

# GUNS, GROWTH, AND STABILITY: MACROECONOMIC IMPACTS OF DEFENSE SPENDING IN THE WESTERN BALKANS AND THEIR RELEVANCE FOR TÜRKİYE \*

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## Abstract

The effects of defense spending on macroeconomic indicators in Balkan countries are significant at both academic and political levels. This study uses econometric methods to evaluate how the issue affects Türkiye's regional security and economic interests, highlighting its strategic and economic implications. The relationship between defense spending and economic growth in five Western Balkan countries—Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia—was examined using data from 2007 to 2024. Estimates made using Swamy's Random Coefficients Model and Seemingly Unrelated Regression (SUR) models concluded that defense spending has a negative effect on economic growth in Albania, Bosnia and Herzegovina and North Macedonia, and a positive effect in Croatia and Serbia.

**Keywords:** Defense spending, Economic growth, Swamy's Random Coefficient Model, SUR models

*Silahlar, Büyüme ve İstikrar: Batı Balkanlar'daki Savunma Harcamalarının Makroekonomik Etkileri ve Türkiye Açısından Önemi*

## Öz

Balkan ülkelerinde savunma harcamalarının makroekonomik göstergeler üzerindeki etkileri hem akademik hem de politik düzeyde önem arz etmektedir. Bu çalışma, konunun Türkiye'nin bölgesel güvenlik ve ekonomik çıkarlarını nasıl etkilediğini değerlendirmek için ekonometrik yöntemler kullanarak stratejik ve ekonomik etkilerini vurgulamaktadır. Beş Batı Balkan ülkesi olarak kabul edilen Arnavutluk, Bosna-Hersek, Hırvatistan, Kuzey Makedonya ve Sırbistan'da savunma harcamaları ile ekonomik büyüme arasındaki ilişki, 2007-2024 yılları arasındaki veriler kullanılarak incelenmiştir. Swamy'nin Tesadüfi Katsayılar Modeli ve Görünüşte İlişkisiz Regresyon (SUR) modelleri kullanılarak yapılan tahminler sonucunda, savunma harcamalarının Arnavutluk, Bosna-Hersek ve Kuzey Makedonya'da ekonomik büyüme üzerinde olumsuz, Hırvatistan ve Sırbistan'da ise olumlu bir etkiye sahip olduğu sonucuna varılmıştır.

**Anahtar Sözcükler:** Savunma harcamaları, Ekonomik büyüme, Swamy'nin Tesadüfi Katsayılar Modeli, SUR modeller

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## **Guns, Growth, and Stability: Macroeconomic Impacts of Defense Spending in the Western Balkans and Their Relevance for Türkiye**

### **Introduction**

Defense spending constitutes one of the most fundamental elements of states' security and foreign policy strategies. These spendings, made to ensure national security, are not limited to strengthening military capabilities but also have significant effects on countries' economic structures. Although the effects of defense spending on key macroeconomic indicators such as economic growth, unemployment, and inflation have long been a subject of debate in economic literature, the diversity of findings keeps this field current and dynamic.

Western Balkan countries represent one of the most critical regions in this debate due to their historical background, political fragility, and geopolitical position. Strategically positioned as a bridge between Europe, the Middle East, and Asia, the Balkans have been a region where the interaction between security and defense policies and the economy has been particularly intense, especially in the post-Cold War period. In countries such as Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia, defense spending is of critical importance in terms of both regional security dynamics and internal economic balances. Therefore, examining the effects of defense spending in these countries on macroeconomic indicators offers valuable results from both theoretical and practical perspectives.

From Türkiye's perspective, the Balkans are of strategic importance not only due to their geographical proximity but also because of historical, cultural, and economic ties. Considering the role Türkiye plays in regional security, the economic and political stability of Balkan countries directly affects Türkiye's security interests. Therefore, revealing the interaction between defense spendings in these countries and fundamental macroeconomic indicators such as economic growth, unemployment, and inflation will contribute to a more comprehensive assessment of Türkiye's security and economic policies toward the Balkans.

The literature presents different theoretical approaches regarding the relationship between defense spending and macroeconomic indicators.

According to the Keynesian perspective, defense spending can stimulate economic growth by increasing aggregate demand, while classical and neoclassical approaches argue that such expenditures may crowd out private investment by increasing the tax burden. Empirical studies conducted within this framework also reveal different results across countries and periods. Although studies on Balkan countries are limited in number, considering the economic structures and security policies of these countries, there appears to be a significant gap in the literature.

This study represents a comprehensive analysis focusing on these five countries. Although the limited availability of data on Balkan economies poses a major challenge for research, the econometric methodology employed here allows us to address and partly overcome this limitation. The lack of access to long-term datasets is primarily attributable to the region's historical and political complexities, including state fragmentation, the emergence of newly established countries, and the persistence of conflict environments, all of which have hindered systematic data collection and continuity. For this reason, panel data analysis was employed in this study, as the chosen econometric approach partially mitigates these limitations by generating unit-specific insights.

This study aims to fill this gap by examining the relationship between defense spending and economic growth in Albania, Bosnia and Herzegovina, Croatia, Serbia, and North Macedonia using panel data methods. Another contribution of the study is to evaluate the findings from Türkiye's perspective and discuss what the security-economy relationship in the Balkans means for Türkiye's regional policies. Thus, the aim is to contribute to literature both theoretically and empirically, as well as to provide strategic insights for policymakers.

## 2. Theoretical Background

The mission of states to protect their national security and sovereignty is financed through defense spending, which constitutes a significant component of public spending. These expenditures include personnel costs for the maintenance of military forces, the procurement of military equipment and ammunition, capital investments in the defense industry, and strategic research and development activities. However, defining and measuring military expenditures presents methodological challenges. These challenges stem primarily from institutional structural differences between countries' military and security institutions and uncertainties in their mission statements. For example, in some countries, the jurisdictions of police and military forces overlap, while in others, this distinction is clear. Furthermore, the inclusion of social service expenditures

for military personnel, such as health and education, and investments in dual-use technologies, such as space and nuclear technology, in the scope of military spending complicates the standardization and comparability of calculations. This situation poses a significant problem in terms of accurately tracking military spending and comparing it to the international level (Dunne & Smith, 1990).

Military spendings are primarily an economic indicator because they are a measure of economic input. They are a way of measuring the economic resources that states allocate to military activities. Therefore, they can be used to assess the government's relative priorities between the military and non-military sectors, to show the economic burden of military expenditures, and to indicate the opportunity cost of investing in the military (Omitoogun & Sköns, 2006). Empirical studies show that military spending can have both positive and negative effects on the economy. On the one hand, defense spending can lead to inefficiency in resource use and slow growth by diverting labor and capital from civilian production. On the other hand, equipping the workforce with skills through the military, technological advancement, and encouraging R&D investments can support economic growth (Dunne, Smith, & Willenbockel, 2004). Indeed, while some studies emphasize the negative effects of defense spending on macroeconomic variables, it is generally accepted that the military contributes to modernization, imparts new skills, and creates demand for certain sectors (Deger & Sen, 1983).

Two opposing schools of thought shape the theoretical background on this issue. From a Keynesian perspective, military spending stimulates economic growth by fostering investment, creating employment, and facilitating technological progress. In particular, Military Keynesianism argues that increased defense expenditures by the government can serve as a countercyclical tool to boost economic activity, especially during periods of conflict (Aijaz Syed, 2021). One approach explaining the relationship between defense spending and economic growth is that these expenditures can have negative effects on growth due to their opportunity cost. According to this view, an increase in defense spending can disrupt the efficient allocation of public resources by reducing social welfare expenditures such as health and education. Since public expenditures are financed through taxation, borrowing, or expanding the money supply, every additional resource allocated to defense requires a higher tax burden or increased borrowing. Furthermore, since a country's future production capacity depends on savings and investments, it is argued that an increase in defense spending could slow economic growth by diverting existing funds away from investments (Koçbulut & Altıntaş, 2021).

Along with the economic effects of defense expenditures, it would be appropriate to briefly discuss the fundamental factors that determine the level of

these expenditures. The factors determining the level of defense expenditures can be considered within the framework of multidimensional and interrelated elements. In this context, it should be noted that these expenditures are primarily shaped by economic and budgetary constraints, that countries' geopolitical positions and historical experiences play a decisive role in defense policies, that domestic regional dynamics and security threats are important factors to be considered in the planning process. Furthermore, it can be stated that the country's political regime, the size of the population at risk, the possibility of any type of attack, the level of national income and income distribution, and the age structure of the population also influence the scope and prioritization of defense expenditures (Giray, 2004).

Throughout history, the Balkans have been described as one of Europe's most fragile and conflict-prone regions. Due to its ethnic, religious, and cultural diversity, as well as being a geography where geopolitical interests converge, the region has frequently been the scene of wars, political crises, and external interventions throughout history. Today, the European Union's integration process plays a critical role in harmonizing historical differences in the region. The EU's institutional structures and normative regulations contribute to the transformation of Western Balkan countries in the areas of democratization, economic development, and security; at the same time, they encourage the integration of these countries into a common European identity by accepting their mutual differences (Gecaj, 2018). The Balkans have become a strategic area reflecting the geopolitical competition of major powers in the modern era. In this context, three key actors stand out: (i) the United States as the leader of the Western block and a global power; (ii) the Russian Federation, which is seeking to reestablish its historical influence in the region; and (iii) the People's Republic of China, which, despite its limited presence in the region in the past, has recently been seeking to increase its economic and strategic influence. Therefore, the Balkans cannot be considered "insignificant" on the foreign policy agenda of any major power; on the contrary, it stands out as a region where interests intersect and clash. In this context, the competition between the US and Russia is particularly evident through NATO's expansion process and directly affects the security balances in the region. On the other hand, China approaches the Balkans not so much as a geopolitical arena, but rather as part of its global economic strategy, viewing the region primarily as a component of economic integration within the framework of the Belt and Road Initiative (Zarić & Budimir, 2022).

In Western Balkan countries, the economic implications of defense spending extend beyond the enhancement of military capabilities; such expenditures are intrinsically linked to economic security, largely due to the region's dependence on external sources. Economies in the Western Balkans

exhibit a pronounced reliance on imported intermediate goods and energy inputs (World Bank Report, 2023). The heavy dependence on imported intermediate goods renders the security of logistical corridors and trade routes strategically critical. Moreover, the dependence of these economies on external energy sources further elevates the importance of these supply channels. Energy plays a pivotal role in national security through its profound influence on economic stability. To mitigate the risk of severe economic or societal disruptions, states must ensure the protection of critical energy infrastructure, including electricity grids, pipelines, and power generation facilities—an imperative that parallels the defense of other essential strategic assets. Likewise, securing reliable and uninterrupted fuel supplies remains a fundamental requirement. Acknowledging the strategic significance of energy, another dimension of the challenge appears which is the substantial economic burden imposed by dependence on imported energy resources (Schizer, 2022). In this regard, defense spending contributes to safeguarding trade routes, securing energy infrastructure, and supporting the continuity of production. Evaluating their impact on macroeconomic variables requires an integrated framework that encompasses both military and logistical security dimensions.

Turkiye's ties with Balkan states play a crucial role in regional security and strategic collaboration. Turkiye's efforts to reestablish and maintain peace and order in the Western Balkans have earned the country a good reputation and demonstrated its significant political and military weight in the region. During the AKP government, Turkiye's security policy in the Western Balkans continued along two main axes, similar to previous periods. First, Turkiye continued to participate in EU and NATO-led peacekeeping missions in the Western Balkans and strongly supported the efforts of countries in the region to join NATO. Second, Turkiye sought to develop bilateral military relations with Western Balkan countries through defense cooperation agreements, military equipment donations, and officer training at Turkish military academies (Kelkitli, 2013). Turkiye's security relations with the region are shaped through multidimensional mechanisms such as NATO membership, joint operations, and the European Union harmonization process. Defense spending trends in the Balkans are a major factor in shaping Turkiye's security strategies.

Western Balkan countries have implemented significant reforms in their security and defense policies in line with NATO membership and Partnership for Peace Program requirements. However, Serbia and Croatia stand out as the two dominant actors in the region in terms of military capacity, defense spending, and defense industry potential. Albania, Bosnia and Herzegovina, and North Macedonia, on the other hand, face significant constraints in the defense sector due to limited budgetary resources, political instability, and ethnic tensions.

Therefore, the military capabilities of these countries remain relatively limited and marginal when compared to Serbia and Croatia in terms of both deterrence and potential threat perception (Gecaj, 2018).

### 3. Literature Review

The impact of defense spending on macroeconomic performance has been one of the most debated issues in the field of economics for several decades. A substantial body of literature has sought to assess whether military spending serves as a driver of economic growth or, conversely, constitutes a burden on national economies by diverting resources from more productive sectors. These discussions have largely centered on the effects of defense expenditure on fundamental macroeconomic indicators such as economic growth. While some studies argue that defense spending can stimulate aggregate demand, enhance technological development, and create employment opportunities (Benoit, 1978; Biswas, 1992; Murdoch, Pi, and Sandler, 1997); others contend that excessive military expenditures may crowd out private investment, generate inflationary pressures, and exacerbate fiscal imbalances and have negative effect on economic growth (Deger & Sen, 1983; Faini, Annez, and Taylor, 1984; Başar and Küni, 2012).

The variation in these findings indicates that the relationship between defense spending and macroeconomic outcomes can differ based on factors such as economic structure, institutional framework, and geopolitical context in each country. Dunne, Smith, and Willenbockel (2005) provides evidence that the relationship between defense spending and economic growth differs substantially between developed and developing countries. Kusi (1994) contends that the nexus between economic growth and defense spending cannot be generalized across countries, as it is highly context dependent. Specifically, the direction and magnitude of the relationship may vary according to the period of analysis, structural characteristics of the economy, and the level of socio-economic development of the country under consideration. This observation underscores the importance of accounting for both temporal and contextual heterogeneity when evaluating the macroeconomic consequences of defense expenditures.

The body of research focusing specifically on Balkan countries remains relatively limited. Barros (2002) examines the relationship between total factor productivity and military spending in Balkan countries and assesses the catch-up hypothesis, which suggests that poorer countries grow faster. The findings show that allocating excessive resources to military spending negatively affects regional development and that there is a negative relationship between military spending and productivity growth. Kalaš, Mirović, and Milenković (2021)

employs panel data covering seven Balkan countries for the period 2004–2018 and identify evidence of a long-run relationship between military expenditure and economic growth. The results indicate that shocks to military expenditure and economic growth in one country exert spillover effects on other countries. Another important finding of this article is the existence of a unidirectional causality relationship from military spending to economic growth. Mabeba (2024) conducts an empirical investigation into the impact of military spending on Croatia's economic growth over the period 1981–2020. The study concludes that military expenditure exerts a positive and statistically significant influence on economic welfare.

#### 4. Data and Methodology

This study seeks to empirically examine the relationship between economic growth, defense expenditures, inflation, and unemployment within the Western Balkan countries. Specifically, annual data for the period 2007–2024 covering Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia is utilized. The analysis aims to capture both the direction and magnitude of the effects of defense spending, inflation, and unemployment on economic growth. The study applies an econometric model, with the estimation equation given below:

$$EG_{it} = \beta_0i + \beta_1i DE_{it} + \beta_2i INF_{it} + \beta_2i UNEMP_{it} + uit \quad (1)$$

In the proposed econometric model, the variable EG denotes economic growth, DE corresponds to defense spending, INF represents inflation, and UNEMP captures unemployment. All data was retrieved from the World Bank database. The model is estimated with panel data, which combines both cross-sectional and time-series dimensions. Since each cross-sectional unit is observed across the entire study period, the dataset constitutes a balanced panel. Within the framework of panel data econometrics, the most frequently employed approaches include the classical pooled model—where both the intercept and slope coefficients are assumed to remain constant across units and time—as well as models that allow the intercept to vary across units or across both units and time. Conventional estimations generally rest on the assumption of slope homogeneity; however, this assumption may not always be held in practice. In such instances, heterogeneous panel models are preferred, as estimating heterogeneous data under the restrictive homogeneity assumption can lead to substantial biases and inefficiencies in parameter estimates (Tatoğlu, 2012). The Random Coefficients Model (RCM) represents a heterogeneous static regression framework, initially developed by Hildreth and Houck as an extension of

Swamy’s (1970) model. The appropriateness of employing the RCM, particularly in relation to the assumption of parameter homogeneity, is typically evaluated through statistical procedures such as the F-test or Hausman-type tests, which assess whether the variability of parameters across cross-sectional units warrants the adoption of a heterogeneous specification (Tatoğlu, 2012).

The Seemingly Unrelated Regression (SUR) method is characterized by the absence of direct relationships between the explanatory variables of the equations in the system. The notion of “relatedness” or “unrelatedness” among the regressions pertains specifically to the correlation structure of their error terms rather than to the regressors themselves. First introduced by Zellner (1962), the SUR framework comprises a set of classical linear regression equations in which the explanatory variables of one equation do not appear in any other. Accordingly, the system is not simultaneous in nature, but potential efficiency gains in estimation arise when the disturbances across equations are contemporaneously correlated (Sümer, 2013). In panel data models, the presence of cross-sectional dependence implies that individual units cannot be treated as independent entities. Under such circumstances, the system can be appropriately analyzed within the framework of the Seemingly Unrelated Regression (SUR) model. The SUR approach is particularly suitable when intercept and slope parameters are allowed to vary across units, while contemporaneous correlation among the error terms is assumed to exist. Consequently, the SUR methodology provides a viable alternative to estimators explicitly designed to account for inter-unit correlation (Tatoğlu, 2012).

## 5. Empirical Results

Presented below are the estimation results for the random coefficients model (Swamy), derived using a linear regression approach:

**Table 1:** Random Coefficient Model Results (Swamy)

VARIABLES	COEFFICIENTS/ PROBABILITY VALUES (p)
DE	-0.0651 (0.634)
INF	0.0006 (0.807)
UNEMP	-0.0238 (0.003)***
C	9.1308 (0.000)***
WALD TEST	8.96 (0.0298)**
HAUSMAN TEST	1641.28 (0.000)***

**Note:** \*, \*\*, and \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively.

Based on the results presented above, the Wald test statistic, which assesses the joint significance of the independent variables—defense spending, inflation, and unemployment—on the dependent variable, economic growth, indicates overall significance. However, when considered individually, defense spending and inflation are not statistically significant, whereas unemployment is. Specifically, a one-unit increase in unemployment is associated with a 2% decline in economic growth.

The value reported at the bottom of Table 1 corresponds to the Hausman test statistic, which was employed to evaluate whether the model parameters exhibit variation across country units. The test results lead to the rejection of the null hypothesis of parameter constancy, indicating significant heterogeneity in the parameters. A unit-level examination further corroborates this finding, revealing that the parameters indeed differ across units. Detailed estimation results for each country unit are provided in Table 2.

**Table 2:** Group Specific Coefficients (Swamy)

MODELS FOR COUNTRIES	DE	INF	UNEMP
ALBANIA	-0.1646* (0.099)	-0.0014 (0.460)	-0.0450*** (0.000)
BOSNIA AND HERZEGOVINA	-0.4857*** (0.000)	-0.0025 (0.122)	-0.0154*** (0.000)
CROATIA	0.2638*** (0.008)	0.0072*** (0.000)	-0.0211*** (0.000)
NORTH MACEDONIA	-0.0303 (0.207)	0.0004 (0.790)	-0.0182*** (0.000)
SERBIA	0.0915 (0.189)	-0.0005 (0.788)	-0.0195*** (0.000)

**Note:** \*, \*\*, and \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively.

The analysis indicates that the defense expenditure variable is statistically significant for Albania (1), Bosnia and Herzegovina (2), and Croatia (3), highlighting its varying impact across the countries studied. In contrast, the inflation variable attains statistical significance solely in the case of Croatia (3), suggesting a more limited role in influencing economic growth across the sample. Notably, the unemployment variable demonstrates robust statistical significance for all countries considered, underscoring its consistent relevance as a determinant of economic performance.

Examining the specific effects of defense spending, the results reveal a heterogeneous pattern: the coefficient for defense spending is negative for Albania (1) and Bosnia and Herzegovina (2), indicating that higher defense expenditures are associated with a reduction in economic growth in these countries. Conversely, the corresponding coefficient for Croatia (3) is positive, suggesting that increased defense spending contributes to economic growth in this context. These findings underscore the importance of country-specific institutional, economic, and policy contexts in shaping the relationship between defense spending and economic performance. The divergent effects observed may reflect differences in fiscal allocation efficiency, the scale of defense spending relative to GDP, or broader macroeconomic conditions prevailing in each country.

The following section reports the outcomes of our model estimation conducted via the Seemingly Unrelated Regression (SUR) approach.

**Table 3:** Seemingly Unrelated Regression (SUR) Model General Results

MODELS	R2	CHI2	PROB.
EG(ALBANIA)	0.5016	22.84	0.0000
EG (BOSNIA AND HERZEGOVINA)	0.9617	643.22	0.0000
EG(CROATIA)	0.7056	53.88	0.0000
EG (NORTH MACEDONIA)	0.9601	609.65	0.0000
EG(SERBIA)	0.7166	49.87	0.0000

The results for the coefficient of determination ( $R^2$ ) and the Wald test statistics for all sub-models corresponding to the individual units are presented. The statistical significance of the Wald test statistics across all models underscores the overall significance of the models, confirming that the included independent variables collectively contribute to explaining variations in the dependent variable.

Examining the  $R^2$  values in detail, Albania (1) exhibits the lowest value at 50%, indicating a moderate level of explanatory power for the model in this context. In contrast, Bosnia and Herzegovina (2) and North Macedonia (4) attain the highest  $R^2$  values at 96%, reflecting a strong capacity of the models to account for variation in the dependent variable within these units. The generally high  $R^2$  values across the sub-models suggest that the models demonstrate robust explanatory performance overall, effectively capturing the underlying relationships between the independent and dependent variables.

These findings provide valuable insights into the heterogeneity of model performance across different units, highlighting both the variability and the consistency of explanatory power across the countries considered. Detailed estimation results for each unit, specifically within the framework of the Seemingly Unrelated Regression (SUR) models, are summarized in Table 4.

**Table 4:** Seemingly Unrelated Regression (SUR) Model Coefficient Results

MODELS FOR COUNTRIES	DE	INF	UNEMP
ALBANIA	-0.0848 (0.142)	-0.0026 (0.869)	-0.0428*** (0.000)
BOSNIA AND HERZEGOVINA	-0.4372*** (0.000)	-0.0017 (0.381)	-0.0143*** (0.000)
CROATIA	0.0622 (0.328)	0.0096** (0.035)	-0.0199*** (0.000)
NORTH MACEDONIA	-0.0265* (0.070)	0.0002 (0.866)	-0.0164*** (0.000)
SERBIA	0.1085** (0.034)	0.0036 (0.360)	-0.0138*** (0.000)

**Note:** \*, \*\*, and \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively.

An examination of the results at the individual country level reveals heterogeneous effects of defense spending on economic growth. Specifically, defense expenditures exhibit a negative impact on economic growth in Bosnia and Herzegovina (2) and North Macedonia, indicating that higher allocations to defense in these countries may be associated with slower economic performance. Conversely, in Serbia (5), defense spending demonstrates a positive effect, suggesting that increased defense investment may contribute to economic expansion in this context. For Albania (1) and Croatia (3), the analysis finds no statistically significant relationship between defense spending and economic growth, implying that defense expenditures do not exert a measurable influence on economic performance in these countries.

Regarding labor market conditions, the unemployment variable consistently exerts a statistically significant effect on economic growth across all countries under consideration, highlighting its robust and pervasive influence on macroeconomic performance. In contrast, the inflation variable attains statistical significance only in Croatia (3), suggesting that inflationary pressures have a meaningful impact on economic growth solely within this national context.

These findings emphasize the importance of considering country-specific institutional, economic, and policy frameworks when assessing the determinants of economic growth. Differences in defense spending's impact may stem from fiscal efficiency, how budgets are allocated, or overall macroeconomic conditions. Similarly, the consistent significance of unemployment emphasizes the central role of labor market dynamics in influencing growth trajectories across the region.

**Table 5:** Seemingly Unrelated Regression Model Correlation Matrix

	EG1	EG2	EG3	EG4	EG5
EG1	1.0000				
EG2	0.5616	1.0000			
EG3	0.7791	0.3496	1.0000		
EG4	0.5302	0.6131	0.3650	1.0000	
EG5	0.5626	0.5636	0.6699	0.5751	1.0000

An examination of the correlation matrix for the residuals across units reveals substantial inter-unit correlations, exceeding 50% in several cases. Notably, Albania (1) exhibits correlations above 50% with all other countries; Bosnia and Herzegovina (2) shows strong correlations with North Macedonia (4) and Serbia (5); Serbia (5) is highly correlated with North Macedonia (4); and Croatia (3) is correlated with Serbia (5). The presence of inter-unit correlation is formally tested using the Breusch-Pagan Lagrange Multiplier test, which yields a Chi2(10) value of 58.474 with a p-value of 0.000, leading to the rejection of the null hypothesis of no inter-unit correlation. These results confirm the existence of significant inter-unit correlation across the countries considered.

Consequently, this estimator can accommodate inter-unit correlation, allowing for separate parameter estimates for each unit while accounting for the correlations among them. It is important to note that, for the estimation of Seemingly Unrelated Regression (SUR) models, rejection of the null hypothesis in the Breusch-Pagan Lagrange Multiplier test is a prerequisite, as it justifies the application of the SUR framework to account for the interdependence between units.

## 6. Discussion

An examination of the empirical findings reveals that, within the Swamy model, defense expenditures exert a measurable influence on economic growth in Albania, Bosnia and Herzegovina, and Croatia; however, the direction of this effect is not uniform across countries. Specifically, the effect is negative in Albania and Bosnia and Herzegovina, while a positive association is observed in Croatia. The results obtained from the SUR model further indicate that defense expenditures significantly affect economic growth in Bosnia and Herzegovina, North Macedonia, and Serbia. In this framework, the effect is negative in Bosnia and Herzegovina and North Macedonia, but positive in Serbia. These findings highlight the analytical value of country-specific assessments over generalized conclusions. Additionally, defense spendings have measurable effects on economic growth in various countries and across model specifications, indicating that further analysis of this relationship is relevant for the Western Balkan context.

These findings suggest that the impact of defense spending on economic growth is contingent upon a range of structural and contextual factors, including the composition of a country's economy, the degree of political stability, the capacity of its defense industry, and its foreign policy priorities. In smaller and more fragile economies, fiscal constraints and the reallocation of resources from non-defense sectors to defense spending may exert a contractionary effect on growth. This dynamic is reflected in the negative outcomes observed for Albania, Bosnia and Herzegovina, and North Macedonia. By contrast, in countries with relatively more developed defense industries or with strong strategic positions in the regional security architecture, defense expenditures may foster economic growth through channels such as job creation, technology transfer, and stimulation of investment. In this regard, the positive effects identified in Croatia—an EU member state—and Serbia—a country with notable strategic influence—illustrate how defense spending can function as a driver of economic performance under certain conditions.

Accordingly, the findings underscore the heterogeneous character of the relationship between defense expenditures and economic growth in the Western Balkan countries, demonstrating that this nexus cannot be adequately captured by uniform theoretical frameworks. This highlights the critical importance of country-specific analyses in order to account for national differences. Moreover, the region's political fragility, ongoing NATO and EU integration processes, evolving security strategies, and the growing involvement of external actors indicate that the relationship between defense spending and economic performance should be examined not only through economic variables but also within the broader context of regional stability and security. Indeed, economic

security and national security are inherently interdependent and cannot be meaningfully disentangled.

Regarding the empirical findings, the negative impact of defense spending on economic growth in Bosnia and Herzegovina can be attributed to the limited allocation of resources toward growth-enhancing channels, such as research and development, domestic production, and logistics infrastructure. In Albania, where defense spending reached record levels in 2023, modernization initiatives—including the development of new air and naval bases—have been pursued in line with NATO membership obligations and regional security concerns. The modernization of the air force along with efforts to revitalize the domestic military industry, are notable. However, the consumption-heavy nature of these expenditures, particularly the reliance on imported goods, may have limited their contribution to domestic economic growth. As a NATO member, North Macedonia has substantially increased its defense spending in recent years, primarily through investments aimed at military modernization and NATO interoperability. This expansion may exert negative effects on economic growth by placing additional pressure on the public budget, thereby constraining expenditures in growth-promoting areas such as infrastructure, education, and healthcare. Serbia, which maintains the highest defense spending in the region, emphasizes both domestic production in the defense industry and the development of technological capabilities through international cooperation. In this context, defense expenditure positively contributes to economic growth, as investments in domestic production generate a direct multiplier effect on the national economy. As both an EU and NATO member, Croatia is required to increase its defense spending to meet alliance objectives and maintain regional stability. Defense expenditures in Croatia positively influence economic growth, owing to the country's substantial production capacity, well-established growth channels, and the integration of defense spending with domestic manufacturing, technological development, and strategic infrastructure.

For Türkiye, the security and stability of the Balkans hold particular strategic significance. From geopolitical and geostrategic perspective, the region occupies a pivotal position, and its stability directly influences Türkiye's own security environment. Historical, cultural, and geographical linkages further reinforce the region's importance, while both the Turkish communities residing in the Balkans and the sizable Balkan-origin population within Türkiye constitute a valuable bridge for strengthening bilateral and multilateral ties. Beyond security considerations, the Balkans also represent a critical sphere for economic cooperation and investment, given their strategic location for safeguarding Türkiye's trade routes with Europe as well as its energy and transportation corridors. Moreover, enhanced engagement with Balkan countries is essential for

Turkiye in addressing the challenges it faces in its European integration process. In this regard, Turkish foreign policy increasingly positions cooperation with the Western Balkans as a complementary dimension of its pursuit of EU membership (Tahirovic, 2014).

For these reasons, examining the economic effects of defense expenditures in the Western Balkan countries contributes not only to the academic literature but also to the formulation of Türkiye's foreign policy and security strategies. In this regard, the findings of this study concerning the Western Balkan countries hold important implications for Türkiye's regional policies and economic strategies. In particular, the positive effects observed in Serbia and Croatia present both a model case and an opportunity for enhanced cooperation with Türkiye. These countries, by generating measurable benefits from defense spending, may possess specialized capacities in certain segments of the defense industry. Given its status as the most advanced defense system in the region, Türkiye is well positioned to integrate such unique capabilities into its own supply chain. This would strengthen Türkiye's role not only as a supplier, but also as a regional technology partner and system developer. A strategic objective should therefore be to support Serbia and Croatia in further amplifying the growth-enhancing effects of their defense expenditures through Turkish technology and investment. Establishing agreements that promote joint production and technology transfer could serve as a priority policy avenue. Furthermore, incorporating these two countries into the international marketing networks of the Turkish defense industry may contribute to the creation of a regional framework of trust, interdependence, and shared prosperity. In Albania, Bosnia and Herzegovina, and North Macedonia, the main reason defense spending reduces growth may be import dependency and the crowding-out effect. Instead of directing these countries' defense spending toward imports, Türkiye should focus on projects that will increase economic capacity in these countries. By strengthening the economic foundations of these countries through development aid and cooperation focused on non-defense, civilian, and productive economic sectors, Türkiye can consolidate its position as a key player not only in military but also in economic integration and regional prosperity.

## 7. Conclusion

Estimates derived from Swamy's Random Coefficients Model and Seemingly Unrelated Regression (SUR) analysis (2007-2024) of five Western Balkan countries (Albania, Bosnia and Herzegovina, Croatia, North Macedonia, and Serbia) indicate that the impact of defense spending on economic growth is heterogeneous. Specifically, positive effects observed in Croatia (an EU

member) and Serbia (a country with strategic influence) suggest that defense spending acts as an economic growth driver under certain conditions, a dynamic contrasted by the negative outcomes found in Albania, Bosnia and Herzegovina, and North Macedonia. The findings for Croatia and Serbia are in line with Benoit (1978), Biswas (1992), and Murdoch, Pi, and Sandler (1997); while for Albania, Bosnia and Herzegovina and North Macedonia are with Deger and Sen (1983), Faini, Annez, and Taylor (1984), and Başar and Künü (2012).

The findings indicate substantial cross-country variation in the defense–growth nexus, highlighting the need for country-level analyses. The negative effect of defense spending in Bosnia and Herzegovina stems from insufficient investment in growth-enhancing areas such as R&D, domestic production, and logistics infrastructure. In Albania, defense spending surged to record levels in 2023 due to modernization efforts aligned with NATO commitments. However, the consumption-oriented structure of these expenditures—largely dependent on imports—likely limited their positive contribution to domestic economic growth and negative effect is observed in the analysis. In North Macedonia, rising defense spending driven by NATO modernization requirements may negatively affect economic growth by increasing budgetary pressures and reducing fiscal space for growth-supporting public expenditures. In Serbia, defense spending supports economic growth, as investments are closely tied to domestic defense production and generate strong multiplier effects. In Croatia, defense spending positively affects growth due to substantial production capacity and its integration with domestic industry, technology, and strategic infrastructure.

Several policy measures can be implemented to enhance the positive contribution of defense spending to economic growth in the region. Prioritizing allocations toward the domestic defense industry, technology transfer, and military R&D—rather than consumption-oriented expenditures—would strengthen regional production capacity. Furthermore, defense-related infrastructure investments that ensure the security of logistics and trade corridors can mitigate economic vulnerabilities by safeguarding the continuous supply of energy and intermediate goods. In this regard, integrating defense expenditures with strategic infrastructure planning and logistics security is essential for reinforcing the broader economic growth framework.

Given historical ties, cultural influence, and vital geopolitical position bridging Europe and Asia, the relations between Türkiye and the Western Balkan Countries are of paramount and enduring significance, shaping not only regional security dynamics but also the prospects for strategic cooperation, economic development, and cultural exchange across Southeastern Europe. The security and stability of the Balkans constitute a matter of profound strategic significance for Türkiye, as developments in this proximate region have the potential to

directly impact Türkiye's geopolitical objectives, foreign policy alignments, and the welfare of its historical and cultural connections with the region's diverse populations. Consequently, the analysis of the economic effects of defense expenditures within the Western Balkan countries is of critical importance, contributing substantially not only to the academic literature on defense economics and regional development but also to providing empirical grounding essential for the effective formulation of Türkiye's foreign policy and long-term security strategies in the region.

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