unemployment rates, for the period 1999-2012**

	<b>GDP growth rates</b>	<b>Employment rate*</b>	<b>Employment rates changes (chain indices in %)</b>	<b>Unemployment rate**</b>	<b>Unemployment rates changes (chain indices in %)</b>
1999	4,3	40,2		32,7	
2000	4,5	40,3	0,2	32,5	-0,6
2001	-4,5	42,6	5,7	31,1	-4,4
2002	0,9	40,4	-5,1	32,4	4,3
2003	2,8	38,5	-4,7	37,1	14,6
2004	4,6	36,8	-4,6	37,4	0,9
2005	4,4	37,9	3,0	37,6	0,5
2006	5,0	39,6	4,6	36,3	-3,5
2007	6,1	40,7	2,7	35,2	-3,0
2008	5,0	41,9	3,2	34,0	-3,5
2009	-0,9	43,3	3,2	32,3	-4,8
2010	2,9	43,5	0,5	32,2	-0,3
2011	2,8	43,9	0,9	31,6	-2,2
2012***	-0,4	44,0	0,2	31,2	-1,3

\* The employment rate is calculated as participation of the employed persons (15-64) in the working age population (15-64)

\*\* The unemployment rate is calculated as participation of the unemployed persons (15-64) in the workforce (15-64)

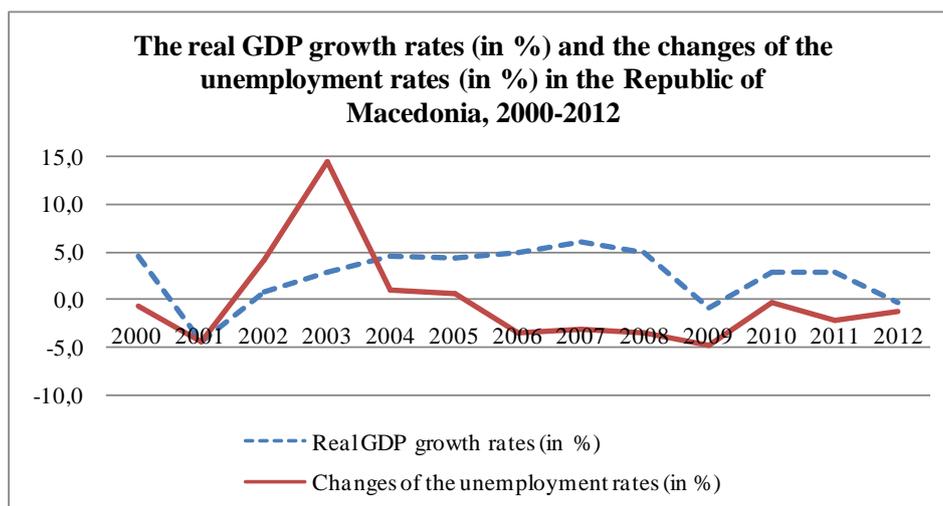
\*\*\* The data for the GDP growth rate for 2012 are preliminary data

Source: State Statistical Office of the Republic of Macedonia, Statistical Yearbook of the Republic of Macedonia 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011 and 2012; Labour Force Survey, Statistical Review: Population and Social Statistics: No. 2.4.06 (1999), No. 2.4.1.03 (2000), No. 2.4.2.08/410 (2001), No. 2.4.2.21/429 (2002), No. 2.4.3.13/453 (2003), No. 2.4.5.02/494 (2004), No. 2.4.6.07/531 (2005), No. 2.4.8.06 (2007), No. 2.4.9.12/632 (2008), No. 2.4.10.04/651 (2009), No. 2.4.11.09/692 (2010), No. 2.4.12.11/727 (2011), No. 2.4.13.06/745 (2012)

The changes of the unemployment show that they are not totally correspondent to the dynamics of the GDP growth (Figure 1). In the period 1999-2001 the decrease of the unemployment rate for 1.6 percentage points was followed with decrease of the GDP growth rate from 4.3% to -4.5%. After that comes a period of continuous rise of the unemployment rate from 32.4% (2002) to 37.6% (2005), although the GDP growth rate in the same period was characterized with significant increase (from 0.9% to 4.4%). The decrease of the unemployment rate

(from 37.6% in 2005 to 31.2% in 2012), parallel with the decrease of the GDP growth rate, especially in the period 2007-2009, depicts that the unemployment did not affect the changes of the GDP.

**Figure 1:**



Source: State Statistical Office of the Republic of Macedonia, Statistical Yearbook of the Republic of Macedonia 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011 and 2012; Labour Force Survey, Statistical Review: Population and Social Statistics: No.2.4.1.03 (2000), No.2.4.2.08/410 (2001), No.2.4.2.21/429 (2002), No.2.4.3.13/453 (2003), No.2.4.5.02/494 (2004), No.2.4.6.07/531 (2005), No.2.4.8.06 (2007), No.2.4.9.12/632 (2008), No.2.4.10.04/651 (2009), No.2.4.11.09/692 (2010), No.2.4.12.11/727 (2011), No.2.4.13.06/745 (2012).

Besides the relation between the unemployment and the economic growth, it is very important to emphasize the changes in the employment rate (calculated as participation of the employed persons (15-64) in the total working age population (15-64) in the observed period, also are not following the trend of the GDP growth rates. The data shows that in 2001 there is a negative GDP growth rate (-4.5%) and an increase of the employment rate for 5.7%. Then followed by the period until 2007 (except in 2005), in which the GDP growth rate was positive, while the employment rate till 2004 was decreasing. When in the period 2005-2012 the employment rate was continuously increasing, the GDP growth rates did not follow this tendency, since they were drastically decreasing from 6.1% (2007) to -0.9% (2009). In 2010 the GDP growth rate had relatively increased (2.9%) and then again started to decrease (-0.4% in 2012).

These changes are showing that the changes in the GDP, i.e. the movement of the GDP growth rates are not tracked with relevant changes in the employment rates. It means that in terms of intensifying the economic growth of the country, the employment rate was not registering continuum in the increase.

Labour market conditions are important determinants of the unemployment rate. Changes in the labour market in the Republic of Macedonia may also cause the relationship between economic growth and the unemployment rate to break down. In fact, neither labour force growth nor productivity growth has been constant in the Republic of Macedonia in the last few decades, and it is likely that there have been some shifts in the economic growth rate consistent with a constant rate of unemployment.

#### **4. Regression analysis**

Over the years, economists have studied Okun's law in various forms using different models, different data and different time samples. One of their motivations has been to determine whether Okun's law has changed over time. In fact Okun postulated that a one percentage point increase in the growth rate above the trend rate of growth would lead only to 0.3 percentage points in the reduction of unemployment. Reversing the causality a one percentage point increase in unemployment will mean roughly more than 3 percentage point loss in GDP. In general, the relationship has held up with some variation in the responsiveness of unemployment to the deviation of output from its potential.

A number of studies have followed with empirical investigation of the relationship between the unemployment and output in the emerging market and developing economies (Kreishan, 2011; Dumitrescu, Dedu, Enciu 2009). These studies mostly revealed the validity of the relation between output and unemployment rate. However, although Okun's law fits the data for most countries, the coefficient in the relationship – the effects of a one percentage change in output on the unemployment rate varies across countries, ranging from – 0.39 for advanced economies to – 0.17 in emerging markets and developing economies (Davide Furceri, Prakash Loungani, Jair Rodriguez and Hites Ahir 2012).

The theoretical model that is the basis for setting the statistical model for empirical analysis is the interpretation of the Okun's law as a relationship between the deviation of unemployment from its natural rate and the deviation of output from its potential,

$$u_t - u_t^* = a(y_t - y_t^*) + e_t \quad (1)$$

In which  $u$  is the unemployment rate,  $y$  is output and  $u^*$  is a long term natural rate and is potential output level. The assumption behind the equation is that shifts in aggregate demand cause fluctuations in the output, which in turn cause companies to hire and fire workers. The error term  $e_t$  captures factors that shift the unemployment-output relationship, such as unusual changes in productivity or in labor force participation. The basic deficiency of this equation is the method of calculating the natural rate of unemployment and potential output. In order to overcome this drawback we estimate a version of Okun's law in first differences:

$$u_t - u_{t-1} = c + a(y_t - y_{t-1}) + e_t \quad (2)$$

In this equation  $u_{t-1}$  is the unemployment rate in the previous period and  $y_{t-1}$  is the real GDP in the previous period. Here, the change in unemployment depends on the change in output and a constant. This follows from equation (1) with the assumptions that the natural unemployment rate is  $u^*$  constant and potential output  $y^*$  grows at a constant rate  $c/a$ . However, for developing countries and emerging economies these assumptions are not reasonable because of the time variation in natural rate of unemployment and growth accelerations and slowdowns.

In order to empirically test Okun's law for Republic of Macedonia, we have used data for real GDP growth and unemployment in the period 2004Q1-2012Q4. The source of the data is the State Statistical Office, the National Bank and the Ministry of Finance of the Republic of Macedonia.

Assessment of the relationship between unemployment rate and real GDP in the Republic of Macedonia is made by linear regression analysis, using quarterly data for the period 2004-2012 year. The base theoretical model for setting the statistical model for empirical analysis is the version of Okun's law in first differences (equation 2) using the method of least squares (OLS). The calculations of statistical parameters are obtained by the software package XLSTAT 2013.

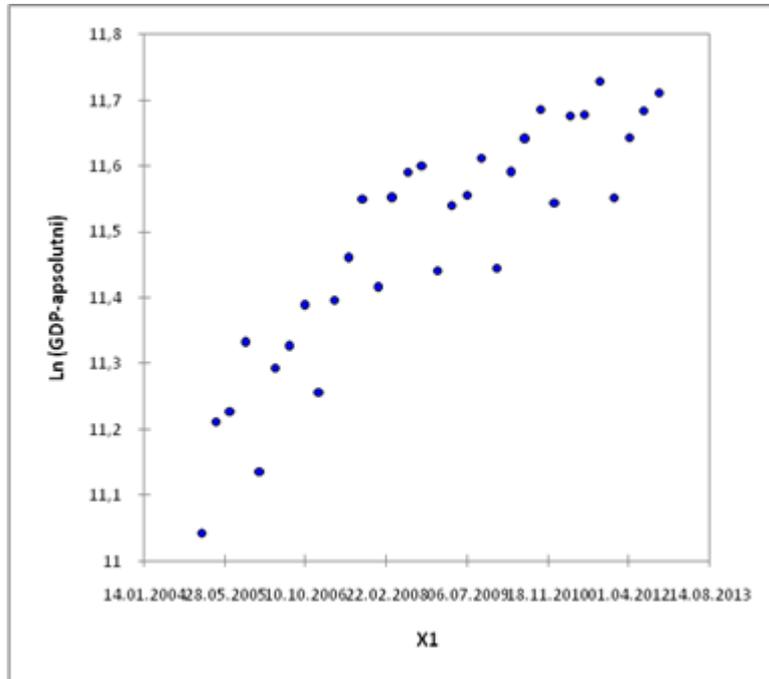
According to available empirical analysis for developing and emerging economies, the results confirm the validity of Okun's law but the strength of the relationship varies. The estimates range for Okun's coefficients are from small positive values to  $-0.8$ , with the majority of the estimates between  $-0.2$  and  $-0.4$  (Davide Furceri, Prakash Loungani, Jair Rodriguez and Hites Ahir 2012). That is because the usefulness of unemployment rates as an indicator of the labor market in these economies is often questioned. One argument is that in low-income countries people cannot afford to be unemployed, everyone is in some kind of job either in the rural sector or in self-employment. Another argument is that many of these economies have large informal sectors, so that neither the unemployment nor the employment statistics have much relevance. Intuitively, countries with larger informal sectors should have smaller Okun coefficient – that is, unemployment should respond less to a given changes in output.

Similarly, some studies (Michael Owyang and Tatevik Sekhposyan, 2012) for the developed countries (USA) confirm these findings, that the relationship described by Okun's law is less stable during times of high unemployment.

In this research for the Republic of Macedonia it is expected for the results of the empirical analysis to confirm Okun's law, but the coefficient should be smaller.

In order to obtain reliable regression results and to make sure that our model could not be subject to „spurious regression”, a series of preliminary tests were made. The first step was to determine whether the variables are stationary or non-stationary. Figure 2 and Figure 3 show the time series for real GDP and the unemployment rate in the analyzed period. These plots (graph) give an initial clue about the likely nature of the time series. Over the period of study the GDP has been increasing, that is, showing an upward trend, suggesting perhaps that the mean of the GDP had been changing. This suggests that the GDP series is not stationary.

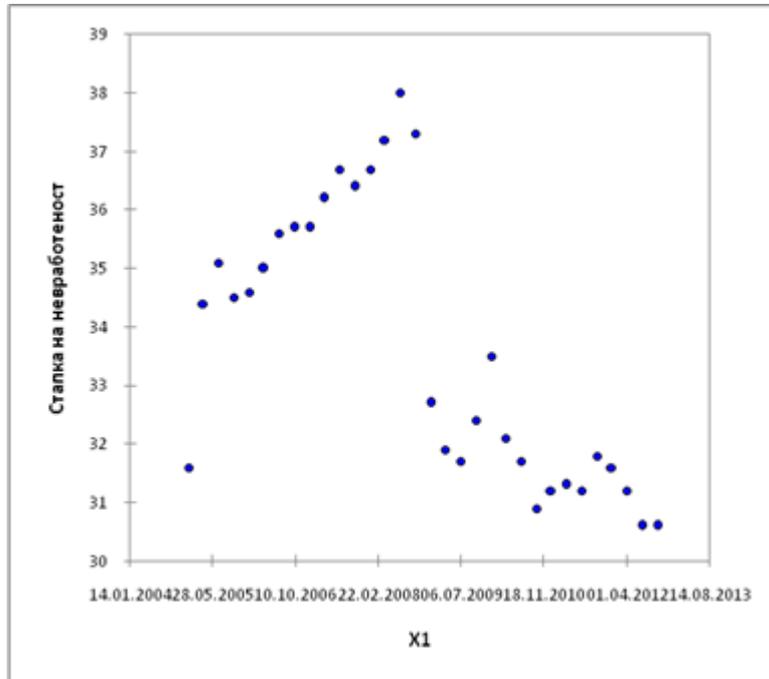
**Figure 2:**



Source: Authors' calculations using the software package XLSTAT, 2012.

The data for the unemployment rate shows upward and downward trends and the mean values are not constant and have also been changing. These series are not stationary. Both variables proved to be non-stationary, therefore, regression tests were applied to the transformed time series (first differences).

Figure 3:



Source: Authors' calculations using the software package XLSTAT, 2012.

The results of the regression are presented in the next table:

Independent variables - X	Results
Real GDP	-0,160 (-2,498)***
Number of observations (n)	32
$R^2$	0,172
Adjusted $R^2$	0,145
Durbin - Watson	0,402

Source: Authors' calculations using the software package XLSTAT, 2012.

The equation has the following form:

$$u_t - u_{t-1} = c + a(y_t - y_{t-1}) + e_t$$

$$\Delta u = 5,35 - 0,16\Delta y$$

The empirical analysis shows that the rise of one percentage point of unemployment is associated with a decline of roughly 1.6 percentage points of the real GDP growth. The regression also shows that only 17.2% of the changes in the GDP can be explained with the changes in the unemployment. Therefore it can be concluded that the Okun's concept is not totally prominent for the Macedonian economy.

### **5. Expenditures of the unemployment and their influence on the economic development**

In the discussion for the consequences and implications of the unemployment for the economic development it is important to point out the inappropriate treatment of the unemployed, who are without working engagement as a development factor, i.e. as human capital, as well as the expenses for the unemployed persons which are made by the state in form of social transfers and active labour market policies. Long-term unemployment, especially the large share of unemployed who are young and with high education, undoubtedly causes unfavorable effects on the economic development. The economic loss is even higher because of the limited possibilities to use the human capital in making new values, as well as big expenditures, which are made for the education of the labour force.

If the GDP is analyzed according to the expenditure approach<sup>7</sup> in the period 2004-2011, it can be noticed that the allocations for the final public consumption are around 19%. Within the final public consumption in the same time interval (with exception of the period 2008-2010) more than 40% are allocated for education and healthcare. It means that two fifths of the GDP are targeted for education and healthcare, expenses which are significantly intended for normal functioning of the labour force market.

The main problem here is how much of these funds intended for education and healthcare as an investment in human capital are effectively used. If the unemployment in the country is long-term and consists mainly of young people, it means huge lost of human capital. Namely, the government for these persons provides conditions for

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<sup>7</sup> State Statistical Office of the Republic of Macedonia, Statistical review: National Economy and Finances, Gross Domestic Product No.3.4.8.01/582 (2006), No.3.4.11.01 (2009) and No.3.4.13.02 (2011).

education, the necessary healthcare, but without their engagement on the labour force market they cannot give contribution to intensify the economic development. Relatively low utilization of the available human capital is one of the most significant consequences of the unemployment for the economic development.

The problem is getting even bigger if we deepen the analysis with the government costs for social transfers and for active labour market policies. According to the data from the budget of the Republic of Macedonia for 2013, within the social transfers which were planned on a level of 74,340 million MKD, for benefits for the unemployed 2,012 million MKD are going to be used, while for the active labour market policies 322 million MKD.<sup>8</sup> According to the Operative plan for active programmes and employment measures for 2013, for the implementation of these measures around 555 million MKD were allocated.<sup>9</sup>

The amount of these financial assets shows that the government is planning significant resources to support the unemployed. If these assets can be used for more productive goals, i.e. if they can be invested in more productive projects, their contribution for intensifying the economic development and for improvement of the living standard would be even higher.

Considering the previously stated positions, it can be concluded that in order to overcome the negative consequences from unemployment on the economic development, it is necessary to undertake proper employment policy and labour market policy. It is a way to provide higher level of labour demand, greater utilization of the available human capital and improvement of the socio-economic development of the country.

### **Conclusion**

Providing sustainable economic growth is a key determinant for creation of new jobs and for solving the unemployment problem. This supposes creation of certain macroeconomic preconditions, such as

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<sup>8</sup> Government of the Republic of Macedonia, Ministry of Finance, Budget of the Republic of Macedonia for 2013, p.6.

<sup>9</sup> Government of the Republic of Macedonia, Ministry for Labour and Social Policy, Ministry for labour and social policy, Operative plan for active programmes and employment measures for 2013, Skopje, 2012, p.28.

economic stability, favorable climate for investments and flexible labour market institutions.

In contemporary terms of globalization, the Macedonian economy works as an open market economy in which the basic preconditions for development are based on increased investment activity and competitiveness, use of highly qualified labour force, development of the country's economic infrastructure and utilization of modern communication and information technology.

In order to intensify the economic growth, the Republic of Macedonia should encourage domestic and foreign direct investments to sustain macroeconomic balance and stability of the national economy. Therefore, the important goals and priorities of the country are: increase of the economic development and competitiveness, increase of the foreign and domestic investments, rise of the employment, improvement of the living standard and life quality.

In the years when the economic growth rates in the Republic of Macedonia were positive, their effect on the employment was limited, because of the short duration of this trend. In order to mitigate the unemployment problem, the Republic of Macedonia needs long-term continuous economic growth, which will be accompanied with greater rise of the real sector as a creator of new jobs and increase of the competitiveness. The experiences are showing that more significant effects on the employment can be expected only with sustainable economic growth which will be maintained for longer time interval. Usually, these effects are manifested after the fourth year.

Macroeconomic indicators of the country are confirming that higher economic growth rates are realized when the investments are increasing. As an example, when in 2007 the economic growth rate in the Republic of Macedonia was 6.1%, the real growth rate of the gross investments was 22.2%. In terms of limited financial capital in the country in the last decade, the attention of the economic policy creators was focused on increasing foreign direct investments as one of the main preconditions to achieve more dynamic economic growth. Numerous measures and activities were taken, but the results stayed relatively modest. Although the investment policy is based on equal treatment of domestic and foreign investors, the state support for domestic companies is relatively smaller, especially if their real possibilities to invest are considered. Regarding this, the economic experts are suggesting to divert

the direct help from the budget to the real sector companies in order to encourage development of the real sector and creation of new jobs.

Alongside the activities for inducing economic growth in the Republic of Macedonia, more serious measures for increasing the competitiveness are necessary as a very important assumption for stimulating the export and decreasing the trade deficit of the country.

The ventures in the infrastructure are important assumptions for increasing competitiveness of the national economy and investments, which will contribute to higher economic development and more balanced regional development, encourage the employment and decrease in the poverty and social exclusion. According to the planned capital expenditures, public investments are directed toward the energy sector, road, rail and utility infrastructure, then in the improvement of the educational and health system, as well as in raising the quality of the social, cultural and sport infrastructure.

Therefore, it can be concluded that sustainable growth and development of Macedonian economy, as important determinant for encouraging employment, can be achieved through maintaining macroeconomic stability, decreasing in the budget deficit, increasing of domestic and foreign investments, as well investments in the infrastructure, development of the real sector and increase of the competitiveness. Every successful policy in these areas will contribute to creation of new jobs as well as in keeping the current jobs in the country.

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