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The Interdependence of Macroeconomic Stability Parameters: The Case of the Western Balkans[2]

Abstract: *The primary objective of this paper is to highlight the main types of causality between economic growth, inflation, and unemployment, as well as to reexamine the fundamental regularities associated with these variables. To investigate the potential dependence among the variables, a sample of Western Balkan countries (Albania, North Macedonia, Serbia, Bosnia and Herzegovina) over the period 1995–2024 is used. As the appropriate methodological framework, panel cointegration, the Mean Group (MG) cointegration technique, and panel causality tests were employed. The study established the existence of cointegration among the variables. The key finding concerns the positive and statistically significant impact of inflation on economic growth, as well as the causality running from inflation to economic growth. The results align with the view that a moderate inflation rate in the short term is associated with economic growth, and that stable and sustainable economic growth requires price stability. While the benefits of moderate price increases in the short run can be effective, the focus should remain on the long-term horizon.*

Keywords: *economic growth, inflation, panel cointegration, panel causality*.

Međusobna uslovljenost parametara makroekonomske stabilnosti: Primer Zapadnog Balkana

Apstrakt: *Osnovni cilj ovog rada jeste da istakne glavne tipove kauzalnosti između ekonomskog rasta, inflacije i nezaposlenosti, kao i da preispita osnovne*

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zakonomernosti povezane sa ovim varijablama. Za ispitivanje potencijalne zavisnosti među varijablama korišćen je uzorak zemalja Zapadnog Balkana (Albanija, Severna Makedonija, Srbija, Bosna i Hercegovina) za period od 1995. do 2024. godine. Kao odgovarajući metodološki okvir primenjeni su panel kointegracija, Mean Group (MG) kointegraciona tehnika i panel test kauzalnosti. Istraživanje je potvrdilo postojanje kointegracije među varijablama. Ključni nalaz odnosi se na pozitivan i statistički značajan uticaj inflacije na ekonomski rast, kao i na kauzalnost koja ide od inflacije ka ekonomskom rastu. Rezultati su u skladu sa stavom da je umeren nivo inflacije na kratak rok povezan sa ekonomskim rastom, dok stabilan i održiv ekonomski rast zahteva stabilnost cena. Iako benefiti umerenog rasta cena na kratki rok mogu biti efikasni, fokus treba da ostane na dugoročnom horizontu.

Ključne reči*: ekonomski rast, inflacija, panel kointegracija, panel kauzalnost.*

1. Introduction

Achieving high rates of economic growth, low unemployment, and price stability represents the fundamental goals of economic policy. In this context, identifying the appropriate relationship between these variables is not intended to demonstrate a connection in the form of "instrument for achieving a goal," but rather to point out the main types of causality among these variables, as well as to re-examine the basic regularities associated with them. This opens the possibility for formulating an adequate economic policy. Establishing macroeconomic stability presents an additional challenge for Western Balkan countries in their efforts to further integrate into European economic flows. Recently, the Western Balkan countries have experienced moderate economic expansion, but there are also increasing risks stemming from possible external shocks. The growth of economic activity and appropriate labor market reforms should enable a reduction in the unemployment rate in the Western Balkans; however, even a declining unemployment rate remains a persistent problem in these countries.

The Consumer Price Index (CPI) shows an upward trend during the observed period. Several factors may be cited as reasons for this: fiscal imbalances that led to hyperinflation in some countries during the 1990s, the COVID-19 pandemic, the energy crisis, the Russia–Ukraine conflict, and disruptions in supply chains. According to Loungani and Swagel (2001), the theoretical literature highlights four sources of inflation in developing countries: Growth in the money supply or exchange rate fluctuations; Output gap and business cycle dynamics; Movements in oil and non-oil commodity prices; Price inertia, i.e., past price movements.

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Uncertainty accompanied by high and unexpected inflation is viewed as a key factor negatively affecting capital returns, investment, and per capita output. Additionally, inflation may harm macroeconomic stability by reducing overall factor productivity. Inflation impacts economic activity through rising costs and distortions in efficient resource allocation. This theoretical standpoint supports the position that price stability should be the primary long-term goal of monetary policy (Barro, 1995; Andres & Hernando, 1997). Fischer (1977) emphasized that monetary policy affects short-term output dynamics, but does not have long-term effects on economic growth. On the other hand, Bruno and Easterly (1996) found a negative relationship between the inflation rate and economic growth in the short and medium term. However, the authors also stress that there are no lasting negative effects of inflation if the national economy tends to return to its pre-crisis growth trajectory.

The aim of this paper is to examine the interdependence of key indicators of macroeconomic stability: the inflation rate, economic growth, and the unemployment rate. The countries of the Western Balkans served as an example, while the time frame covers the period from 1995 to 2024. This study addresses the research gap stemming from the lack of regional analysis of specific macroeconomic relationships. Although there is a substantial body of literature on macroeconomic relations in the Western Balkan countries, longitudinal analyses that simultaneously examine the relationships between inflation, unemployment, and economic growth over extended periods are rarely conducted. Most existing studies focus on short time spans or individual countries. The period from 1995 to 2024 offers an opportunity to observe long-term trends and the limitations of traditional macroeconomic postulates within the specific context of the Western Balkans. The contribution of the paper is twofold. First, it re-examines fundamental macroeconomic regularities during a specific period, including the most recent inflation surge due to the pandemic and supply chain disruptions. Second, the paper analyzes the relationships between variables using panel econometrics, including second-generation panel stationarity and cointegration tests, and a new causality test (Juodis et al., 2021). In addition to the introduction and concluding remarks, the paper includes a review of relevant literature, the methodological framework, and selected empirical results.

2. Literature Review

A comprehensive understanding of the interrelationship between unemployment, inflation, and economic growth constitutes a fundamental basis and an effective instrument for mitigating cyclical fluctuations in the economy.

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While other factors are also relevant, accelerated economic growth, coupled with low unemployment and inflation rates, is generally regarded as desirable. However, numerous constraints hinder the simultaneous achievement of these objectives. The success of macroeconomic policy cannot be adequately assessed through the examination of any single variable in isolation, given the inherent interdependencies among these indicators.

From a long-term perspective, higher rates of economic growth contribute to an improved material standard of living. Nevertheless, in the short term, the rate of growth exerts significant influences on other macroeconomic variables. Elevated growth rates may engender upward pressure on prices, thereby increasing inflationary risks. Conversely, insufficient economic growth may precipitate higher unemployment rates. Although rising unemployment is traditionally associated with economic recessions, there exists the possibility that the economy may grow at a pace inadequate to prevent an increase in unemployment.

Phillips notably emphasized that one of the primary challenges in the formulation and implementation of economic policy lies in the lack of sufficient quantitative understanding of the mechanisms governing economic systems.

Previous empirical research has predominantly examined bilateral relationships between these variables without integrating their interconnected dynamics. Given that unemployment, inflation, and economic growth form the "tripillars" of macroeconomic stability—often conceptualized as the "golden triangle" of internal balance (Caporale & Škare, 2011)- it is imperative to adopt a trivariate analytical approach.

Recent empirical studies have increasingly revisited these fundamental macroeconomic relationships, albeit with some methodological controversies arising from the application of diverse econometric techniques. Škare & Caporale (2014), employing a Vector Error Correction Model (VECM) on a panel dataset comprising 119 countries, explored both short- and long-term interactions among inflation, employment, and economic growth. Their findings suggest that employment growth exerts a positive influence on economic growth in the short run, yet a negative effect in the long run—where output growth lags behind productivity gains. Furthermore, inflation appears to positively impact economic growth in the short term; however, in the long term, price volatility and uncertainty detrimentally affect economic performance. Similarly, inflation positively affects employment dynamics in the short run but has a negative long-term impact via its influence on output.

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2.1.   Inflation-unemployment nexus

In the context of growing concerns about disinflation in Eurozone countries, the Phillips curve is gaining renewed importance. Skarica (2016) demonstrated that the Phillips curve remains valid in the Eurozone, although the strength of this relationship weakened during the post-crisis period. Additionally, there is considerable heterogeneity in the behavior of the dependent variables across Eurozone countries.

Bhattarai (2016), using time series analysis, confirmed the existence of cointegration between unemployment and inflation, showing this to be the case in OECD countries. Unemployment in these economies varies significantly across countries, while inflation remains largely stable and low due to inflation targeting policies. Out of 35 analyzed national economies, 28 exhibited empirical dependence between unemployment and inflation, consistent with the Phillips curve. To make this trade-off more relevant and effective, the author emphasizes the need for coordination of microeconomic structures and institutional reforms, which would enhance the efficiency of wage and employment negotiations. Kumar & Orrenius (2016), using data from the U.S., demonstrated that the Phillips curve has a nonlinear and convex shape. A decrease in the unemployment rate below its historical average exerts a greater upward pressure on wages compared to increases in unemployment above the historical average. Analyzing the New Keynesian Phillips curve, Lopez-Villavicencio & Saglio (2016) assessed wage rigidity and indexation in developed countries. The results indicated significant heterogeneity: nominal wage rigidities are prevalent in the U.S., while wage indexation is more common in European countries. Seydl & Spittler (2016) emphasized that globalization has led to abrupt changes in the sectoral structure of national economies, with rising demand in the services sector, where workers generally have weaker bargaining power. This factor significantly contributes to the flattening of the Phillips curve. Crump et al. (2024) studied the unemployment–inflation trade-off with a New Keynesian Phillips curve, and provided corroborating evidence that labor market has remained tight since 2021. Blanchard (2016), analyzing the Phillips curve in the United States, reported the following findings:

- A low unemployment rate pushes inflation upward, while high unemployment pushes it downward. In other words, the Phillips curve is still alive, although the relationship is weaker than in the past;

- Inflation expectations are becoming increasingly anchored. As a result, the relationship between the level of unemployment and inflation becomes more important than that between unemployment and changes in prices—bringing us back to the relationship observed in the 1960s;

- The slope of the Phillips curve, i.e., the effect of unemployment on inflation for a given level of expected inflation, has significantly declined. This decline dates back to the 1980s and shows no further weakening during the Global Financial Crisis;

- The standard error of the residuals is very high, particularly in relation to the low level of inflation. This supports the argument against the so-called "divine coincidence."

2.2. Unemployment- economic growth nexus

Empirical studies increasingly show that the relationship between unemployment and economic activity varies across business cycles and tends to be stronger during periods of economic contraction than in times of expansion. The larger increase in unemployment during the Global Financial Crisis may stem from the non-linearity of Okun's law, rather than from a structural rise in the natural rate of unemployment. Asymmetries in Okun's law may be the result of weaker expectations for economic growth, employer pessimism regarding recovery prospects (Silvapulle et al., 2004), changes in labor force roles, sectoral growth rates, asymmetric cost adjustments, or labor market mismatches (Harris and Silverstone, 2001).

Potential sources of asymmetry in Okun's law are linked to cyclical economic movements, and the relationship is not stable over time. Gordon (2010) argued that Okun's law is outdated and that productivity does not represent a pro-cyclical factor, which contradicts the role of technological shocks and the real business cycle theory. The McKinsey Institute (2010) supported this view but added that labor market conditions change over time and that improvements in employment depend on labor market reforms, not solely on total output.

On the other hand, Ball et al. (2013) and Gali et al. (2012) found that Okun's law does vary to some extent over time, but it remains relatively stable, and the strength of the relationship between variables is quite robust. According to their research, the strength of this relationship did not change significantly during the Global Financial Crisis. Only a limited number of studies have devoted attention to properly defining asymmetries through endogenously determined breakpoints.

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2.3. Inflation- economic growth nexus

A large number of empirical studies investigating the potential relationship between these two variables emerged in the late twentieth and early twenty-first century. As a result, there now exists a substantial body of theoretical and empirical literature on the issue of the relationship between inflation and economic growth, both in developed and developing countries. Barro (1995) examined the effects of inflation on growth performance using a sample of 100 countries over the period 1960–1990. The results of his regression analysis showed that, on average, a 10-percentage-point increase in inflation reduces the growth of real GDP per capita by 0.2–0.3 percentage points and the share of investment in GDP by 0.4–0.6 percentage points. Although this impact may appear insignificant in the short term, in the long run, it can greatly affect a country's standard of living. The author supports this claim by stating that, if monetary policy results in a 10% annual increase in inflation, over a thirty-year period, the resulting decline in GDP could range between 4% and 7%. According to the author, this is sufficient evidence of the importance of price stability.

Gomme (1993) found a negative relationship between inflation and growth, based on a sample of 100 countries from 1960 to 1990. De Gregorio (1993) examined the link between inflation and economic activity within the framework of endogenous growth theory, using data from 12 Latin American countries over the period 1950–1986. His empirical results confirmed that inflation negatively impacts economic growth. Specifically, the author found that if inflation during the observed period had been half of its actual rate, GDP per capita would have been 25% higher. According to this study, the primary channel through which inflation affects economic growth is the reduction in capital productivity. The author also emphasized the impact of fiscal imbalances on chronic inflation in many countries.

On the other hand, some studies found no long-term connection between the two variables. Faria & Carneiro (2001) examined the inflation-growth relationship in Brazil, which experienced a period of high inflation between 1980 and 1995. Their empirical results indicated a negative relationship between inflation and economic growth in the short term, but no causality in the long run. Gylfason & Herbertsson (2001) analyzed 170 countries over the period 1960–1992 and confirmed a statistically significant negative relationship between inflation and economic growth. Valdovinos (2003) investigated the inflation-growth relationship in eight Latin American countries from 1970 to 2000. The empirical results showed a weak and small negative correlation in the original data. However, after filtering both time series using the Baxter and King filter,

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the long-run average revealed a negative correlation between inflation and growth in the selected countries. Saaed (2007), using data from Kuwait between 1985 and 2005, found a strong and long-term inverse relationship between the consumer price index and GDP. Azar (2009) also found a statistically significant and negative relationship between inflation and economic growth in the U.S. On the other hand, a positive relationship between inflation and growth can be found in the works of Mallik & Chowdhury (2001). Azam & Khan (2022) showed that in developing and developed economies, the management authorities need to cogitate a maximum rate of 12.3% and 5.4%, respectively, as an inflation target to avoid the detrimental effects of high inflation on economic growth for sustaining macroeconomic stability.

3. Data and Methodology

Given that the primary objective of this section is to examine the causal relationship between economic growth, inflation, and unemployment, the analysis employs three key macroeconomic variables: Gross Domestic Product (GDP), the Consumer Price Index (CPI), and the unemployment rate. To investigate potential causality among these variables, a panel dataset was constructed for the selected countries of the Western Balkans—namely Albania, North Macedonia, Serbia, and Bosnia and Herzegovina. Montenegro and Kosovo were not included in the analysis due to the limited availability of reliable and consistent macroeconomic data for the entire observation period, as well as methodological differences that hinder comparability with other Western Balkan countries.

Economic growth is represented by Gross Domestic Product (GDP), measured in constant 2015 US dollars, with data sourced from the World Bank (WDI, 2025). Inflation is proxied by the Consumer Price Index (CPI), using historical values indexed to 2017=100, obtained from the official website of the International Macroeconomic Data Set of the Economic Research Service (ERS), United States Department of Agriculture (USDA). Finally, the unemployment rate is used as a measure of labor market performance (UN, unemployment total, % of total labor force, modeled ILO estimates), also retrieved from the World Bank database (WDI, 2025).

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Table 1. Descriptive Statistics in the Western Balkan Countries (1995-2024)

Variables	lnGDP			lnCPI (2010=100)			lnUN		
Country	Mean	St. dev	J-B*	Mean	St. dev	J-B*	Mean	St. dev	J-B*
Albania	22.94	0.35	2.26	4.39	0.29	7.39	2.68	0.20	5.51
North Macedonia	22.84	0.23	2.50	4.49	0.20	0.83	3.30	0.33	1.05
Serbia	24.35	0.25	1.82	3.78	1.20	3.42	2.66	0.31	0.93
Bosnia & Herzegovina	23.33	0.38	22.77	4.49	0.19	1.10	3.11	0.30	7.59

Source: Author. Note: J-B refers to Jarque- Bera test. The Jarque-Bera test is a statistical test that checks whether a dataset follows a normal distribution by examining its skewness and kurtosis.

For statistical reasons and to facilitate empirical analysis, all variables are transformed into their natural logarithmic forms (ln). Descriptive statistics for the selected variables are presented in Table 1. In order to identify and assess relationships and cointegration among the variables, a sufficiently long series is generally required. However, in the context of panel models-which combine cross-sectional and time-series data- such analysis can be conducted even with relatively shorter time spans, thus enhancing the robustness and feasibility of the investigation.

In the present case, the data set covers a period of 30 observations for each of the 4 countries. Given that the panel is strictly balanced, the total number of observations amounts to 120. Based on their level of economic development, all four countries included in the analysis fall into the category of upper-middle-income economies, according to the World Bank classification. Referring to the previously outlined theoretical foundations, the econometric model can be specified as follows:

$$Model\ 1\ \ln(GDP)_{it} = \theta_i + \beta_1 \ln(CPI)_{it} + \beta_2 \ln(UN)_{it} + \varepsilon_{1,it} \quad (1)$$
$$Model\ 2\ \ln(CPI)_{it} = \gamma_i + \alpha_1 \ln(GDP)_{it} + \alpha_2 \ln(UN)_{it} + \varepsilon_{1,it} \quad (2)$$

Where i=1, 2,…,N denotes the index of the country under analysis, and t=1, 2,…,T represents the time dimension of the observed variables. The coefficients ß$_1$, ß$_2$, α$_1$ and α$_2$, capture the long-run effects of the independent variables on the dependent variable, while θ_i and γ_i represent country-specific fixed effects. The terms ε$_{1it}$ and ε$_{2it}$ denote the stochastic error terms.

Given the potential presence of common shocks across the selected countries, which may result in contemporaneous correlation, it is crucial to examine the cross-sectional dependence among panel units. Considering the relatively small number of cross-sectional units and the limited time dimension, the

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Pesaran CD test was employed to assess cross-sectional dependence. The results, presented in Table 2, indicate that the null hypothesis of cross-sectional independence is rejected, suggesting the existence of significant dependence among the panel units.

Table 2. Pesaran CD test

H_0: No cross-section dependence	Statistic	Probability
lnGDP	12.61	0.00
lnCPI	12.44	0.00
lnUN	10.33	0.00

Source: Author

Variation in slope coefficients across panel units may result in biased and inconsistent regression estimates. Slope heterogeneity refers to structural differences in parameter estimates across cross-sectional units (Zeraibi et al., 2021). Considering the structural and economic differences among the countries included in the sample, it is essential to assess whether the slope coefficients are indeed heterogeneous.

To address this issue, a slope heterogeneity test was conducted following the methodologies proposed by Pesaran & Yamagata (2008), as well as Blomquist and Westerlund (2013). Subsequently, the analysis proceeded with an examination of the stationarity properties of the panel data series, with the aim of determining whether the variables are stationary at level or become stationary only after differencing.

In this context, when testing for panel stationarity, it is necessary to employ second-generation panel unit root tests. These tests account for the possibility of cross-sectional correlation among units. Accordingly, the Pesaran CIPS test (Pesaran, 2007) will be used as the appropriate unit root test in this study. Furthermore, the presence of a long-run equilibrium relationship among the observed variables was assessed using the Westerlund (2007) cointegration test. This test is particularly suitable for panel data characterized by cross-sectional dependence, offering robust and reliable inference in such settings. The MG (Mean Group; Pesaran & Smith, 1995) cointegration techniques were also employed. The Mean Group (MG) estimator embodies a common approach in panel data analysis, whereby separate regressions are estimated for each cross-sectional unit, and the resulting coefficients are subsequently averaged. This method accounts for heterogeneity across units by allowing all slope coefficients to vary freely.

Relying exclusively on a single class of panel estimators may result in inconsistent or misleading inferences. To strengthen the robustness of the panel cointegration analysis, this study also incorporates the Granger non-

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causality test. Unlike the commonly used Dumitrescu-Hurlin test, the procedure developed by Juodis et al. (2021) remains valid in models with either homogeneous or heterogeneous slope coefficients. A key innovation of this approach lies in the specification of the null hypothesis, which assumes that all Granger causality coefficients are equal to zero and, importantly, homogeneous across cross-sectional units. Based on this assumption, the authors advocate for the use of a pooled least squares estimator, akin to a fixed-effects model, for estimating these coefficients. This framework reflects a more realistic modeling strategy in many empirical settings, particularly when full heterogeneity cannot be supported by the data structure.

4. Empirical Results

Table 3 reports the results of the slope homogeneity tests developed by Pesaran & Yamagata (2008) and Blomquist & Westerlund (2013). The findings provide clear evidence of heterogeneity in slope coefficients across the panel units. In all estimated models, the null hypothesis of slope homogeneity is consistently rejected, indicating significant variation in the relationship between the variables across countries.

Assessing the integration properties of the variables requires testing for panel stationarity. However, traditional unit root tests - commonly referred to as first-generation tests - may produce biased results in the presence of cross-sectional dependence among panel units. Considering the evidence of cross-sectional dependence reported in Table 4, this study applies the second-generation panel unit root test proposed by Pesaran (2007). Under the null hypothesis, the test assumes that the panel series contains a unit root, implying that the variables are non-stationary. The test results indicate that the null hypothesis cannot be rejected when applied to the variables in their levels, suggesting that the series exhibit non-stationarity in their original form. However, after transforming the variables into first differences, the series become stationary. Accordingly, it is concluded that all variables are integrated of order one, $I(1)$.

Table 3. Slope Coefficient Heterogeneity Testing

Model	Pesaran Yamagata, 2008		Blomquist Westerlund, 2013	
	Delta	Adj. Delta	Delta	Adj. Delta
Model 1	18.70*	20.08*	11.82*	12.70*
Model 2	8.00	8.60	2.00**	2.11**

*Notes:** and * denote significance at the 5% and 1% level. Source: Author*

Table 4. Findings from the CIPS Panel Unit Root Test

Variables	Level	1st difference
lnGDP	-1.55	-4.68*
lnCPI	-2.14	-4.31*
lnUN	-1.33	-4.18*

*Notes * denotes significance at the 1% level. Source: Author*

Table 5. Testing for Cointegration with the Westerlund approach

	Variance ratio	Probability
Model 1	1.88	0.04
Model 2	1.83	0.04

Source: Author

Furthermore, to assess the existence of a long-run equilibrium relationship among the variables included in the empirical analysis, the Westerlund cointegration test was applied. The results, presented in Table 5, provide empirical evidence in favor of cointegration among the variables, indicating that despite being non-stationary in levels, they move together in the long run.

Table 6. MG Estimation Results

Model 1	Coefficient	p-value	Model 2	Coefficient	p-value
lnCPI	1.04	0.00	lnGDP	1.66	0.09
lnUN	-0.13	0.38	lnUN	0.22	0.30
Constant	19.10	0.00	Constant	-36.03	0.05

Source: Author

The results presented in Table 6 illustrate the impact of inflation and unemployment on economic growth, as well as the influence of economic growth and unemployment on inflation, based on estimates obtained using the Mean Group (MG) estimator. Specifically, the findings suggest that higher inflation is associated with increased economic growth in the Western Balkan countries. The corresponding elasticity coefficient indicates that a one-percent increase in inflation leads to a 1.04% rise in economic activity. On the other hand, in this case, no statistically significant relationship is established between the unemployment rate and economic growth. The apparent insignificance of unemployment in long-run growth models requires further contextualization. Informal labor markets and persistently low labor force participation rates in Western Balkan countries may help explain this outcome. In many cases, a substantial portion of the working-age population is either employed informally or inactive due to discouragement or reliance on remittances and subsistence agriculture.

As a result, official unemployment figures often fail to capture the true state of labor market dynamics. For instance, a decline in unemployment may not reflect improved economic conditions, but rather an increase in informal or

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precarious employment. Additionally, structural barriers such as skill mismatches, weak labor market institutions, and limited geographic mobility further detach unemployment from economic growth trends.

In Model 2, where the inflation rate is treated as the dependent variable, a positive and statistically significant effect of economic growth on inflation is observed. Specifically, the model shows that a one-percent increase in economic activity leads to a 1.66% rise in inflation. Additionally, the unemployment rate does not exert a statistically significant influence on the inflation rate in this model.

Table 7. Panel Granger Non-Causality Test (Juodis et al., 2021)

Null hypothesis	Coefficients	P-value
lnCPI does not Granger cause lnGDP	0.04	0.00
lnUN does not Granger cause lnGDP	-0.17	0.00
lnGDP does not Granger cause lnCPI	0.04	0.30
lnUN does not Granger cause lnCPI	-0.07	0.01

Source: Author

Following the previously presented model estimations and results, the next step involves testing for Granger causality. The results are reported in Table 7. Based on the data, there is clear evidence of unidirectional causality running from inflation to economic growth. The positive sign and the corresponding coefficient are consistent with the findings obtained through the MG estimation. In addition, unidirectional causality is also observed from unemployment to economic growth, indicating that changes in the unemployment rate led to changes in economic growth. Finally, the analysis reveals another unidirectional inverse relationship—from unemployment to inflation. In this case, changes in the unemployment rate are found to cause changes in the inflation rate. Before drawing conclusions, one should consider the specificities of the Western Balkan countries. The Western Balkans has a history of high inflation during the transition period (e.g., hyperinflation in the 1990s in Serbia and Bosnia and Herzegovina). Central banks are often weaker and less credible, so inflation does not trigger the same response as it would, for instance, in the eurozone. The region has undergone deep structural changes, including deindustrialization, privatization, and institutional reforms. The transition was often uneven, with high unemployment rates that were structural rather than cyclical – meaning they did not respond to macroeconomic policies as expected. In some countries (e.g., Bosnia and Herzegovina), monetary policy is constrained (due to currency boards), which means there is no

conventional monetary response to inflation or unemployment. Where monetary policy is present (e.g., Serbia, Albania), the issue of central bank credibility is often a challenge – markets and citizens do not trust that inflation targets will be met. This low credibility reduces the effectiveness of monetary policy – further complicating the relationship between inflation and unemployment.

5. Conclusion

The results obtained from the empirical analysis can be interpreted by examining the following relationships: inflation–unemployment, unemployment–economic growth, and inflation–economic growth.

Regarding the first relationship, framed within the context of the Phillips curve, the results indicate the existence of unidirectional causality, running from unemployment to inflation. This implies that changes in the unemployment rate cause changes in the inflation rate. Hence, it can be argued that the Phillips curve relationship holds in the Wetsern Balkan countries. However, it is worth noting that this relationship was not confirmed by the MG estimator and therefore warrants further investigation.

The unemployment–economic growth relationship was found to be statistically insignificant in the long run, although unidirectional causality from unemployment to economic growth was identified. In contrast, the inflation–economic growth relationship is undoubtedly positive and statistically significant. The chosen causality test confirmed the existence of unidirectional causality between the variables.

In addition to these findings, another important result of the empirical analysis should be emphasized. Given that all variables are integrated into order one, panel cointegration tests of the second generation confirmed the existence of a long-run equilibrium relationship among them. These findings carry important macroeconomic implications.

First, the fact that changes in the inflation rate are linked to changes in economic growth must be carefully considered in the formulation of economic policy. Second, after experiencing the Global Financial Crisis and its negative effects, the Western Balkan countries have entered a phase of recovery and economic expansion. However, high inflation remains a particularly sensitive and controversial issue in the region, due in part to a historical lack of confidence in monetary sovereignty. Therefore, greater attention must be paid to effective management and control of inflation.

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Considering also the impact of economic growth on inflation, it is plausible that, in the long run, increased economic growth may exert upward pressure on prices, potentially generating adverse long-term effects, particularly if such growth leads to hyperinflationary dynamics. Policymakers in the Western Balkans face the delicate and critical task of fostering economic activity while simultaneously maintaining low and stable inflation rates over the long term.

The findings support the view that moderate inflation in the short run may be positively associated with economic growth, whereas stable and sustainable growth in the long run requires price stability. Although the short-term benefits of moderate inflation may be effective, the focus of macroeconomic policy should remain on the long-term horizon.

Given the positive and significant impact of inflation on economic growth, as well as the region's sensitivity to high inflation, policymakers should focus efforts on maintaining low and stable inflation rates through effective monetary and fiscal measures that foster confidence in monetary policy. Policymakers should be cautious that stimulating economic growth does not lead to excessive price increases and potential hyperinflation. Development strategies should aim for sustainable growth alongside price stability over the long term. Although moderate inflation may stimulate growth in the short term, policies should emphasize long-term price stability and sustainable economic development to avoid the negative consequences of high inflation. Considering the region's historical lack of trust in monetary sovereignty, it is essential to strengthen the institutional framework and transparency of monetary policy to build trust among economic agents and the public.

Nevertheless, economic growth cannot be viewed exclusively in relation to inflation, as many other factors influence its dynamics - factors that were not included in this analysis. Therefore, future research should aim to explore the effects of money supply, interest rates, and exchange rates on these variables.

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