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MODELING OF ECONOMIC GROWTH IN THE BALKANS

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ABSTRACT

Economic growth and unemployment remain important problems of each country, regardless of their level of economic development. Although there is a wide literature on the link between economic growth and unemployment, there is no consensus on the direction and intensity of relationships, as these two factors have a different impact on the various economies. This study uses data on unemployment and economic growth in the Balkan region. Specifically, the countries included in the study are: Albania, Macedonia, Montenegro, Bosnia and Herzegovina and Greece. The study period is 2008-2016 and annual data is provided by the World Bank to the respective countries. The inverse relationship between economic growth and unemployment was emphasized for the first timeby Okun (1962), so it will be seen whether Okun's law is verified in the case of our study. This study will shed light on the hypothesis of GDP linkage to unemployment for countries in the region (Albania, Montenegro, Macedonia, Bosnia and Greece) Through tests we will show that there is no co-integration between GDP and time lag unemployment. Also, the use of the tests will select the appropriate form between the fixed-effect model and the random effects model.

KEYWORDS: Economic growth. Unemployment, Okun, Fixed effect, Hausman.

1. INTRODUCTION

Economic growth and unemployment remain important problems of each country, regardless their level of economic development. Different countries have different objectives in their

economy policies, which lead to the creation of economic growth and the reduction of unemployment. Eventhough there is a wide literature on the link between economic growth and unemployment, there is no consensus on the direction and intensity of relationships, as these two factors have a different impact on the various economies. For example, the differences in the economic structures of the countries lead to the reflection of the change of relations between economic growth and unemployment, but also to the impact level. The inverse relationship between economic growth and unemployment was first highlighted by Okun (1962).

Whereas later studies have had results that were parallel to that of Okun. Studies can be characterized in two main groups.

The first study group expresses a symmetric relationship between unemployment and economic growth, while the second group of studies, including some of the recent studies, shows the asymmetric relationship between economic growth and unemployment.

2. LITERATURE REVIEW

2.1 The connection between unemployment and economic growth

Various studies have discussed the relationship between unemployment and economic growth.

Different economists ask the question: Has an impact on the long-term growth norm the unemployment rate of a country? The steadily high unemployment rates in Europe over the last two decades shows that unemployment is not, at least to some extendgreat, a pure business cycle phenomenon. This implies a continuous loss of labor and human capital in most European countries. For this reason, it seemsit is reasonable to analyze whether certain levels of unemployment affect the long-term productivity growth or in the productivity long-term level. The Unemployment is a serious problem in Europe, but not in the US. The fall of productivity growth has been stronger in the US compared to Europe. Between the years1979 and 1997, the average unemployment rate in the US was 6.7% and the average rate of labor productivity growth was 0.9%.

In Europe, the average unemployment rate was 9.3% and the average growth rate labor productivity was 2.2%. The common explanation given to these facts is as well follows: High

salaries encourage firms to replace capital work. This leads to the unemployment growth and productivity growth while workers who are still employed aremade more productive.

Gordon (1997) and Bean (1997) in a time series study argue that there is onecausative link driven by unemployment to rising. But the focus of Okun's law is in the short-term demand dynamics, see Gordon (1979). Neither the slowdown productivity growth and unemployment growth over the last decades can not be explained by through such short-term effects in the business cycle.

The correlation between unemployment and the growth is unclear. Bean and Pissarides (1993) reviewed the relationship between unemployment and productivity growth (work and factor of overall) for OECD countries during the period 1955-1985. Authors found evidence of weaknesses of a negative relationship between the two variables. Caballero (1993) used to quarterly data from 1966 to 1989 for the United States and Great Britain, to find that the correlation between unemployment and per capita growth is clear: at medium frequencies, this is positive for both countries, while at very low frequencies, it is positive for Great Britain and zero or even negative for American results, by using labor productivity rather than per capita growth.

According to Walterskirchen (1999), employment will increase if GDP grows faster than productivity. In general, the greater the value of goods and services produced, the greater the demand for labor to produce, because employment and economy growth go the same way. But, too, high productivity means little work.

Blanchard and Wolfers (2000) found that the growth of TFP (productivity ofoverall factor) has a negative effect on unemployment. Fitoussi. (2000) used data for 19 OECD countries over the period 1960-1998 and found that the softened rate.

Hodrick-Prescott's change in labor productivity has a negative effect on unemployment. Using individual UK data that includes the 1982-1999, Bräuninger and Pannenberg (2002) indicate that the increase in unemployment is associated witha decline in productivity growth in Europe and the US during the period 1960-1997. Brauninger, etc. (2002), in an Extended Growth Model with Panel Data,mostly found that unemployment is what actually reduces productivity. Takenat nominal value, their results suggest that if unemployment would have

remained onlevel of 1960, productivity today would be approximately 10% higher than it is currently.

Finally, have a brief look at the adaptation process caused by one increase in the level of unemployment. In the short term unemployment growth leads to an increase capital for a worker. Therefore, productivity and wages increase, but income is reduced. This leads to a reduction in savings and on educational spending. As a result, the growth rates of physical and human capital have decreased and productivity growth has also decreased.

Ndre-Gjoni (2015) analyzed the empirical relationship between real GDP and unemploymentfor the period 2000-2003, in order to evaluate the relationships that exist in the countries of Western Balkans (Albania, Serbia, Montenegro, Bosnia and Herzegovina and Macedonia). The results show that the relationship between economic growth and unemployment has shifted to considerably over time. However, the "Okun relationship" still is considered as a useful prediction tool when factors affecting the volatility of this relationship has been taken into consideration.

The link between unemployment and GDP is provided by Okun's law, according to which for every 2% of GDP the decline in current GDP compared to potential GDP, the unemployment rate increases by 1%. Work compared with other factors of production, it can be considered as a source least reserved, because a lost workday, as a result of unemployment, it is lost forever and can not be regained. (Mançellari, etc. 2000) Unemployment, from an economic point of view, represents the most expensive form of exploitation inadequate development factors. Therefore, it is clear that unemployment does not pose only a category of social policy, but also a criterion of economic development. That means that this feature of work, as a major factor of production in the economy of one the country gives an absolute character the economic loss from unemployment.

According to Okun's law, referring to the Federal Reserve Bank of Saint Louis laws, this law tells usthat when the unemployment rate is high or above the natural rate of each country compared to the country's GDP. Okun has two different versions of this law.

First Version

$$\Delta U_t = a - b^* \Delta \log GDP_t$$

This equation represents the ratio of GDP and unemployment as 2: 1 for the United States of America (Abel, 2008).

ΔU_t- shows the change in unemployment

$\Delta \log GDP_t$- shows the change in GDP

b- is Okun's coefficient

(Neely, 2010) Note that Okuno's coefficient (*b*) may change over time as the link to unemployment with economic growth depends on technology, laws, preferences, demographics and social factors. After the financial crisis of 2008, Okun's coefficient changed continuously in several developed countries. Neely (Neely, 2010) noted that industrialized countries have a small Okuni coefficient, because unemployment is affected by output fluctuations due to the number of dismissed employees. Arthur Okuns' law had many criticisms, but there was also a large number of people who supported it. Ben Bernanke, Chairman of the Federal Reserve (Bernanke, 2013) emphasized that to reduce unemployment, the economy should grow to a level above its potential, so to specify the Okun law states that: If the potential growth of the product Gross domestic product is 2%, GDP needs to increase by 4% in the year to reduce 1% unemployment.

Okun's law includes two important macroeconomic variables: unemployment rate and real GDP. In the last two decades, a large number of empirical studies have tested the validity of Okun's law in various countries. Although the exact numerical value of the correlation coefficient appears to vary in time and place, the results of empirical research for the US and many other countries support Okun's law. Strong empirical support to Okun's law led (Blinder, 1997) to suggest that Okun's law should be considered as one of the key points of the practical part of modern macroeconomics, thus linking the level of activity in the commodity market to the level of labor market activity throughout the business cycle. Okun's law was a big part of the makro-justification for taxpaying, during President Kennedy's campaign.

This law is a way to remember that the forces that govern in short-term business cycles vary greatly from those that govern a long-term economic growth. Long-term growth in GDP is

largely determined by technological progress. On the other hand, short-term movements in GDP are related to the use of labor force. The decline in the production of goods and services during the recession periods are always linked to the increase in the unemployment rate.
Okun's law is important for both views, both theoretical and empirical. From a theoretical point of view, it is a macroeconomic building, as the aggregate supply curve comes from the combination of Okun's law with the Philips curve. From an empirical point of view, Okun's law is considered as a benchmark for policy makers, especially to assess the costs of high unemployment. Beyond that, Okun's law is used in macroeconomic models. (Shoraj & Kolaneci, 2012).

3. EMPIRICAL ANALYSIS

Taking into account previous studies, in this case the variables used are Unemployment (UN) and Gross Domestic Product (GDP). Namely Unemployment is the dependent variables and is expressed in percentage over the total labor force, while the gross domestic product constitutes the independent or explanatory variable.

Since we are dealing with data in the form of time series and sectional data, then the proper way for their analysis is through the panel data model.

The data used are from five countries in the region (Albania, Montenegro, Macedonia, Bosnia and Herzegovina and Greece). These data are annual for the years 2008 - 2016 and have been obtained from the official online source of the World Bank. As the number of observations is equal to each state, we are dealing with balanced panel data.

The data is a balanced panel with 5 sections and 9 time periods for each section. If we refer to unemployment rates, we have that Albania ranged between 13% and 17%, Bosnia and Herzegovina within the range of 23% to 28%, Macedonia from 26% to 33.8%, Montenegro 16% to almost 20%. In this panel, the highest unemployment rates are in Macedonia and Bosnia and Herzegovina, while Montenegro and Albania have the lowest unemployment rates in the region. In this region, we highlight Greece, which has had the lowest unemployment rate in the region for the years 2008-2011, but these rates have increased significantly over the next three years, reaching 28%, and for the last two years there seems to be a light decline.

Macedonia

Unemployment is a continuing problem in the economy of the Republicof Macedonia where a large percentage of qualified labor force can not find work. With the collapse of Yugoslavia, many individuals have lost their job. As a result, of this, the national unemployment continues to be over 30%, on average, from 32% to 36%. Official figures unemployment rates remain high at 31.2%, but may be exaggerated since based on the existence of a broad gray market is estimated to be between 20% and 45% of unemployment GDP, which is not captured by official statistics. Though in recent years it is noticed a slowdown of this rate, which in 2014 was 28%, a decrease of 1% from the previous year and in 2015 a rate of 24.6% a decrease of 3.4% compared to previous year.

Albania

Unemployment on the country level reached 14.2 % in the last quarter of 2016, the lowest level since January 2013. The Statistics Institute reported that compared to the same period a year ago, the decline was more than 3 % points, as at the end of 2015 official unemployment was 17.3 %.

In annual terms, the unemployment rate has fallen more in females than in males, respectively by 4 and 2.5 % points. Even among young people, the level of unemployment in annual terms has declined. Thus, for the age group 15 to 29, the unemployment rate fell from 32.2 %, which was at the end of 2015 to 28.1 % in 2016.

During 2016, annual employment rates increased by 5.8 %. Services and industry have the largest annual growth of jobs. The youth employment rate is 32.5 %, while for the population 30-64 years, in the fourth quarter 2016, the employment rate is 67.8 % Unemployment in Albania started to grow after 2011, reaching peak in the first quarter of 2014 with 18.2 %. Since then, according to the Labor Force Survey, published by INSTAT, unemployment has dropped slightly, except for the last year when the decline is strong.

3.1 Unitary root test

The unit test routines used in the panel data are ADF (1999), Levin, Lin & Chu (2002). For all the basic hypothesis tests it is that there is a unitary root versus the alternative that there is no unit root, so the series are stationary.

Table 1: Test Units for Unemployment and GDP.

Variable	Unemployment		GDP	
Method	**Statistics**	**Probability**	**Statistics**	**Probability**
Levin, Lin & Chu t	-5.70416	0.0000	-5.04082	0.0000
ADF - Fisher Chi-square	49.4013	0.0000	34.4125	0.0000
KPSS - Fisher Chi-square	32.1762	0.0004	23.0259	0.0107

The data used was tested for stationarity and the test results are presented in Table 1. Both the dependent and the independent variables resulted in the series I (1), ie they are stationary in the first margin.

3.1 The Causality Test

To show the causal relationship between the variables in a panel model, the Granger test is used.

The Granger test results for the unemployment rate panel and GDP are given in the following table:

Pairwise Granger Causality Tests			
Sample: 2008 2016			
Lags: 1			
Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
GDP does not Granger Cause UN	40	9.24325	0.0043
UN does not Granger Cause GDP		0.09834	0.7556

According to Student Statistics, the link between UN and GDP variables is unilateral. Changes in GDP will be reflected in changes in the UN for the panel in the study.

3.3 The Co-integration Test

Testing for the co-integration into panel models proposed by Pedroni (1999) also takes into account heterogeneity using specific parameters that are allowed to vary across individual sample members. Considering such heterogeneity, it is an advantage because it is unrealistic to assume that co-integration vectors are identical between the panel sections. The implementation of the co-integration test of Pedroni requires the model's assessment first and then the discovery of the long-term relationship.

$$\Delta UN_{it} = \beta_1 + \beta_2 \Delta \log GDP_{it} + \varepsilon_{it}$$

When it is known that the variables are I (1) then there is a possible cointegration among them, so there may be a long-term relationship with time lags between them. For the purpose of realizing the cointegration test between the dependent variables and the independent variables, Pedroni's co-integration test data panel was used, where the basic hypothesis is: the panel series does not co-integrate among them. The results of the Pedroni test panel are.

Table 1.2: Pedron's Coeintegration Study of Unemployment and GDP.

	Statistics	Probability
Group rho-Statistic	1.553561	0.9399
Group PP-Statistic	-0.741176	0.2293
Group ADF-Statistic	-1.773096	0.0381

From Table 1.2 we notice that in two of the three statistics, the basic hypothesis stands. In this way it turns out that Unemployment and GDP do not co-integrate.

3.4 Evaluation of the panel model

To construct a suitable template for panel data will either use fixed-mode models or random-pattern models. For the panel model evaluation will be used the OLS (Panel Least Squares) method, Dynamic OLS (DOLS) or GLS method.

Estimates for the ΔUN_{it} dependent variable model with fixed effects by sections are shown in the following table:

Variable	Coeficient	Standard Error	Statistics t	Probability
β_{0it}	29.51166	0.919950	32.07962	0.000
$\Delta \log GDP_{it}$	-0.123	0.01463645	-8.881935	0.000
R^2adj	AIC	HQ	BIC	DË
0.887796	4.558705	4.648505	4.799593	0.654220

Estimates for the model with fixed effects by sections and time series are presented in the following table:

Variable	Coeficient	Standard error	Statistics t	Probability
β_{0it}	29.68740	0.990399	29.97519	0.000
$\Delta \log GDP_t$	-0.126	0.015129414	-8.328148	0.000
R^2adj	AIC	HQ	BIC	DË
0.893626	4.631332	4.840867	5.193404	0.654220

If we refer to the model selection criteria as the AIC, the BIC and HQ model with the smallest criterion values is the model with fixed effects according to sections. The use of the test for the elimination of fixed effects gave the following results:

Redundant Fixed Effects Tests			
Test cross-section fixed effects			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	82.964674	(4,31)	0.0000

Since Fisher statistics has a zero probability value, it shows that the basic hypothesis falls down and consequently the fixed-fit model according to sections is a suitable template for the unemployment model with panel data.

Estimates for the ΔUNit dependent variable model with fixed effects according to sections are shown in the following table:

Variable	**Coeficient**	**Standard error**	**Statistics t**	**Probability**
β_{0it}	29.55598	0.920526	32.10772	0.000
$\Delta \log GDP_t$	-0.123	0.014168688	-8.892849	0.000
R^2adj	AIC	HQ	BIC	DË
0.894174	2.703753	2.715965	2.737530	0.646155

3.5 Hausman Test

To determine the model chosen between those with fixed effects and random effects, we use the Hausman test. The underlying hypothesis is: the effects of the case will be consistent and efficient, versus the alternative that the random effects are not sustainable.

Table 1.4: Hausman test.

	Chi-Sq. Statistic	Prob.
Model of random effects	0.000276262	0.986739

The results show that the basic hypothesis stands and the most appropriate model is the one with random effects.With regard to the model's validity, tests such as Breusch-Pagan for serial correlation and Pesaran CD for independence between the sections indicate that the random-case model is a suitable model. The test results are:

Breusch-Pagan test -

Null hypothesis: Variance of the unit-specific error = 0

Asymptotic test statistic: Chi-square(1) = 2.83467

with p-value = 0.0922496

Pesaran CD test for cross-sectional dependence

Test statistic: z = 5.511698,

with p-value = P(|z| > 5.5117) = 3.55e-008

Average absolute correlation = 0.616.

Model wastes have normal distribution since the value of the squared statistic is 0.66 and its virtually 0.71.

4. CONCLUSIONS

This study attempted to shed light on the hypothesis of GDP linkage to unemployment for countries in the region (Albania, Montenegro, Macedonia, Bosnia and Greece) Both GDP and Unemployment resulted in series I (1) according to the unit root test, ie they are stationary in the first margin. When it is known that the variables are I (1) then there is a possible co-integration among them, so there may be a long-term relationship with time lags between them.

Through the co-integration test for panel data, it turned out that there is no co-integration between GDP and time lag unemployment.

At the end, the Hausman test was used to select the appropriate form between the fixed and the random effects model. It turned out that the most convenient is the use of a random-effect model.

Thus, an increase of 1% of unemployment will lead to a decrease of 1.8% of GDP (roughly 2%). Thus the Okun Law for the case of our study is confirmed.

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