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Impact of economic growth and inflation on the unemployment rate – evidence from the Balkan region

Research in the strand of unemployment has attracted much attention in the last two decades due to its close link with macroeconomic development as confirmed by many theoretical and empirical endeavours. However, in the context of the Balkan region, empirical investigations are rare, and this study strives to fill this gap. For this purpose, the research examines the impact of economic growth and inflation on the unemployment rate. Our evidence is based on a sample of 11 countries of the Balkan region over the period 2000–2021. Our robust panel regression analysis, using static models such as the Dricroll–Kraray standard errors approach, feasible generalized least square estimations, seemingly unrelated regression, and dynamic panel estimation models, reveals that economic development and inflation reduce the unemployment rate. Theoretically, the findings mainly support Okun's Law and the Phillips curve hypothesis. Our findings suggest that policymakers may design policies to ensure equitable and sustainable economic development and a balanced monetary policy to reduce the unemployment rate in the Balkan region.

Keywords: unemployment, inflation, economic growth, Balkan region, Okun's law, Phillips curve

JEL classification: M14, G31, C22, O43, E24

Introduction

The recent worldwide economic and financial challenges have caused unemployment and stagnant economic growth, becoming increasingly critical issues [Cacciatore, Ghironi, 2021]. A growing number of countries are experiencing a drastic rise in unemployment rates, which is a worrying trend even though unemployment is also a problem in developed economies [Ahiadorme, 2022; Wulandari et al., 2019]. This situation orders concentrated efforts to minimize the catastrophic impact of these unwanted unemployment-related challenges, thereby pursuing sustainable economic growth [Liu et al., 2022]. Keeping in view the harmful impact of unemployment, several recent studies remained focused on how to reduce

unemployment through education, the financial structure, information communication technology (ICT), institutional quality, trade openness, financial development, and public expenditure [Huang et al., 2022; Usman et al., 2022; Xu et al., 2021; Liu et al., 2022; Cacciatore, Ghironi, 2021; Czernich, 2014].

However, despite its importance, the existing literature remained less focused on how to minimize unemployment via economic growth [Rodríguez-Puello et al., 2022]. It is a widely accepted view in economics that higher economic development increases employment and reduces unemployment [Keji, 2021]. This proposition is reinforced by the theory of Okun [1962], which describes an inverse relationship between productivity and unemployment. Economic law illustrates that economic development reduces the unemployment rate. Empirically, the existing literature has also supported the positive role of economic development in reducing unemployment across individual countries and regions [Bergkvist, 2016; Oldekop et al., 2016]. Empirically, Abu [2017], Velnampy et al. [2013] and Habees and Rumman [2012] established the inverse relationship between economic growth and the employment rate. On the other hand, the studies of Kashem and Rahman [2020], Khaliq and Noy [2007], and Kreishan [2011] supported there being an insignificant or positive economic growth and unemployment relationship. However, the results of these empirical studies are inconsistent, highlighting the need for further research via sophisticated econometric methods to establish the connection between economic expansion and the unemployment rate.

On other hand, the extant literature has also supported the role of inflation in reducing unemployment with the help of the Phillips Curve hypothesis [Ahmed, Cassou, 2021; Bennani, 2022]. The Phillips curve hypothesis states an inverse relationship between the unemployment rate and an economy's inflation [Mumtaz, Theodoridis, 2020]. In other words, the lower the unemployment in an economy, the higher the rate of inflation. Empirically, few studies such as Reichel [2022], Islam et al. [2021], and Buttler et al. [2005] have supported the positive role of inflation in reducing unemployment. On the contrary, Wright [2012] and Berentsen et al. [2011] established an insignificant or positive inflation and unemployment relationship. The mixed evidence warrants a concentrated effort to revisit the impact of inflation on the unemployment rate.

We uniquely contribute to the existing literature by examining the impact of economic development and inflation on the unemployment rate in the Balkan Region, since previous studies are conducted from the perspective of individual countries or different regions. For instance, Ahiadorme [2022] focused on the relationship between inflation, economic growth, and unemployment in Sub- Saharan African countries. Bhattarai [2016] examines the inflation-unemployment nexus in OECD countries. Similarly, Wulandari et al. [2019] examine the inflation and unemployment nexus in Indonesia. Hjazeen et al. [2021] established the

growth-unemployment nexus in Jordan. However, Balkan countries as a region are less focused upon in the extant literature. This study considers Balkan countries as a sample region due to the following reasons. (1) Although the growth rate was stronger in 2018 as compared to 2017, the increase in workforce utility was at a slower pace in the Western Balkan countries in 2018 than in the previous year. (2) The youth unemployment rate increased and showed persistence in the Western Balkan regions. (3) Although the percentage of young people who are neither employed nor in school nor training has decreased since last year, it is still quite high in comparison to other European countries. Hence, there is a need to bring structural reforms to improve productivity, a competitive environment, a sound monetary system, and sustained development-related strategies to further reduce the unemployment rate. Hence, considering the above discussion, we revisited the impact of economic growth and inflation on the unemployment rate in the Balkan region through sophisticated econometric techniques to provide useful and robust insights for policymakers on this topic.

The remainder of the paper is structured as follows. The literature review and hypothesis development-related discussion are provided in section 1. Section 2 presents the research methodology and research steps taken, while section 3 discusses data sources and basic data analysis. Section 4 presents the main research results and discusses them. Section 5 concludes.

1. Economic growth, inflation and unemployment – review of literature

The extant literature comprehends the relationship between economic growth and the rate of unemployment [Billi, 2020]. Following the formulation of Okun's law by Okun [1962], it has been discovered theoretically that the unemployment rate and economic growth show an inverse relationship. His efforts to illustrate the reciprocal relationship between two variables were widely acknowledged [Rodríguez-Puello et al., 2022; Eichengreen, 1945].

Empirically, following Okun's law, several studies examined the link between unemployment and economic expansion. Chand et al. [2017] argued that increasing the economic rate and productive labour force supports enhancing the employability rate in a country. Habees and Rumman [2012] employed the simple model of Okun's law to observe the connection between employment and economic growth in Arab countries. Using statistical techniques such as ARDL, Abu [2017] analysed the productivity rate and its impact on job creation opportunities with the support of Okun's law in Nigeria and established the connection between economic growth and unemployment. Another study was conducted by

Soylu et al. [2018] in eastern European countries to examine the unemployment and economic development relationship based on a sample period of 1992–2014 and concluded that the relationship was an inverse one. Similarly, Nour [2013] supported the negative impact of the unemployment rate and economic growth relationship in Malaysia. The MENA region was explored by Al-Wadi [2017] to examine the connection between economic-related development in the unemployment rate from 1990 to 2016 and established a positive role of economic-related development in the reduction of unemployment.

On the other hand, several studies emphasized that there exists a positive or insignificant relationship between an idle workforce and economic-related development. Using 9 Arab countries from 1994 to 2010, Khaliq and Noy [2007] examined the relationship between economic-related development and job opportunities. The study suggested that economic productivity further deteriorates employment opportunities. Using data from 1970–2008 in Jordan, Krishan [2011] suggested an insignificant role of economic-related development in shaping the unemployment rate. Based on OECD countries, Kashem and Rahman [2020] observed an insignificant association between economic development and the unemployment rate. Likewise, using sample data from 2009–2016, Tamimi and Jaradat [2019] established the negligible role of economic development in reducing the unemployment rate. Therefore, based on the theoretical and empirical discussion covered in the literature review, our study developed the following hypothesis and made empirical testing to examine it:

H1: Economic growth has a negative impact on the unemployment rate.

Theoretically, the Phillips curve hypothesis supported the notion that there exists an inverse inflation and unemployment relationship. This hypothesis complements the idea that when the unemployment rate drops, the inflation rate would rise in tandem with it [Li et al., 2013].

The empirical studies of existing literature established the role of inflation and its effect on the rate of unemployment. According to the discussion of Ball and Mazumder [2019], the connectivity between inflation and unemployment drives an inverse relationship. Using cointegration techniques, Reichel [2022] observed an inverse inflation and unemployment relationship in advanced countries such as the US and Japan. Based on sample data from 1975–2004 in Malaysia, Fukuoka [2010] analysed that the unemployment ratio is affected by inflation and explored that this effect persists over the long term. A study by Islam et al. [2021] based on North Cyprus, explored the inflation and unemployment relationship given the Phillips hypothesis and supported the constructive role of inflation in reducing unemployment.

Additionally, this inverse connection is supported by studies to explore the correlation of unemployment with the change in inflation in the long term [Buttler et al., 2005; Schreiber, Wolters, 2007]. Moreover, a relationship with the reciprocal effect is discussed in different countries during different periods to examine the role of inflation on the unemployment rate. Similarly, determinants of unemployment were analysed by Eita and Ashipala [2010] in Namibia during the period from 1971 to 2007. The study followed the Philips curve to investigate the impact of inflation and economic growth on the nature of joblessness and delivered a negative correlation.

Nevertheless, a few studies have supported the positive influence of inflation on unemployment. However, it did not influence it in the long run. According to the findings of Wright [2012], this inflationary pressure and unemployment have a long-term positive effect on each other. Similarly, the arguments of Friedman [2021] further labelled that the inverse relationship between the rate of unemployment and the change in inflation exists. He further demonstrated that the negative sloping Phillips curve, which supports the trade-off between two variables, only occurs in the short term. On the other hand, Islam et al. [2021] investigated the unemployment and inflation using the sample data from 1950–1999 and concluded a weak link in the long run. Therefore, we empirically test the following hypothesis:

H2: The inflation rate is negatively associated with the unemployment rate.

Based on the preceding discussion, we can draw the following conclusions. Both the theoretical and empirical literature highlights the conflicting findings of many studies related to the impact of economic development and inflation on the unemployment rate, and there currently exists a need to give conclusive remarks that can be made about the problem as a whole. In addition, the results of the empirical studies varied among regions. Two limitations exist in contemporary literature. Firstly, researchers mainly focused on a small portion of the sample consisting of a cluster of economies or regions; however, the Balkan countries as a region are less focused. Secondly, it becomes challenging to conclude profound findings from the different studies delivered by scholars using versatile statistical methodologies and regional diversifications. Keeping in view, the above limitations, we considered 11 economies of the Balkan region to examine the impact of economic growth and inflation on unemployment using advanced panel estimation models such as the Dricroll–Kraray approach (D–K), the feasible generalized least square (FGLS), seeming unrelated regression (SUR), and system GMM to provide better insights for the policymakers.

2. Research methodology and design

This paper explores the rate of unemployment proportional to the change in inflation and economic growth through an array of advanced panel statistical techniques. Following Lee et al. [2020], this study also applied the widely known technique of Diskoray's Model to produce consistent and reliable results even in the presence of cross-sectional dependence. Further, FGLS, SUR, and system GMM are applied as a robustness check in order to obtain consistent coefficients. The baseline model of this study is as follows:

$$Unemp_{i,t} = \delta_0 + \delta_{i,t}EG_{i,t} + \delta_{i,t}INF_{i,t} + \sum_{t=1}^{t=n} \delta_{i,t}Controls_{i,t} + \varepsilon_{i,t} \quad (i)$$

where $Unemp_{i,t}$ stands for the unemployment rate.

We considered five proxies to measure unemployment such as total unemployment, unemployment of males, unemployment of females, and youth unemployment. The control variables include population growth, urban population, trade, and industry [Aluko, 1965; Nchofoung et al., 2022; Pradhan et al., 2018].

We performed the data analysis in four steps. Firstly, the study estimated the descriptive statistics. In the second step, the study produced a correlation matrix. In the third step, we checked the cross-sectional dependency diagnostic tests such as heteroskedasticity and serial correlation. In the fourth step, the study analysed the impact of economic-related development and inflation on the unemployment rate via the D–K model. Further, the relationship is evaluated via advanced statistical techniques such as FGLS, SUR, and system GMM for further robustness [Lee et al., 2020].

3. Data sources, data sample and descriptive statistics

The study collected data on economic growth, inflation, unemployment, and other macroeconomic variables from the IMF and World Bank websites for 11 Balkan countries in the period 2000–2021. The details of the countries are provided in Table 1.

The summary statistics results are reported in Table 2. Unemployment has a mean value of 15.298%, which is greater than the mean reported values of Kim et al. [2019] for OECD countries. The higher value indicates that the Balkan region has a greater unemployment rate vis-a-vis OECD countries. The economic growth has a mean value of 24.399 which is greater than the reported value of Hjazeen et al. [2021], which suggests that the Balkan region is enjoying greater economic development in comparison to Jordan. Further, the report's average value of inflation is lower than the average value in the report by Bitzenis et al. [2021], suggesting

that inflation is comparatively lower in the Balkan region as compared to Greece. As far as the control variables are concerned, the urban population had the highest mean and standard deviation values (M = 59.691, SD = 9.769) among the control variables.

Table 1. List of countries

No.	Country
1	Albania
2	Bosnia and Herzegovina
3	Bulgaria
4	Croatia
5	Greece
6	Montenegro
7	North Macedonia
8	Romania
9	Serbia
10	Slovenia
11	Turkey

Source: Own elaboration.

The correlation matrix is presented in Table 3. The results reveal that economic growth has a negative correlation coefficient, which is statistically significant at 1%. The negative coefficient value suggests that economic development is negatively associated with the unemployment rate in the Balkan countries. Further, the matrix also suggests that inflation is negatively associated with unemployment. Overall, the correlation coefficient values among the independent variable are lower than 0.80, suggesting no multicollinearity issue.

The results of Pesaran et al. [2004] for cross-dependency are reported in Table 4. The CD test analysis shows that the defined variables are statistically significant at 1.00%, which refused the Ho of cross-sectional independence. Therefore, the results are consistent with the cross-sectional dependency for all stated variables in the Balkan countries. Moreover, we applied two widely known techniques, namely the Wooldridge and Hickin [2002] test and the Modified Wald test by Greene and Haidt [2002], to test the two-regression assumptions of serial correlation and heteroscedasticity. The results of Wooldridge and Hickin's [2002] test revealed that the data is plagued with serial correlation. Furthermore, the Modified Wald confirms the existence of heteroscedasticity in the dataset. The results of both tests are reported in Table 5.

Table 2. Descriptive statistics

Variable	Symbol	Description	Obs	Mean	SD	Min	Max
unemployment	Unemp	unemployment, total (% of the total labour force)	242	15.298	8.175	3.91	37.25
female unemployment	unemp F	unemployment, female (% of the female labour force)	242	15.647	8.486	3.38	38.43
male unemployment	unemp M	unemployment, male (% of the male labour force)	242	14.497	7.814	3.51	36.963
youth unemployment	unemp Y	unemployment, youth total (% of total labour force aged 15–24)	242	32.381	14.460	8.16	65.828
economic growth	EG	GDP per capita (constant 2010 USD)	242	24.399	1.487	21.709	27.75
inflation	Infl	annual change in the consumer price index (CPI)	230	5.490	10.610	–1.736	95.005
urban population	pop ur	urban population (% of the total population)	242	59.691	9.769	41.741	80.038
trade openness	Trade	trade (% of GDP)	242	87.773	27	22.492	161.743
industry	Industry	industry (including construction), value added (% of GDP)	242	23.794	5.014	13.328	38.695

Source: Own elaboration.

Table 3. Correlation matrix

	unemp	unemp_F	unemp_M	unemp_Y	EG	infl	pop_ur	trade	industry
unemp	1.00	–	–	–	–	–	–	–	–
unemp_F	0.75***	1.00	–	–	–	–	–	–	–
unemp_M	0.99***	0.71***	1.00	–	–	–	–	–	–
unemp_Y	0.95***	0.73***	0.93***	1.00	–	–	–	–	–
EG	–0.52***	–0.43***	–0.57***	–0.48***	1.00	–	–	–	–
infl	–0.16*	–0.10	–0.16*	–0.19**	0.22***	1.00	–	–	–
pop_ur	–0.11	–0.04	–0.15*	–0.15*	0.49***	–0.01	1.00	–	–
trade	–0.06	–0.04	–0.02	–0.10	–0.43***	–0.38***	–0.18**	1.00	–
industry	–0.48***	–0.51***	–0.43***	–0.47***	0.28***	0.37***	–0.42***	0.02	1.00

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Own elaboration.

Table 4. Results from cross-section independence tests

Unemployment	9.7***	0.000
Female unemployment	7.63***	0.000
Male unemployment	8.90***	0.000
Youth unemployment	2.01**	0.000
Economic growth	2.19**	0.000
Inflation	3.5***	0.000
Urban population	1.91**	0.000
Trade openness	2.12**	0.000

Notes: *** $p<0.01$, ** $p<0.05$.

Source: Own elaboration based on: [Pesaran, 2004].

Table 5. Results of diagnostic tests for heteroscedasticity and serial correlation

	Test statistic	p-value
Heteroscedasticity Modified Wald (χ^2) H	238.436***	0.000
Serial correlation Wooldridge Test (F-test)	164.61***	0.000

Notes: *** $p<0.01$.

Source: Own elaboration.

4. Research results and discussion

We examined the impact of economic growth and inflation on unemployment through advanced models such as Driscoll and Kraay's [1998] standard errors panel regression models, FGLS and SUR, and system GMM estimation models to produce efficient and consistent estimates due to the presence of cross-sectional dependency, serial correlation within panels and group-wise heteroskedasticity. The regression results are reported in Tables 4–6. Our findings reveal that the regression coefficients of economic growth are positive and statistically significant at 1.00% across the difference proxies of unemployment. This negative coefficient of economic development suggests that economic growth reduces unemployment in the Balkan countries. The results are consistent with the notion proposed by Okun [1962] in Okun's Law, as the study found that employment is inversely related to economic related development. Based on Okun's [1962] conception of the connection between unemployment and economic growth, the emphasis is given that a more skilled workforce with sustainable development is required to generate a significant production level. According to Okun [1962], the unemployment rate fell during times of high real growth and rose during times of low or negative real growth.

Similarly, concerning the impact of inflation on the unemployment rate, our findings reveal that the impact of inflation has negative and statistically significant

Table 6. Determinants of unemployment based on the Dricroll–Kraray model

Variables	l_unemp	l_unemp_F	l_unemp_M	l_unemp_Y
EG	-1.219***	0.137	-1.459***	-0.816***
	(0.154)	(0.145)	(0.178)	(0.123)
infl	-0.0111***	0.00443**	-0.0120***	-0.00983***
	(0.00250)	(0.00180)	(0.00251)	(0.00209)
pop_ur	0.0362***	0.000402	0.0471***	0.0326***
	(0.00367)	(0.00721)	(0.00442)	(0.00394)
trade	-0.000559	-0.00122	0.000453	-0.00221***
	(0.000822)	(0.00181)	(0.000922)	(0.000668)
industry	1.61e-05	-0.0272***	-0.0100	-0.00576
	(0.00717)	(0.00799)	(0.00707)	(0.00672)
constant	30.33***	-0.0127	35.67***	21.75***
	(3.847)	(3.175)	(4.367)	(3.104)
f-stats (p-value)	0.000	0.000	0.000	0.000
observations	242	242	242	242
no. of groups	11	11	11	11

Notes: Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$.

Source: Own elaboration.

coefficient values, suggesting that inflation reduces the unemployment rate in the Balkan region. These findings are in line with the hypothesis of the Phillips curve, which expresses that the stated variables are inverse proportionally to each other. Further, this hypothesis demonstrates that an economy's inflation rate rises as unemployment falls.

Our results are in line with recent empirical studies such as those of Ball and Mazumder [2019], and Reichel [2022]. These studies also concluded the negative impact of inflation on the unemployment rate. On other hand, the finding is in contrast to Wright [2012], as this study suggested the positive impact of inflation in shaping unemployment.

We applied the FGLS, SUR, and System GMM models to obtain efficient and consistent results as a robustness check (Tables 7–9). The findings support the idea that the rate of unemployment and economic development are inversely related to each other. Further, the results also validate the previous findings that inflation is negatively associated with unemployment. This study shares common ground with empirical studies such as those of Soylu et al. [2018], Abu [2017], and Nour [2013] with regard to the impact of economic-related development on the unemployment rate in the Balkan region. Further, the findings are also consistent with Ball and Mazumder [2019], and Reichel [2022], whose studies also explored that inflation has an inverse relationship with unemployment.

Table 7. Determinants of unemployment based on the FGLS model

Variables	l_unemp	l_unemp_F	l_unemp_M	l_unemp_Y
EG	−0.202***	−0.116***	−0.242***	−0.132***
	(0.0285)	(0.0327)	(0.0293)	(0.0249)
infl	−0.00175	−0.00739**	−0.00268	−0.00477**
	(0.00274)	(0.00312)	(0.00282)	(0.00240)
pop_ur	0.00234	0.00799*	0.000100	0.00878**
	(0.00403)	(0.00464)	(0.00414)	(0.00352)
trade	−0.00748***	−0.00361***	−0.00762***	−0.00700***
	(0.00112)	(0.00128)	(0.00115)	(0.000976)
industry	−0.0385***	−0.0703***	−0.0255***	−0.0361***
	(0.00774)	(0.00882)	(0.00796)	(0.00676)
constant	9.230***	7.878***	9.706***	8.597***
	(0.530)	(0.616)	(0.546)	(0.464)
f-stats (p-value)	0.000	0.000	0.000	0.000
observations	242	242	242	242
no. of id	11	11	11	11

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Source: Own elaboration.

Table 8. Determinants of unemployment based on the SUR model

Variables	l_unemp	l_unemp_F	l_unemp_M	l_unemp_Y
EG	−0.202***	−0.116***	−0.242***	−0.132***
	(0.0285)	(0.0327)	(0.0293)	(0.0249)
infl	−0.00175	−0.00739**	−0.00268	−0.00477**
	(0.00274)	(0.00312)	(0.00282)	(0.00240)
pop_ur	0.00234	0.00799*	0.000100	0.00878**
	(0.00403)	(0.00464)	(0.00414)	(0.00352)
trade	−0.00748***	−0.00361***	−0.00762***	−0.00700***
	(0.00112)	(0.00128)	(0.00115)	(0.000976)
industry	−0.0385***	−0.0703***	−0.0255***	−0.0361***
	(0.00774)	(0.00882)	(0.00796)	(0.00676)
constant	9.230***	7.878***	9.706***	8.597***
	(0.530)	(0.616)	(0.546)	(0.464)
f-stats (p-value)	0.000	0.000	0.000	0.000
observations	242	242	242	242
R-squared	0.530	0.485	0.511	0.507

Notes: Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Own elaboration.

Table 9. Determinants of unemployment based on the dynamic panel data model
            estimated with system GMM

Variables	l_unemp	l_unemp_F	l_unemp_M	l_unemp_Y
L.l_unemp	−0.130	–	–	–
	(0.109)	–	–	–
L.l_unemp_F	–	0.941***	–	–
	–	(0.0432)	–	–
L.l_unemp_M	–	–	−0.146	–
	–	–	(0.107)	–
L.l_unemp_Y	–	–	–	−0.102
	–	–	–	(0.110)
EG	−0.272***	0.0389	−0.220**	−0.164**
	(0.0832)	(0.0291)	(0.0872)	(0.0693)
infl	−0.00555***	0.000626	−0.00478**	−0.00692***
	(0.00215)	(0.000892)	(0.00232)	(0.00184)
pop_ur	0.0195*	0.0122***	0.0132	0.0167**
	(0.0102)	(0.00423)	(0.0109)	(0.00842)

Table 9. cont.

Variables	l_unemp	l_unemp_F	l_unemp_M	l_unemp_Y
trade	−0.00786***	−0.000335	−0.00642***	−0.00659***
	(0.00134)	(0.000475)	(0.00141)	(0.00115)
industry	−0.0186	−0.0159***	−0.0239*	−0.0152
	(0.0121)	(0.00512)	(0.0131)	(0.0102)
constant	9.524***	0.330	8.615***	7.667***
	(1.977)	(0.562)	(2.042)	(1.700)
Wald test (p-value)	0.000	0.000	0.000	0.000
AR (1)	0.48308	0.58470	0.03446	0.36969
AR (2)	0.23465	0.17517	0.29369	0.31107
Hensen test	0.45885	0.51405	0.22010	0.44625
observations	242.000	242.000	242.000	242.000
no. of id	11.000	11.000	11.000	11.000

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Source: Own elaboration.

Conclusions

Different macroeconomic factors affect the ratio of unemployment. Hence, economic researchers have explored different macroeconomic determinants of unemployment. However, the theoretical and empirical endeavours remain inconclusive. This study contributes to the literature twofold. Firstly, this study contributes to investigating the relationship in the Balkan Region, as this region is less focused upon. Secondly, the extant literature has ignored the issues of cross-sectional dependencies, serial correlation, and heteroscedasticity. Moreover, the application of different traditional econometric techniques for data analysis has also created challenges in comparing research completed by different scholars. Therefore, this study applied an array of advanced statistical techniques such as the Dricroll–Kraray approach (D–K), the feasible generalized least square (FGLS), and seemingly unrelated regression (SUR) to address the issues of cross-sectional dependencies, serial correlation, and heteroscedasticity. Further, we applied system GMM for further robustness checks. Hence, this study revisited the relationship between unemployment, inflation, and economic development through an array of advanced statistical techniques based on 11 Balkan countries between 2000–2021.

Our study explored the rate of unemployment in the Balkan region by investigating the effect of inflation and economic development and our results revealed

a negative and significant association. This study concluded that economic development has a negative impact, following the hypothesis of Okun's law which demonstrates that there exists a reciprocal behaviour between economic development and unemployment. Similarly, the results' impact of inflation on unemployment is consistent with the notion of the Phillips curve hypothesis that supports the negative relationship between a monetary policy-related development and unemployment-related issues. Our findings are qualitatively robust across different econometric models such as the FGLS, SUR, and dynamic panel estimation models.

This study has far-reaching implications for the sustainable economic growth of Balkan countries. Over time, many countries have developed plans to better put their people to work, emphasizing expanding access to employment. The government is playing an important role in encouraging the private sector to expand job opportunities. To meet the growing industrial demands of the developing economies in the Balkan regions, the government must open up further chances for international investment to increase the employment rate, which would further reduce unemployment. This research also suggests that the government should lower the hurdle for new businesses to enter the market, giving them a better chance to expand and increase their market share. In addition, they should ease legal constraints on firms in the Balkans so that they could create additional employment opportunities. Furthermore, policymakers may also consider the monetary policy as an important tool to reduce the unemployment rate and hence design a comprehensive policy related to money supply management to provide job opportunities on an equity basis.

This study employed inflation and economic growth as significant factors to examine the Balkan region's unemployment rate. These economies are so diverse in terms of their politics, economy, culture, ethnicity, and religion that future research may also take these into account for individual countries as units of analysis. Secondly, future studies may replicate this methodology on a larger data sample. Likewise, future research endeavours may target other regions such as Africa, America, and Asia to extend the literature and provide better insights for policymakers, related to the topic. As with all research, the present analysis faces some limitations as well. The main limitations include the data sample and its granularity as well as the scope of variables tested in the estimated regressions – several additional dimensions could be potentially investigated. This will be covered in future research work.

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