THE CORRELATION BETWEEN GROSS DOMESTIC PRODUCT AND UNEMPLOYMENT, IN ROMANIA STARTING WITH 1995

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Abstract

It is known that until the late 1980s, in Romania, the term "unemployed" was practically unused, the centralized economy having as major goal the complete occupancy. Starting with 1990, this phenomenon was manifested itself in our country as well, as a result of the imbalance of the labor market. To understand and represent the macroeconomic phenomena better, the paper presents the analysis of the relationship between the Gross domestic product and the unemployment, as well as the current influences. The conclusions show the fact that beginning with 1995, their dynamics included a relationship, broken by the effects of the world economic crisis present in our country as well.

Key words: unemployment, gross domestic product, correlations, Okun's Law

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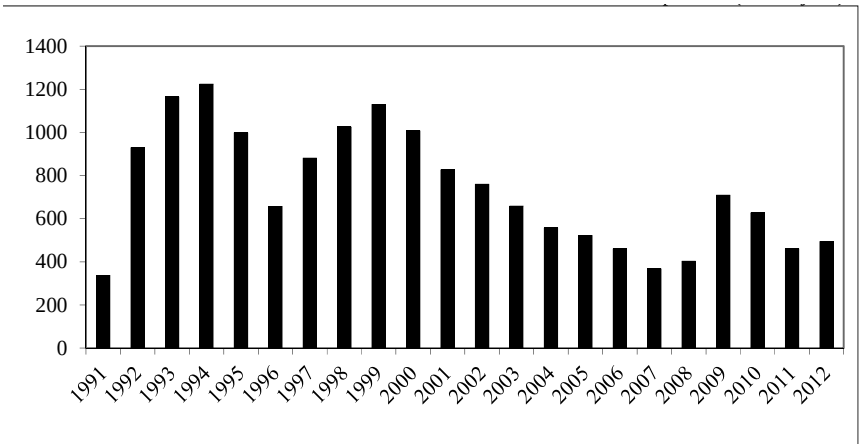
By this article, the starting point was Okun's Law[1], in the sense that it wants to conduct an analysis of the connection between the Gross domestic product (GDP) and the unemployment, based on the statistical data from Romania. In economics, Okun's law is based on empirical observation of the relationship between the unemployment rate and the growth rate of the Gross domestic product[2][1].

Unlike the indicators taken into account by the above-mentioned law, in order to define the unemployment, in this paper used its index (not its rate), so both the Gross domestic product and the unemployment are measured the same.

1 . Arthur Melvin Okun (1928 - 1980) – American economist who noticed and proposed in 1962 the relationship between the unemployment rate and Gross domestic product. Meantime, the usefulness of the provisions of the law has been disputed by the other economists.

2 . Based on data from the United States of America economy, the relationship between proposed indicators by Okun, has the following formula: R= 3% - 2(- and shows the modification of GDP growth when unemployment changes, respectively how many percentage points GDP lost if the unemployment rate increases by one percentage point.

Total number of registered unemployed in Romania between 1991-2012

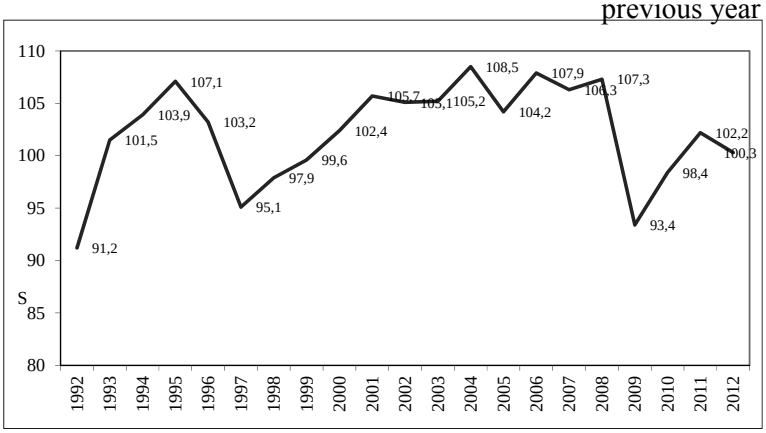


Source: National Bank of Romania – Monthly bulletins
National Agency for Employment (for 1991- 1994)

From the graph representation of the dynamics to the indicators, we notice the obvious relation, at least at the theoretical level, manifested within the economic cycles: when the economy rises, the unemployment level decreases and the other way around, during the recession, together with the decrease of the Growth rate the unemployment rises.

Gross domestic product growth variation, in Romania between 1992-2012

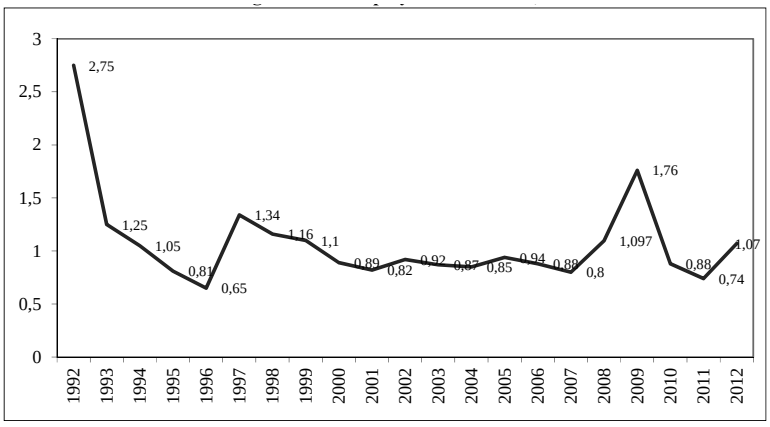
previous year = 100



Source: National Institute of Statistics; National Bank of Romania

We have a period defined by a great economic instability in the first years: increased unemployment and Gross domestic product decrease, followed by a longer period during 1995 and 2007 when the real Gross domestic product growth rate had an increased evolution, while the index of the unemployed persons dropped constantly. 2008 was the year when the global financial crisis effects reached our country as well, manifesting themselves first on the labor market, then, after eight years of a decreasing number of unemployed persons, the indicator increased as regards the previous year.

Index of the total number of registered unemployed in Romania, between 1992-2012



Source: National Bank of Romania, National Agency for Employment

The following year brought an increase by 75% of the number of unemployed persons in relation to 2008, taking into account the fact that the gross domestic product decreased by 7% in regard to the previous year. From 2010 the level of the two indicators has begun to improve gradually, as a result of a slight economic redressing, an evolution justified by a few positive internal economic phenomena. Therefore, I consider that the period may be representative of the present paper is between 1995 and 2007, because the concordance of dynamics to the indicators it finds.

From the evolution of the two indicators we have a linear negative correlation between Gross domestic product and unemployment during 1995-2007. The Gross domestic product growth increased constantly, the unemployed decreased constantly too. We can consider that there is a mathematical model which describes the relationship between causal factor (exogenous) x and effect factor (endogenous) noted with y [2].

The mathematical relationship that expresses the function between variabes has the form:

$$Y = a + bx \quad (1)$$

To determinate the average regression equation and with its help, to estimate the theoretical values, it is necessary to determine the values of the two parameters "a" and "b" for the regression function, using The Least Squares Method 1.

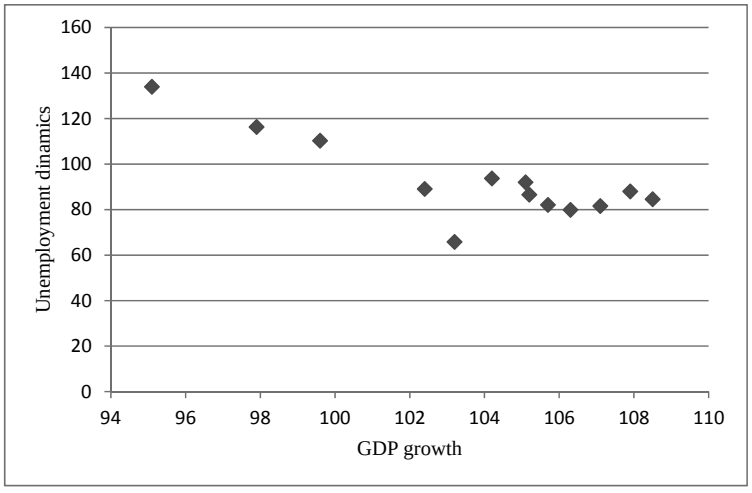
The parameter "b for the regression function (the regression coefficient) shows the slope of the straight line, showing the influence degree of the factorial parameter. Its positive or negative value indicates in which sense the relation is effectuated.

The intensity of the linear connection between indicators can be obtained by applying the correlation coefficient.

We refer to the influence of unemployment on gross domestic product and on the other way, to the influence of gross domestic product on unemployment. Two cases will be treated further:

The existence and the form of the linear correlation between unemployment dynamics and GDP growth it was verified. Gross domestic product was considered as independent variables.

The influence of Gross domestic product on unemployment, in Romania



1. The method has in view to minimize the sum of squared deviation of the real value (observed) from the estimated values (theoretical) calculated based on the regression equation.

We have a linear indirect (negative) relationship. After the calculations, the values of the two parameters were determined: a = 470,6923 and b = -3.6456. The regression function has the following form:

$$Y = 470,6923 – 3,6456X \quad (2)$$

The intensity of the linear connection between the total number of registered unemployed and GDP can be obtained by applying the correlation coefficient. Its value is -0.819579515 which means a very strong relation between indicators. Therefor, its negative value indicates an inverse relationship between the two phewenomena, as we noticed from the graph representation.

Once established correlation function between two indicators can predict values of the dependent variable. The relationship is valid if other influencing factor does not change.

Given that 2008 was the year when the financial crisis have been felt throughout the economy, we looking for how the two indicators would be developed if this phenomenon did not exist.

The adjusted values of the unemployment dynamics were calculated by replacing each variant of the factorial parameter x within the regression function.

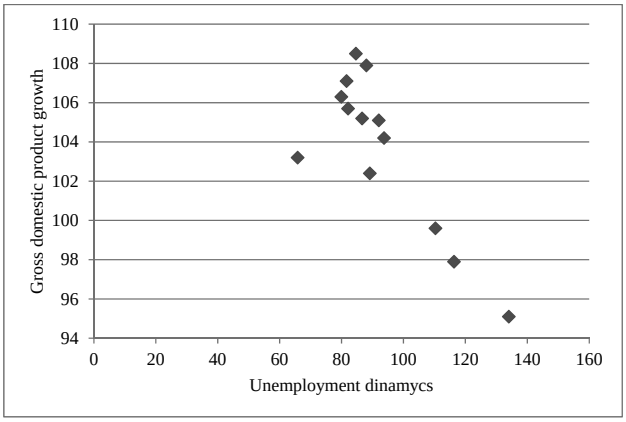
The estimation of the unemployment function on Gross domestic product growth

Year	GDP growth (X)	Unemployment dynamics (Y)	$\hat{Y} = 470,6923 – 3,6456X$
1	*2*	*3*	*4*
2008	107,3	109,7	79,5
2009	93,4	175,9	130,2
2010	98,4	88,4	111,9
2011	102,2	73,5	98,1
2012	100,3	107,1	105,0

In column 4 are the increase in unemployment estimates calculated on the basis of the regression function and in column 3 are actual values that have been on the labor market. We can find a huge difference in the early years, when the crisis began and in the period 2011-2012 this difference decreased.

The existence and the form of the correlation between unemployment dynamics and Gross domestic product growth it was verified. Unemployment was considered the independent variable.

The influence of unemployment on Gross domestic product, in Romania



The values of the two parameters were: a = 120,7723 and b = -0,18425 and the form of the function who shows the dependence between the Gross domestic product and the number of unemployeds in the economy has the following form:

$$Y = 120,7723 – 0,18425X \quad (3)$$

The estimation of the Gross domestic product growth based on the alteration of unemployment

Year	Unemployment dynamics (X)	GDP (Y)	$\hat{Y} = 120,7723 – 0,18425X$
2008	109,7	107,3	100,6
2009	175,9	93,4	88,4
2010	88,4	98,4	104,5
2011	73,5	102,2	107,3
2012	107,1	100,3	101,0

Conclusions

The results of the analysis of the statistical data demonstrated that between the unemployment and the Gross domestic product in Romania during 1995-2007 was a quite powerful connection, both in one way and the other. The world financial crisis changed the evolution of indicators. The determination of the regression function allowed the assessment of adjusted values under the conditions in which the other factors of influence remained unchanged. In other words, what would have happened if the economy had not entered in crisis and how it disrupted the dynamics of unemployment and Gross domestic product.

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