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Balkan Ülkelerinde İstihdam, İşsizlik ve Genç İşsizliği ile Büyüme Arasındaki İlişki: Ampirik Bir Analiz

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Özet

Yüksek işsizlik ve istihdam düzeyinin kötüleşmesi dünya ekonomisinde işgücü piyasasının temel sorunları olarak bilinmektedir. Son dönemlerde üzerinde sıklıkla durulan genç işsizlik konusu da işgücü piyasasının temel sorunlarından biridir. Bugün pek çok gelişmiş ve gelişmekte olan ülke bu sorunlar ile uğraşmaktadır. Balkan ülkelerinde ise durum farklı değildir. Uluslararası ekonomik raporlar pek çok Balkan gencinin işsizlik sorunu ile karşı karşıya olduğunu belirtmekte, gençlerin ülkelerinden göç etmek zorunda kaldıklarına dikkat çekmektedir. Bu kapsamda çalışmanın amacı yedi Balkan ülkesini (Arnavutluk, Bulgaristan, Hırvatistan, Romanya, Slovenya, Sırbistan, ve Yunanistan) ele alarak istihdam, işsizlik ve genç işsizliği ile ekonomik büyüme arasındaki ilişkiyi araştırmaktır. Çalışmada 1996-2017 dönemi verileri kullanılmış ve yöntem olarak Kónya (2006) tarafından geliştirilen bootstrap panel Granger nedensellik testi seçilmiştir. Analiz sonuçları ele alınan Balkan ülkelerinde istihdam, işsizlik ve genç işsizliği ile ekonomik büyümenin birbiriyle ilişkili olduğunu göstermektedir.

Anahtar kelimeler: İstihdam, İşsizlik, Genç işsizliği, Ekonomik büyüme, Balkan ülkeleri, Panel nedensellik.
Jel Kodu: E24, O40, O57, C23

The Relationship of Economic Growth with Employment, Unemployment and Youth Unemployment in the Balkan Countries[2]: An Empirical Analysis

Abstract

High unemployment and deterioration of employment conditions are considered as the main problems of labour markets in the world economy. The issue of youth unemployment, which has been frequently discussed recently, is also a central labour market problem. Today, many developed and developing countries are experiencing these problems. The situation in the Balkan countries is not different. International economic reports show that many of Balkan youths face unemployment problem and this results in young people migrating from their countries. In this context, the aim of the study is to research the relationship of economic growth with employment, unemployment and youth unemployment by considering the seven Balkan countries (Albania, Bulgaria, Croatia, Greece, Romania, Serbia, and Slovenia). In the study, 1996-2017 period data was used and the bootstrap panel Granger causality test proposed by Kónya (2006) has been chosen as the econometric method. The findings of the analysis indicate that the economic growth is related with employment, unemployment and youth unemployment in the mentioned Balkan countries.

Keywords: Employment, Unemployment, Youth unemployment, Economic growth, Balkan countries, Panel causality.
Jel Codes: E24, O40, O57, C23

1 INTRODUCTION

High unemployment and deterioration of employment conditions are considered as the main problems of labour markets in the world economy. As Balliu (2016) pointed out, labour markets in the some Balkan countries have low employment rates and high unemployment rate in Europe. "Unemployment is considered as important economic and political issue that society has to deal with. Much has been written about labour market problems and unemployment issue in developed Western Europe including the countries that are part of euro-zone" (Balliu, 2016:1). On the other hand, the issue of youth unemployment, which has been frequently discussed recently, is also a new labour market problem. Today, many developed and developing countries are experiencing these problems. The situation in

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[2] Seven Balkan countries were examined in this study. They are as follow: Albania, Bulgaria, Croatia, Greece, Romania, Serbia, and Slovenia.

the Balkan countries is not different. International economic reports (Oruc and Bartlett, 2018; World Bank, 2017; Thorup, 2014) show that many of Balkan youths face unemployment problem and this results in young people migrating from their countries. Considering the results of the studies on the subject, these developments in the labour market are thought to be related to the economic growth of the countries. Therefore, this study researches the relationship of economic growth with employment, unemployment and youth unemployment in some Balkan countries.

Balkans or Balkan Peninsula is generally called as the Balkan States. The Balkans region lies on the eastern of Europe's southern peninsulas. The region countries have struggled with economic and political problems especially in 1990s. This situation led to the delay in the economic developments in the Balkan countries, and stability in the region has taken time. These developments have also increased the academic studies which concentrate on the Balkan countries.

Within this context, in this study, the relationship of economic growth with employment, unemployment, and youth unemployment is analysed by considering the seven Balkan countries (Albania, Bulgaria, Croatia, Greece, Romania, Serbia, and Slovenia). 1996-2017 period data was used in the analysis, and the bootstrap panel Granger causality test proposed by Kónya (2006) allowing for panel heterogeneity and taking cross-sectional dependence into account has been chosen as the econometric method. The period of the study was determined according to the availability of the data. The reason for choosing by Kónya bootstrap panel Granger causality test as a method is that it has some advantages: (1) the method allows the researcher to get individual results for each country and hence facilitates making comparisons between countries. (2) We do not feel the need of pre-tests such as the stationarity and cointegration in this method. (3) The method relies on a more realistic assumption due to it takes into consideration cross-sectional dependence.

In this regard, the study consists of three sections: "economic outlook, employment, unemployment and, youth unemployment in Balkan countries" was presented in the first section. Section two provides the "literature review" about the relationship of economic growth with employment, unemployment and youth unemployment. Section three contains the "empirical analysis" for the seven Balkan countries. Lastly, in the conclusion chapter of the study, the interpretations and recommendations are included.

2 ECONOMIC OUTLOOK, EMPLOYMENT, UNEMPLOYMENT, AND YOUTH UNEMPLOYMENT IN BALKAN COUNTRIES

"Balkans or Balkan countries are generally characterized as comprising Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Montenegro, North Macedonia, Romania, Serbia, and Slovenia—with all or part of each of these countries located within the peninsula. In addition to that, some regions of Greece and Turkey are also located within the geographic region generally defined as the Balkan Peninsula" (Danforth et al. 2019). In this study, only seven of these Balkan countries were examined in terms of the relationship of economic growth with employment, unemployment and youth unemployment. As we have noted before, the choice of countries is determined by the availability of data. However, in this part of the study, the economic outlook, employment, unemployment, and youth unemployment in all Balkan countries are generally mentioned.

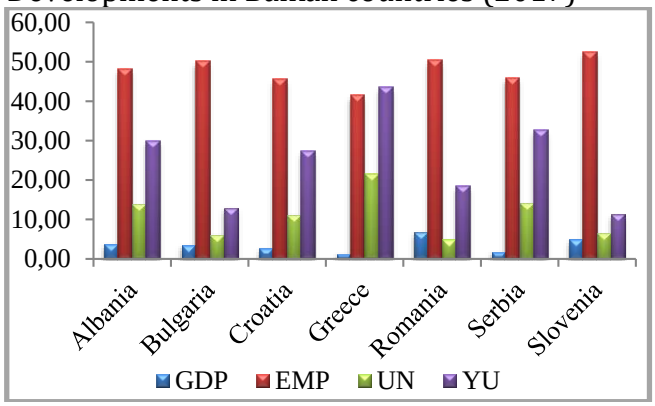
The 2008 global financial and economic crisis which started in United States of America and extended internationally has influenced many developed and developing countries. The governments have taken many measures for the economic problems in the global markets that emerged with the impact of the crisis. Despite this, there are still many countries where the effects of the crisis cannot be determined. The global crisis has also

significantly affected Balkan countries. Although there was a positive growth trend from the beginning of the 2000s to 2009 in Balkan economies, in 2009 and in the following years most of the countries have been faced with a negative GDP growth. For instance, Bulgaria's GDP growth rate dropped from 6.0% to -3,6%; Croatia's from 2% to -7%, and Slovenia's from 3% to -7.8% in 2009. These declines in economic growth have shown a tendency to improve in some countries (like Albania, Bulgaria, and Turkey) in 2010, but recently there are still many countries (like Greece and Serbia) with negative growth rates (World Bank, 2019).

According to Uvalić and Cvijanović (2018), "the economic crises in the Western Balkans after 2009 brought about many structural problems. These are as follows: serious external imbalances deriving from high trade and current account deficits, economic and social problems in the labour markets, extreme deindustrialisation along with a fast expansion of services (telecommunications, banking, retail trade, real estate) that primarily serve the domestic market". Based on this information, we may conclude that labour market and economic growth in the Balkan economies are affected by the 2008 global financial and economic crisis. World Bank reports highlight employment developments at the regional level following the global crisis. However, in the Balkan economies youth unemployment is still indicated important labour market problems. Concerning this issue Balliu (2016) says that, high unemployment problem is the most crucial challenge in the Balkan economies. Hence, "even during periods of significant economic growth, employment level improves by small percentage". Figure 1 below shows the developments in economic growth, employment, unemployment and youth unemployment in the Balkan countries for 2017.

As shown in Figure 1, Romania has the biggest GDP growth (6.95%) in 2017 among others. Slovenia and Albania follow Romania with 5% and 3.8% GDP growth rate, respectively, in 2017. When we look at the countries in terms of unemployment, Greece, Serbia, Albania, and Croatia are the countries that have the highest unemployment rate. These four countries have also highest youth unemployment in 2017. Greece's youth unemployment rate is 43.6% Serbia's is 32.8%, Albania's 30%, and Croatia's 27.3%. The employment rates in the group of countries considered close to each other and it is approximately 50%[1].

Figure 1: Economic growth, Employment, Unemployment and Youth Unemployment Developments in Balkan countries (2017)



Source: World Bank, Data Bank (2019).

As can be understood from figure 1, These Balkan countries have important unemployment problems, especially the youth unemployment problem. Malaj and Rubertis (2016) indicate that this situation causes people to migrate from their country and brings along some social and economic problems. The developments led to an increase in the measures taken towards youth unemployment. As a result of the increases in youth unemployment, employment policies were revised and new searches about the subject were made by labour organizations and government institutions. In this context, The Balkan Children and Youth Foundation (BCYF - A partner of International Youth Foundation)

[1]For detailed labour market and economic growth indicators of the countries, see the figure 3 in appendix.

and The Gjirokastra Youth Center (GjYC) can be considered as an important institutions. According to Thorup (2004), BCYF reports stated that it is quite important to determine "the issues of youth employment and the promotion of economic expansion through job creation" in order "to improve the prospects and conditions of young people in the Balkans". On the other hand, "GjYC's youth employment program highlights the importance of a comprehensive approach to youth employment".

As we see on the economic outlook of Balkans, employment, unemployment and youth unemployment and economic growth subjects seem quite important in the region. My openly confessed motivation is to research the relationship of economic growth with employment, unemployment and youth unemployment empirically in seven of Balkan countries. From here on out, the literature review is included and empirical studies are summarized in the next phase of the study.

3 LITERATURE REVIEW

There are many empirical studies which focused on labour market and economic growth. In this part of the study, some of these studies and their results are given. The studies were randomly selected and eight of them examining Balkan countries, eight of studies are about other countries.

When the results of the studies investigating the Balkan countries are examined, it is understood that the variables of employment, unemployment, and youth unemployment are generally related to economic growth in the countries. For example, Fetai et al. (2017) signed that unemployment has a negative relationship with per capita growth in Western Balkans. Misini and Badivuku-Pantina's (2017) model show that if the GDP is increased for 1%, it will have a negative effect on unemployment reduction in average of -0.43% in Kosovo. On the other side, Dritsakis and Stamatiou (2016) investigated the Greece economy and found a unidirectional causal relationship between unemployment and economic growth for the periods 1995-2015.

Apart from these studies, some papers examining the issue with the observations of different countries except the Balkan countries have similar results. These studies can be listed as follows; Bölükbaş (2018) considered twenty emerging economies, Üzar and Akyazı (2018) researched thiry-four OECD countries, Abraham and Ozemhoka (2017) investigated low-income countries of Sub-Saharan Africa. Meyer (2017) analysed South Africa and Uras (2016) aims to find results for Turkey. These studies and other studies are given in detail in the table 1 below.

Table 1: Empirical Literature Review

Studies	Country (Countries)	Periods	Results
Studies Examining Balkan Countries			
Fetai et al. (2017)	Western Balkans	1994-2015	The goal of the study is to find the determinants of economic growth. One of the findings shows that unemployment has a negative relationship with per capita growth.
Koçbulut and Bolat (2017)	7 Balkan countries	2004-2016	The results of the paper show that the temporary shocks in the Balkan countries do not cause to the permanent effects on unemployment rate. Besides that, the results also sign that the natural rate of unemployment hypothesis seems to be valid in the Balkan countries.
Misini and Badivuku-Pantina (2017)	Kosovo	2004-2014	According to the empirical results of the study, when the GDP is increased for 1%, it will have a negative effect on unemployment reduction in average of -0.43%.
Balliu (2016)	Western Balkans	2000-2015	The study's results sign that unemployment has negative effect on GDP. According to the authors, the result is meaningful

			because when unemployment rate reduces the GDP of the country increases.
Dritsakis and Stamatiou (2016)	Greece	1995-2015	The findings of the study show that there is a unidirectional causal relationship between unemployment and economic growth both in the short and long-run.
Ndregjoni and Zerelli (2015)	4 Balkan countries	2000-2013	The methodology of the paper is based on Okun's law and the findings show that Okun's relationship between changes in the unemployment rate and output growth may change significantly over time.
Sadiku et al. (2015)	FYR of Macedonia	2000-2012	The empirical findings state that there is not any causal relationship between economic growth and unemployment. However a change in the growth rate of real GDP does not cause a change in unemployment and vice-versa.
Nikoli (2014)	Albania	2000-2013	The results of the study show that Okun's law does not apply to the Albanian economy. For all that, the study also emphasized that the economic crises affected the economic conditions of the country.
Studies Examining Other Countries			
Bölükbaş (2018)	20 Emerging economies	1991-2016	Panel causality test results have indicated that there exists statistically significant bidirectional causality between economic growth and youth unemployment. In addition, there is a cointegration relationship between the variables.
Güriş and Yaman (2018)	23 OECD countries	2000-2015	The results of the paper state that economic growth has a reducing impact on unemployment. On the other hand, in the study, it has been concluded that all countries has been affected by the 2008 economic crisis equally.
Üzar and Akyazı (2018)	34 OECD countries	2000-2016	According to the results of the econometric analysis, there is a bidirectional causality relationship between economic growth rate and unemployment rate.
Abraham and Ozemhoka (2017)	Low-income countries of Sub-Saharan Africa.	1991-2013	The findings of the paper show that there are negative relationships between youth unemployment and economic growth variables in the low-income countries of Sub-Saharan Africa. On the contrary that, the results also show that there is a positive relationship between the variables in the individual countries.
Aksu (2017)	Turkey	1960-2009	Econometric analysis results show that there is no short-term relationship between economic growth and employment but employment has impact on economic growth in the long-run.
Meyer (2017)	South Africa	2002-2016	The study found long-rung cointegration relationships among the employment, real GDP, inflation and the repo rate. The results of the study also indicate that economic growth and repo rate cause changes in employment.
Uras (2016)	Turkey	2000-2014	The consequences of the study state that while there is no causality relationship from unemployment to economic growth, there exists a causality relationship in a reverse way.
Akkemik (2007)	Turkey	1988-2004	The results of the analysis show that the adjustments in the labour market lagged GDP growth, and labour markets respond to GDP changes with a delay of more than four periods.

4 EMPIRICAL ANALYSIS

In this part of the study, the causality analysis between employment, unemployment, youth unemployment, and economic growth is conducted on seven Balkan countries (Albania, Bulgaria, Croatia, Greece, Romania, Serbia, and Slovenia) through a 22-year period between 1996–2017 (While the study period was preferred, it was tried to be considered as long as possible. However, in some countries there was a problem of obtaining data and therefore the period of 1996-2017 was preferred). The

time period was determined by the availability of the data. Within the study, the economic growth rate is defined as GDP and means GDP growth (%), the employment rate (EMP) is defined as employment to population ratio, 15+, total (%) (Modelled ILO estimate), unemployment rate (UN) shows total unemployment (% of total labour force-modelled ILO -International Labour Organization- estimate), the youth unemployment rate (YU) is the number of the total youth unemployment (% of total labour force ages 15-24) (modelled ILO estimate). The data have been extracted from World Bank's Data Bank.

The empirical part of the study covers three different panel data model forecasts. Panel data model (1) is created to forecast the causality between employment and economic growth, panel data model (2) is formed to see the causality between unemployment and economic growth while panel data model (3) is utilized to do the same for the causality between youth unemployment and economic growth. Models used in the study are constructed as in the equations (1), (2), and (3) below;

$$GDP_{it} = \alpha_{1i} + \alpha_{2i}EMP + u_{it} \quad (1)$$

$$GDP_{it} = \delta_{1i} + \delta_{2i}UN + \varepsilon_{it} \quad (2)$$

$$GDP_{it} = \beta_{1i} + \beta_{2i}YU + \mathrm{p}_{it} \quad (3)$$

In equations (1), (2), and (3), i stands for the countries (i=1, 2, . . . ,7), t denotes time period (t=1996, 1997, . . ., 2017), α_{1i}, δ_{1i}, and β_{1i} are constant terms, α_{2i}, δ_{2i}, and β_{2i} are, respectively, the parameters of employment, unemployment, and youth unemployment that express the effect to economic growth.

The models used in this study, are based on the bootstrap panel Granger causality test by Kònya. The test has many advantages in comparison to the other panel causality tests: We do not feel the need of pre-tests (stationarity and cointegration tests) in this method. On the other hand, this test holds on more realistic assumptions inasmuch as it allows for cross-sectional dependence. In addition to all these, the test enables panel heterogeneity that means we make easily compare the countries by using individual country results. Kònya bootstrap panel Granger causality test is implemented in two stages. In the first stage, we are in need of observing that whether cross-sectional dependence and panel heterogeneity is valid for the whole panel. In the second stage, panel Granger causality forecasting for each country is made by using the method of seemingly unrelated regression (SUR).

In the light of this information, we test cross-sectional dependence and panel heterogeneity as the first step of the panel Granger causality test. We know that cross-sectional dependence indicates whether the cross-sections are correlated or not. If the common factors affect countries, that is expected. As the dependence among the countries is quite high in today's world, it is moral certainty that a shock regarding economic growth or employment within a country will affect other countries as well. When we consider this factor, it can be said that the forecasts not taking cross-sectional dependence into account will be biased and inconsistent (Pesaran, 2004). In the econometrics literature, Breusch-Pagan (1980) proposed Lagrange Multiplier (LM) test statistic to set cross-sectional dependence which provides the asymptotic chi-square distribution with N(N-1)/2 degrees of freedom as shown in the Equation (4) ;

$$CD_{LM1} = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^{2} \quad (4)$$

Within the LM test, the null hypothesis states that there is no cross-sectional dependence while the alternative hypothesis is constructed as there is cross-sectional dependence for at least one pair. We may write the hypotheses for this test as below;

$H_o = cov(u_{it}, u_{kt}) = 0$ for all t and $i \neq t$)

$H_1 = cov(u_{it}, u_{kt}) \neq 0$ for at least *one pair of* $i \neq t$).

In that equation (4), $\hat{\rho}_{ij}$ is the pair-wise correlation coefficient of the residuals of ordinary least square forecasts for each *i*. The LM statistic is used to test cross-sectional dependence when $T \to \infty$ and N is constant, i.e. T > N. When N is higher, the power of the LM statistic becomes limited. In order to prevent this problem, Pesaran (2004) recommends two different tests that display asymptotic standard normal distribution: LM_2 for $T \to \infty$ and $N \to \infty$ (T>N); CD for cases in which N is high and T is relatively low, i.e. N>T. Statistics of the test are stated as indicated in the equations (5) and (6);

$$CD_{LM2} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \qquad (5)$$

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right) \qquad (6)$$

In cases where the group mean is zero as against the individual means being less/more than zero, LM_2 and CD tests could fail in rejecting the null hypothesis (this hypothesis means that there is no cross-sectional dependence). To tackle this issue, Pesaran, Ullah and Yamagata (2008) suggested bias-adjusted LM statistic with asymptotic standard normal distribution for cases in which $T \to \infty$ and $N \to \infty$ by utilizing the mean and the variance of the LM statistic. The bias-adjusted LM statistic is expressed in the equation (7):

$$CD_{LMadj} = \sqrt{\left(\frac{2T}{N(N-1)}\right)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \frac{(T-k)\hat{\rho}_{ij}^2 - \mu_{Tij}}{\sqrt{v_{Tij}^2}} \qquad (7)$$

In the equation (7), μ_{Tij} and v_{Tij}^2 are, respectively, the mean and the variance of (T-k) $\hat{\rho}_{ij}^2$ as suggested by Pesaran et al. (2008). Cross-sectional dependence test results are given in table 2 and table 3.

Table 2: Cross-sectional Dependence Test Results (Based on model)

Method	Model-1		Model-2		Model-3	
	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.
CD_{LM1}	124.32***	0.000	110.66***	0.00	114.28***	0.00
CD_{LM2}	15.94***	0.000	13.83***	0.00	14.39***	0.00
CD	8.85***	0.000	8.13***	0.00	8.19***	0.00
CD_{LMadj}	0.39	0.347	0.09	0.46	-0.25	0.59

Notes: *** denotes the significance for at 0.01 level, respectively

Table 3: Cross-sectional Dependence Test Results (Based on variables)

	GDP		EMP		UN		YU	
	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.
CD_{LM1}	55.89***	0.00	29.40	0.10	39.08**	0.01	43.70***	0.00
CD_{LM2}	5.38***	0.00	1.29*	0.09	2.79***	0.00	3.50***	0.00
CD	-2.66***	0.00	-1.77**	0.03	-2.46***	0.00	-2.44***	0.00
CD_{LMadj}	2.77*	0.00	6.50	0.00	10.00***	0.00	9.90	0.00

Notes: *, ** and *** denote the significance for at 0.10, 0.05, 0.01 levels, respectively

We should not to forget that in this study T (=22) > N (=7) and CD test is more efficient when N>T, the cross-sectional dependence tests indicate that the null hypothesis of no cross-sectional dependence for the forecast models is rejected according to the common results of three test statistics (CD_{LM1}, CD_{LM2} and CD). Similarly, the null hypothesis of no cross-sectional dependence for employment (EMP), unemployment (UN), youth unemployment (YU), and economic growth (GDP), are rejected based on CD_{LM2} test statistics. These findings suggest the employment, unemployment, youth unemployment, and economic growth shocks in seven Balkan countries affect other countries.

In addition to these cross-sectional dependence test results, the slope homogeneity test was done in the empirical analysis. As stated previously, the heterogeneity of slope coefficients is another assumption in Kònya bootstrap panel Granger causality test. In order to test this assumption slope homogeneity statistic was suggested by Swamy (1970). But this test is only efficient when T>N. Unlike this test, Pesaran and Yamagata (2008) has proffered a different standardized version of Swamy's test which facilitates applicability to larger panels. Denoted as $\tilde{\Delta}$, the first stage is to calculate the modified Swamy ($\tilde{S}$) statistic as

illustrated in the equation (8) (Pesaran and Yamagata, 2008):

$$\tilde{S} = \sum_{i=1}^{N} \left(\hat{\beta}_i - \hat{\beta}_{WFE}\right)' \frac{x_i' M_\tau x_i}{\tilde{\sigma}_i^2} \left(\hat{\beta}_i - \hat{\beta}_{WFE}\right) \qquad (8)$$

In the equation, $\hat{\beta}_i$ is the pooled OLS estimator; $\hat{\beta}_{WFE}$, weighted and fixed effect pooled estimator; M_τ, the identity matrix; and lastly $\tilde{\sigma}_i^2$ is the estimator of σ_i^2. In the next step, the standardized version of Swamy statistic with asymptotic normal distribution is generated as in the following equation (9) below (Pesaran and Yamagata, 2008):

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \qquad (9)$$

On the condition of $\sqrt{N}/T \to \infty$, the null hypothesis that slope coefficients are homogeneous when $(N,T) \to \infty$ is tested against the alternative hypothesis that slope coefficients are heterogeneous. We can write the hypotheses as follows:

$H_0: \beta_i = \beta; for\ all\ i,$

$H_1: \beta_i = \beta_{j;} for\ i \neq j$

Besides that, Pesaran and Yamagata (2008) suggested bias adjusted $\tilde{\Delta}_{adj}$ test which is applicable for smaller samples and whose error terms are distributed normally as shown in the equation (10) below:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}}\right) \qquad (10)$$

We may see the results of slope homogeneity in table 4:

Table 4: Slope Homogeneity Test Results

Method	Model-1		Model-2		Model-3	
	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.
$\tilde{\Delta}$	2.46***	0.00	3.20***	0.00	2.62***	0.00
$\tilde{\Delta}_{adj}$	2.64***	0.00	3.43***	0.00	2.81***	0.00

Notes: *** denotes the significance for at 0.01 level, respectively

According to the test results, the null hypothesis that assumes the homogeneity of slope coefficients is rejected at 1% significance level for the all models. The result infers that the causality between economic growth and employment / unemployment / youth unemployment may differ as of countries. What's more, the presuppositions of Kònya bootstrap panel Granger causality test are valid as cross-sectional dependence and panel heterogeneity are detected within the panel.

After the cross-section dependence and slope homogeneity tests we may start to test panel causality relations between variables. In this part of Kònya bootstrap panel Granger causality test, Wald test statistics and bootstrap critical values are calculated by means of SUR system estimation which is developed by Zellner (1962).

In the estimation, the series are handled with their initial values and the stationarity test on cross-sections is not required because of the critical values of cross-sections are carried by bootstrap. Besides that it is assumed that each equation has pre-determined different variables and error terms which are correlated with each other in the analysis. For all that, Wald test is also applied to examine the causality between variables. In the analysis of the system that each equation has pre-determined different variables and error terms which are correlated with each other. Wald test is also applied to examine the causality. Kònya (2006) suggested the following two sets of equations (11) and (12) based on SUR system:

$$
\begin{aligned}
Y_{1,t} &= \alpha_{1,1} + \sum_{i=1}^{mly_1} \beta_{1,1,j} Y_{1,t-j} + \sum_{i=1}^{mlx_1} \gamma_{1,1,j} X_{1,t-j} + \varepsilon_{1,1,t} \\
Y_{2,t} &= \alpha_{1,2} + \sum_{i=1}^{mly_1} \beta_{1,2,j} Y_{2,t-j} + \sum_{i=1}^{mlx_1} \gamma_{1,2,j} X_{2,t-j} + \varepsilon_{1,2,t} \\
&\vdots \\
Y_{N,t} &= \alpha_{1,N} + \sum_{i=1}^{mly_1} \beta_{1,N,j} Y_{N,t-j} + \sum_{i=1}^{mlx_1} \gamma_{1,N,j} X_{N,t-j} + \varepsilon_{1,N,t}
\end{aligned} \tag{11}
$$

and

$$
\begin{aligned}
X_{1,t} &= \alpha_{2,1} + \sum_{i=1}^{mly_2} \beta_{21,j} Y_{1,t-j} + \sum_{i=1}^{mlx_2} \gamma_{2,1,j} X_{1,t-j} + \varepsilon_{2,1,t} \\
X_{2,t} &= \alpha_{2,2} + \sum_{j=1}^{mly_2} \beta_{2,2,j} Y_{2,t-j} + \sum_{j=1}^{mlx_2} \gamma_{2,2,j} X_{2,t-j} + \varepsilon_{2,2,t} \\
&\vdots \\
X_{N,t} &= \alpha_{2,N} + \sum_{j=1}^{mly_2} \beta_{2,N,j} Y_{N,t-j} + \sum_{j=1}^{mlx_2} \gamma_{2,N,j} X_{N,t-j} + \varepsilon_{2,N,t}
\end{aligned} \tag{12}
$$

Within the equations, Y is economic growth rate; X is employment (unemployment/youth unemployment); t is the time period, N is the number of countries while α, β and γ are common factors and ε is the disturbance. According to Kònya (2006), "there is no simple rule to decide on the maximum lag, though there are formal model specification criteria to rely on. Ideally, the lag structure is allowed to vary across countries, variables and equation systems". In our analysis, the maximum lag length is set as 3 and the appropriate lag lengths for the systems have been determined according to Akaike (AIC) and Schwarz (SIC) information criterion.

Following this test we may have bring four different types of causality:

- Granger causality does not exist between X and Y if $\gamma_{1,i} = 0$ and $\beta_{2,i} = 0$ for each *i*.
- Bidirectional Granger causality exists between X and Y if γ_(1,i)≠0 and β_(2,i)≠0 for each i.
- Unidirectional Granger causality exists from X to Y when $\gamma_{1,i} \neq 0$ and $\beta_{2,i} = 0$ for each i.
- Unidirectional Granger causality exists from Y to X when $\gamma_{1,i} = 0$ and $\beta_{2,i} \neq 0$ for each i.

The Kònya bootstrap panel Granger causality test results are reported in table 5, table 6, and table 7 in appendix. According to the results of causality test, there is a unidirectional causality from economic growth to employment in

Croatia and Greece while the direction of the causality is reversed (from employment to economic growth) in Serbia. But there is no causality between employment and economic growth in Albania, Bulgaria, Romania, and Slovenia. When we look at the estimated coefficients for the countries in the period 1996-2017, it is clear to see statistically significant causality relationships. According to the findings, economic growth increased employment in Croatia and Greece and; in contrast, employment led to increase in economic growth in Serbia.

Table 6 in appendix shows the findings of the causality relationship between unemployment and economic growth. The findings show that there is bidirectional causality between the variables in Croatia. In addition to this, there is a unidirectional causality between unemployment and economic growth in Greece and Slovenia. Estimated coefficients seem positive and significant in the findings. That means economic growth increases unemployment in Croatia, Greece, and Slovenia; in contrast, unemployment raises economic growth in Croatia.

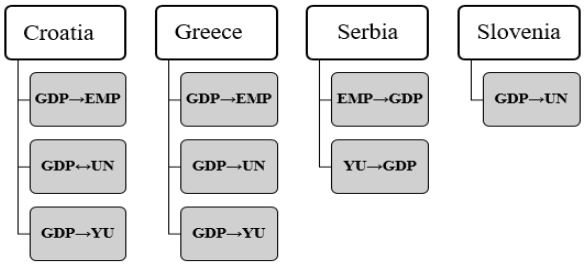
Lastly, findings of the causality test between youth unemployment and economic growth state similar results with other causality test; in a nutshell, we found a unidirectional causality relationship from economic growth to youth unemployment in Croatia and Greece, in contrast, a unidirectional causality relationship from youth unemployment to economic growth in Serbia.

5 CONCLUSION

In this study, the relationship of economic growth with employment, unemployment and youth unemployment was investigated for 7 Balkan countries (Albania, Bulgaria, Croatia, Greece, Romania, Serbia, and Slovenia) by considering the period of 1996-2017. The method used in the analysis is the bootstrap panel Granger causality test developed by Kónya (2006). The study has significant results for the mentioned Balkan countries. The summary of the results is presented in figure 2.

As shown in figure 2, employment, unemployment, youth unemployment and economic growth variables have a causal relationship with each other in Croatia, Greece, Serbia, and Slovenia. The bootstrap panel Granger causality test results in these countries can be listed as follows.

Figure 2: Results of Empirical Analysis



There is a unidirectional causality from economic growth to employment in Croatia and Greece while the direction of the causality is reversed (from employment to economic growth) in Serbia. In response to this, there is not any causal relationship between employment and economic growth in Albania, Bulgaria, Romania, and Slovenia.

There is bidirectional causality between the unemployment and economic growth in Croatia, in addition to this, there is a unidirectional causality from economic growth to unemployment in Greece and Slovenia. Lastly, we found a unidirectional causality relationship from economic growth to youth unemployment in Croatia and Greece, in contrast, a unidirectional causality relationship from youth unemployment to economic growth in Serbia.

Based on these results, we may consider that the effects of the developments in economic growth on the labour market are quite important in these four countries. For this reason, economic growth factor should be taken into consideration in employment policies in these countries.

Especially in Croatia and Greece, the effect of variables on each other is noteworthy. Economic growth is related to both employment, and unemployment. Besides that, a unidirectional causal relationship from

economic growth to youth unemployment in these two countries. In this way, the findings may be explained by the recent low economic growth rate and high youth unemployment rate of the countries. On the other hand, according to the results of empirical analysis, no causality relationship was found between the labour market and economic growth in Albania, Bulgaria and Romania. We think that a detailed research should be conducted in countries to find out the reasons for this finding.

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Appendix:

Table 5: The Bootstrap Panel Granger Causality Test Results (Model 1)

Country	GDP ↛ EMP				EMP ↛ GDP				Results
	Wald Statistics [EC]	Bootstrap Critical Values			Wald Statistics [EC]	Bootstrap Critical Values			
		1%	5%	10%		1%	5%	10%	
Albania	0.718	23.90	8.81	5.13	6.476	23.25	11.92	7.73	GDP ↮ EMP
Bulgaria	11.899	25.41	15.67	11.93	4.133	28.62	14.19	9.61	GDP ↮ EMP
Croatia	**21.437** [0.011]	21.92	14.03	1.13	2.143	21.44	11.66	7.85	**GDP → EMP**
Greece	**75.700*** [0.003]	58.55	38.71	30.06	3.318	11.20	6.00	4.11	**GDP → EMP**
Romania	5.346	19.77	11.27	8.24	4.413	25.77	15.94	11.44	GDP ↮ EMP
Serbia	0.167	8.75	5.00	3.45	**10.647*** [0.069]	24.13	12.50	8.44	**EMP → GDP**
Slovenia	3.450	19.78	11.60	8.38	0.043	21.47	10.90	7.28	GDP ↮ EMP

Notes: ***, **, and * denote the significance for at 0.01, 0.05 and 0.10 levels, respectively. [...] = EC: Estimated coefficients. Critical values obtained from 10.000 replications.

Table 6: The Bootstrap Panel Granger Causality Test Results (Model 2)

Country	GDP ↛ UN				UN ↛ GDP				Results
	Wald Statistics [EC]	Bootstrap Critical Values			Wald Statistics [EC]	Bootstrap Critical Values			
		1%	5%	10%		1%	5%	10%	
Albania	2.165	15.50	7.60	5.00	6.304	23.21	12.74	8.80	GDP ↮ UN
Bulgaria	3.214	15.35	8.54	6.06	1.158	29.51	14.24	9.40	GDP ↮ UN
Croatia	**13.194** [0.015]	14.90	8.57	6.33	**16.856** [0.013]	18.06	9.61	6.48	**GDP ↔ UN**
Greece	**73.849*** [0.002]	50.27	34.10	26.99	2.483	13.95	7.85	5.58	**GDP → UN**
Romania	1.229	18.52	10.39	7.12	2.590	22.98	12.09	8.24	GDP ↮ UN
Serbia	0.755	9.12	4.88	3.41	4.825	22.20	12.18	7.95	GDP ↮ UN
Slovenia	**14.800** [0.075]	27.21	17.33	13.03	2.574	21.84	10.92	7.27	**GDP → UN**

Notes: ***, **, and * denote the significance for at 0.01, 0.05 and 0.10 levels, respectively. [...] = EC: Estimated coefficients. Critical values obtained from 10.000 replications.

Table 7: The Bootstrap Panel Granger Causality Test Results (Model 3)

Country	GDP ↛ YU				YU ↛ GDP				Results
	Wald Statistics [EC]	Bootstrap Critical Values			Wald Statistics [EC]	Bootstrap Critical Values			
		1%	5%	10%		1%	5%	10%	
Albania	5.622	18.63	10.87	7.96	0.002	24.23	12.05	8.19	GDP ↮ YU
Bulgaria	4.126	18.32	11.22	8.65	0.397	30.47	15.47	10.28	GDP ↮ YU
Croatia	**11.870*** [0.054]	19.97	12.13	9.41	3.718	21.60	11.61	8.16	**GDP → YU**
Greece	**64.275**** [0.014]	69.14	45.30	35.99	4.176	19.56	10.46	7.58	**GDP → YU**
Romania	0.001	14.61	7.97	5.27	4.581	18.42	10.31	7.27	GDP ↮ YU
Serbia	1.500	9.11	4.78	3.22	**10.500*** [0.055]	22.01	11.10	7.51	**YU → GDP**
Slovenia	3.021	25.73	15.67	11.92	1.118	20.85	11.391	7.84	GDP ↮ YU

Notes: ** and * denote the significance for at 0.05, and 0.10 levels, respectively. [...] = EC: Estimated coefficients. Critical values obtained from 10.000 replications.

Figure 3: GDP, Employment, Unemployment and Youth Unemployment Rates in Seven Balkan Countries (1996-2017)