ANALYSIS OF CORRELATION BETWEEN THE UNEMPLOYMENT RATE AND GROSS DOMESTIC PRODUCT IN THE EUROPEAN UNION

Iuga I., Cioca I.C.[*]

Abstract: Vacancies, unemployment, wage levels and labor costs do not only affect a country's economy by lowering the Gross Domestic Product, but every person's life. The purpose of this paper is to analyze the Gross Domestic Product and unemployment rate in the European countries for the period 2005-2011. To perform the analysis, official data from Eurostat, National Statistical Institute and the National Agency for Employment in Romania were taken. The research objectives are to analyze the two indicators for 27 European countries, including Romania. The indicators obtained by Romania were analyzed and compared to the indicators registered by other countries. The expected results consist of establishing a link between GDP and unemployment rate. This link and the intensity of the link will be established by calculating and analyzing the correlation indicator.

Keywords: Gross domestic product, unemployment, unemployment rate

Introduction

Among European Union policy there is included that relating to employment following the introduction of a chapter on the labor market in the Treaty of Amsterdam in 1997. Europe and the whole world, since 2008, have passed through an economic and financial crisis, which apparently is ongoing. Years of economic and social progress have been affected by this crisis, highlighting the deficiencies of Europe's economy.

According to European Communication Commission [1], Europe Strategy 2020 puts forward three mutually reinforcing priorities: smart growth (developing an economy based on knowledge and innovation); sustainable growth (promoting a more efficient economy in terms of resource use, more ecological and competitive); inclusive growth (fostering an economy with a high rate of *employment*, to ensure social and territorial cohesion).

European Union needs to define where it wants to develop by 2020. In this perspective, the Commission proposes the following main targets for EU: 75% of the population aged between 20 and 64 should have a job, 3% of EU's GDP should be invested in research and development; rate of early school leavers should be under 10% and at least 40% of the younger generation should have higher education; the number of people at risk of poverty should be reduced by 20 million.

---

[*] **Cioca Ionela Cornelia,** Teaching assistant, Ph.D, Science Faculty, Department of Economics and Business Administration, "1Decembrie 1918" University of Alba Iulia, Alba Iulia, Romania, ✉ corresponding author: s_ionela09@yahoo.com

2013

vol.7

POLISH JOURNAL OF MANAGEMENT STUDIES
Iuga I., Cioca I.C.

Miron Wolnicki, Eugeniusz Kwiatkowski and Ryszard Piasecki [2], explain the sources of jobless growth in Poland, the country undergoing economic system transition and integration with the European Union .

Other papers examine the link between macroeconomic development and evolution of the unemployment rate: Hakan Berument, Nukhet Dogan, Aysıt Tansel [3], in their paper, check if various macroeconomic shocks have different effects on global unemployment and unemployment on different levels of education in Turkey. Persefoni V. Tsaliki [4] argues that unemployment is a systemic element of economic development and which does not need, and "normally" does not create, full employment of labor force, regardless of flexibility in labor markets. Misbah Tanveer Choudhry, Enrico Marelli, Marcello Signorell [5], in their paper, assess the impact of financial crisis on young people. The authors consider different types of financial crises and different groups of countries according to their income level

Analysis of Gross Domestic Product at European Union level and Romania

The Gross Domestic Product represents the synthetic expression of the results of the economic activity produced inside the economic environment in a certain time span, irrespective of the contribution of domestic or foreign participants. This indicator is used to measure economic activity in a country. Gross Domestic Product evolution is important for Stock Exchange because it is the economy health as a whole, showing phases of economic expansion and contraction. Related to this indicator, from the figure 1, the following can be noticed:

- there is an upward trend in all EU countries
- in 2005 the highest values are recorded in countries such as Germany, United Kingdom, France, Italy, and the lowest in Malta, Cyprus, Latvia
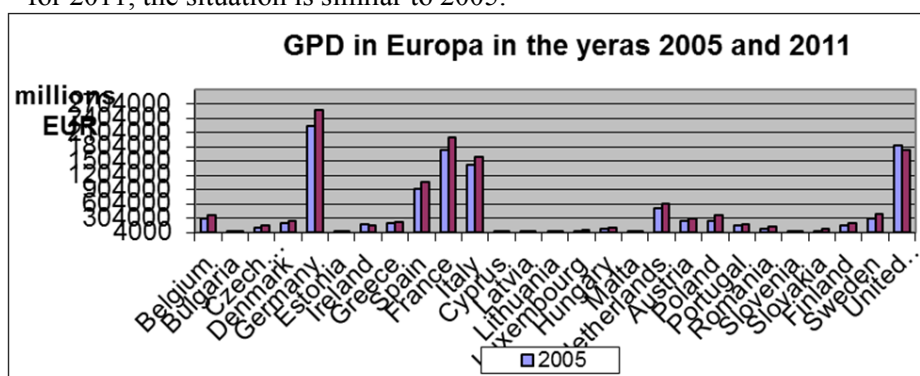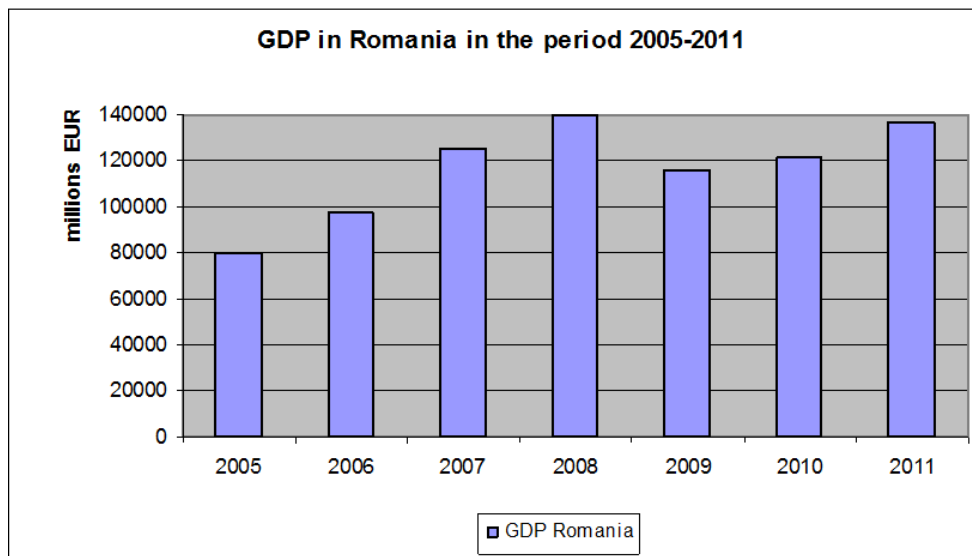- for 2011, the situation is similar to 2005.

Figure 1. GPD in Europa in the years 2005 and 2011
Source: Personal processing of data collected from the Eurostat

POLISH JOURNAL OF MANAGEMENT STUDIES
Iuga I., Cioca I.C.

2013

vol.7

Figure 2. GDP evolution in Romanian in the period 2005 – 2011
Source: Personal processing of data collected from the
National Institute of Statistics

Our country's GDP has had an increasing trend over the years, with the exception of 2009 when it reported a decrease from the previous year. Thus, one can observe that, amid the economic and financial crisis which affected the entire world starting with the second half of 2008, the value of the GDP of Romania for 2009 reports a decrease by approximately 3% as compared to the previous time span.

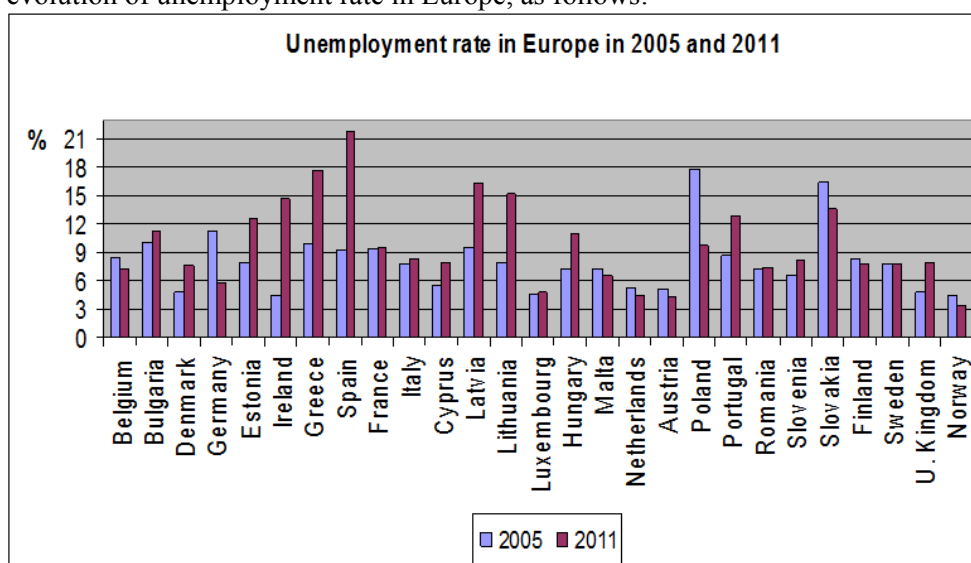**Analysis of unemployment rate in the European Union and Romania**

Unemployment is an economic phenomenon whose occurrence is related to the financial and economic crises. This phenomenon occurs because of the gap between supply and demand for jobs. The International Labour Organization definition of the unemployment rate is the most widely used labour market indicator because of its international comparability and relatively timely availability. Besides the unemployment rate, indicators such as employment and job vacancies also give useful insights into labour market developments [6].
According to Persefoni Tsaliki [4], unemployment is a systemic element of economic development which need not and "normally" does not give rise to full employment of labour regardless of the flexibility in labour markets. The conventional economic analysis of unemployment distinguishes unemployment into seasonal, frictional, structural and cyclical. The first three categories of unemployment are considered normal and acceptable inasmuch they are viewed as the by-products of the normal operation of the labor market. Only cyclical unemployment is viewed as a deviation from the normal and so Keynesian

economics suggest countercyclical economic policies to minimize, if not eliminate, this kind of unemployment.

According to the *Law on the unemployment insurance system and employment stimulation of Romania*, the conditions that a person must meet to be classified as unemployed are: in search of a job from the age 16 or over and until the conditions for retirement; health and physical and mental capabilities render them suitable for work; does not have a job; they are available to start work in the near future [7].

In what follows we make a comparative analysis of unemployment rate in the European Union in 2005 and 2011 and then in Romania in the period 2005-2011. The indicator expressing unemployment in a country is given by the unemployment rate. The Unemployment rate is important year indicator with both social and economic dimensions. The unemployment rate is calculated as a percentage between unemployed and labor force. The figure 3 presents the evolution of unemployment rate in Europe, as follows:

Figure 3. Unemployment rate in Europa in the years 2005 and 2011
Source: Personal processing of data collected from the Eurostat

Regarding this indicator, we found that:
  - unemployment rate has fluctuated in the two analyzed periods
  - in 2005 the highest unemployment rate was in Poland (17.4%), followed by Slovakia (16.4%), Germany (11.3%), Bulgaria (10.1%)
  - the lowest unemployment rates in 2005 were recorded in Luxembourg (4.6%), Norway (4.5%)
  - in 2011 the highest values were recorded in Spain, Latvia, Lithuania, Slovakia, Greece, Ireland, and lowest in Norway, Austria, Luxembourg.

POLISH JOURNAL OF MANAGEMENT STUDIES
Iuga I., Cioca I.C.

2013

vol.7

Making a comparison between Romania and Poland we have seen that the unemployment rate in Poland is superior to the one in Romania, although the value of GDP is higher in Poland.

Figure 4 shows the unemployment rate in Romania during the period 2005-2011. From Figure 4 the following can be noticed:

- between 2005-2011, the average national unemployment rate was 6.9%
- unemployment rate increased from 7.2% in 2005 to 7.4% in 2011;
- the highest unemployment rate in Romania was 7.4% in 2011, while the lowest was in 2008 of 5.8%.
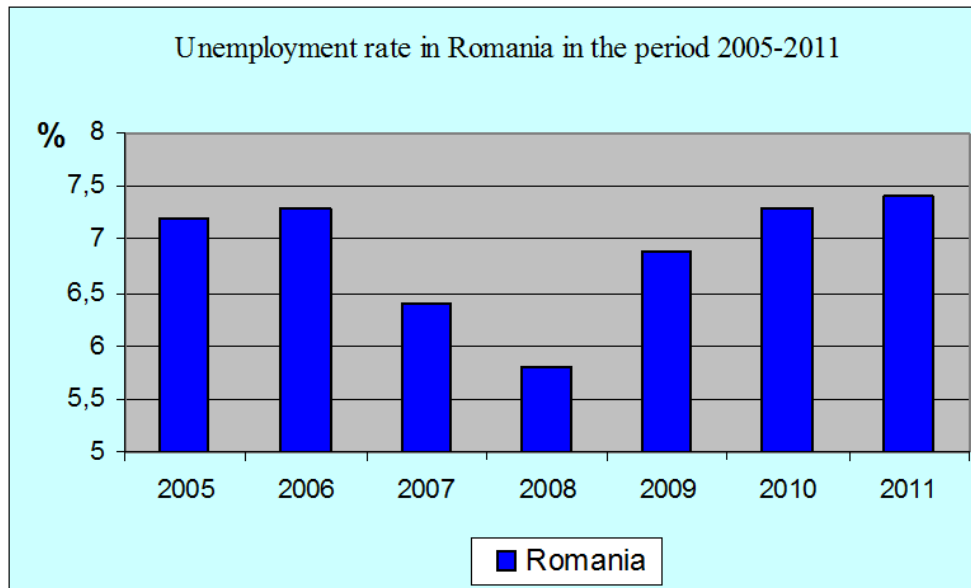
Figure 4 Unemployment rate in Romania in the period 2005-2011

Source: Personal processing of data collected from the
National Institute of Statistics

Analysis of the correlation beteem GDP and unemployment in Romania and European Union

This last part of the paper makes the link between GDP and unemployment rate. We want to study the relation between these indicators with the help of the correlation coefficient. We will calculate the correlation between GDP and unemployment rate for each analyzed year (2005-2011) and we will also analyze the intensity of the relation between the two indicators. The study is based on data from the period 2005 –2011 in all EU countries and we turned to statistics for their interpretation, which allowed calculating the correlation coefficient for the two variables: the independent variable: the unemployment rate, and the dependent variable: GDP. In the case of the EU countries, during 2005-2011, we would obtain

the following Person's correlation coefficient between GDP and unemployment rate:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}}. \qquad (1)$$

If the Person's coefficient is negative, then there is an inverse correlation where X increases and Y decreases. If the result is positive, then there is a direct correlation where X increases and Y decreases. If the coefficient is 0, then there is no correlation. We state that the correlation coefficients were calculated throughout the review (2005-2011), including all analyzed European countries in the graphs above.

Table 1 Correlation coefficients

2005	2006	2007	2008	2009	2010	2011
0,0376	0,14539	0,21148	0,24215	-0,0278	-0,1472	-0,1431

The correlation is not very close between the two indicators because the value is between -0.14 and 0.24. We could talk about a close and very close correlation only if it exceeded 0.5. According to Table 1, the correlation coefficient recorded positive but also negative values, this value was below the value of + / -0.5. This means that the unemployment rate does not affect GDP. The results of the correlations were negative in three years, that means there are inverse correlation but not of high intensity.

Summary

From the analysis of **GDP in Europe** in 2011, we see that only highly industrialized countries have a high value of this indicator. Only 5 countries exceed the amount of 600 billion euros. In the year 2011 the value of the country's GDP in Poland is double than in Romania. Regarding the growth of GDP in 2011 compared to 2005, it appears that in only two countries the value of GDP decreased in 2011 compared to 2005: Ireland and the UK. **In Romania, the development of GDP** was fluctuating over the period 2005-2011. The highest value was recorded in 2008 (EUR 139753 million). In 2009 compared to 2008, GDP decreased by 17%, and in 2009 started to increase until 2011. And yet, the value in 2011 did not reach the level of 2008. In 17 countries, an increase in **unemployment rate** is noticed in 2011 compared to 2005: Bulgaria, Denmark, Estonia, Ireland, Greece, Spain, Italy, France, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Portugal, Romania, Slovenia and the UK. In Spain, unemployment rate has increased the most, compared to the other European countries, in 2011 from 2005, with approximately 12.5%. **In Romania**, the lowest **unemployment rate** was recorded in 2008. In 2011 this rate increased by 1.6% compared to 2005.

POLISH JOURNAL OF MANAGEMENT STUDIES
Iuga I., Cioca I.C.

2013

vol.7

Calculating the **correlation coefficient between GDP and unemployment rate** showed that there is a correlation between these indicators but the correlation is not strong. It follows that there are other factors that influence GDP, such as: technological development, legislation of that state, level of development, living standard, taxation, inputs and outputs of a market or sector, investments etc.

 References

[1]. Communication from the Commission Europe 2020 A strategy for smart, sustainable and inclusive, European Commission, Bruxelles, http://ec.europa.eu/archives/growthandjobs_2009/pdf/complet_ro.pdf, Access on: 15.03.2012

[2]. Miron Wolnicki, Eugeniusz Kwiatkowski and Ryszard Piasecki, *Jobless growth: a new challenge for the transition economy of Poland*, International Journal of Social Economics, Vol. 33, No. 3, 2006;

[3]. Hakan Berument, Nukhet Dogan, Aysıt Tansel, *Economic performance and unemployment: evidence from an emerging economy*, International Journal of Manpower, Vol. 27, No. 7, 2006;

[4]. Jedlicka P., Kovarnik J., "*The Role of Qualification and Education in the Development and the Solution of Unemployment of Graduates in Czech Republic",* Polish Journal of Management Studies, vol.5/2012.

[5]. Brzeziński S., Pietrasieński P., "*Instruments for Supporting Foreign Investors in the Selected Central and Eastern European Countries",* W:Business in Central and Eastern Europe: Cross-Atlantic Perspectives. Monograph. Ed. by Bill KondellasNortheastern Illinois Univ.; Publish.Section of the Faculty of Managem. Częstochowa Univ.Techn.2011.

[6]. Persefoni V. Tsaliki, *Economic development and unemployment: do they connect?*, International Journal of Social Economics Vol. 36 No. 7, 2009;

[7]. Misbah Tanveer Choudhry, Enrico Marelli, Marcello Signorell, *Youth unemployment rate and impact of financial crises*, International Journal of Manpower, Vol. 33, No. 1, 2012;

[8]. Grabara J., Kot S., "*Theoretical Frames for Designing Reverse Logistics Processes",* Spiru Haret University, Faculty of Management Brasov 2009.

[9]. Europe in figures Eurostat yearbook 2012, Eurostat Statistical books, European Union, 2012;

[10].Law no. 76/2002 regarding the unemployment insurance system and employment stimulation of Romania, with subsequent modifications and completions, published in Official Gazette of Romania no.103 from 06.02.2002

ANALIZA KORELACJI MIĘDZY STOPĄ BEZROBOCIĄ A PRODUKTEM KRAJOWYM BURTTO W UNII EUROPEJSKIEJ

Streszczenie: Miejsca pracy, bezrobocie, wysokość pensji i kosztów pracy nie tylko wpływa na kondycję krajowej gospodarki, poprzez obniżenie poziomu Produktu Krajowego Brutto, ale także na życie każdego człowieka. Celem niniejszego artykułu była analiza poziomu PKB i stopy bezrobocia w krajach Unii Europejskiej w okresie 2005-2011. Do przeprowadzenia analizy, wykorzystano oficjalnie dane z Aurostatu, Narodowego Urzędu Statystycznego i Narodowej Agencji ds. Zatrudnienia. Celem badania jest analiza dwóch wskaźników dla 27 krajów europejskich, włączając Rumunię. Wskaźniki uzyskane przez Rumunię zostały zaanalizowane i porównanie do wskaźników osiągniętych przez pozostałe kraje. Osiągnięte wyniki charakteryzują się relacją między poziomem PKB a stopą bezrobocią. Ta relacja i jej intensywność jest ustalona poprzez obliczenia i analizę wskaźnika korelacji.

Słowa kluczowe: Produkt Krajowy Brutto, bezrobocie, stopa bezrobocia

在歐盟失業率和國內生產總值之間的相關性分析

摘要：職位，失業，工資水平和勞動力成本不僅影響一個國家的經濟，通過降低國內生產總值，但每個人的一生。本文的目的是分析2005年至2011年期間在歐洲國家的國內生產總值和失業率。為了進行分析，官方公佈的數據從歐盟統計局，國家統計局和國家機構在羅馬尼亞的就業。這項研究的目的是分析兩個指標，包括羅馬尼亞在內的27個歐洲國家。羅馬尼亞獲得的指標進行了分析和比較其他國家註冊的指標。預期結果包括GDP和失業率之間建立鏈接。鏈接此鏈接和強度將成立由相關指標的計算和分析。