



The Impact of Military Allocations on Economic Development: Insights from the South Caucasus Region

Ramil I. Hasanov^{1*}, Tural Rustamov^{2,3}, Aziz Alibeyli^{4,5}, Emiliya Huseynova¹, Arzu Safarli⁶

¹Mingachevir State University, Mingachevir, Azerbaijan; ²Azerbaijan Technological University, Ganja, Azerbaijan; ³The Economic Scientific Research Institute, Baku, Azerbaijan; ⁴Social Research Center, Baku, Azerbaijan; ⁵Baku State University, Baku, Azerbaijan; ⁶Azerbaijan Technical University, Baku, Azerbaijan. *Email: ramil.hasanov@mdu.edu.az

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ABSTRACT

The shifting geopolitical landscape, along with ongoing global political changes, necessitates a comprehensive reassessment of military expenditures within national governance frameworks. The South Caucasus region, characterized by complex and enduring geopolitical challenges stemming from centuries of military conflict, serves as a critical case for this exploration. This study investigates the role of military spending within the region's political and economic frameworks, focusing on its impact on economic growth and military capabilities. Specifically, it analyzes the relationship between military expenditure and GDP per capita in Azerbaijan, Armenia, and Georgia, employing the Granger causality test for the period from 1996 to 2022. The empirical results show a bidirectional causality between military expenditure and GDP per capita in Azerbaijan, indicating a reciprocal relationship between these variables. In contrast, both Armenia and Georgia exhibit unidirectional causality, where economic growth influences military spending, suggesting that economic performance is a key determinant in defense budgeting decisions in these countries. Beyond econometric analysis, the study incorporates an ethical perspective, exploring how military spending, shaped by factors such as geopolitical pressures, technological innovations, and security concerns can influence economic development. By examining the broader implications of military budgets on national identity, sovereignty, and regional stability, this research offers valuable insights for policymakers.

Keywords: Military Expenditure, Economic Growth, Econometrics, Political Economy, Geopolitics, The South Caucasus, Azerbaijan

JEL Classifications: F5, F43, 047

1. INTRODUCTION

In the sphere of global politics, states engage in an enduring struggle for power, relying on their military capabilities as the primary means to safeguard their interests and exert influence over potential allies or rivals worldwide (Troxell, 2004). In the contemporary context, the foundation of sovereignty for modern nation-states is deeply entrenched in the strength of their armed forces. Military prowess stands as a critical prerequisite for maintaining geopolitical stability and order. Within the framework of international relations, military power assumes a paramount role as a cornerstone of global security, particularly for states wielding

substantial political and economic influence. Consequently, military power emerges as a central and extensively studied subject within the discipline of international relations, reflecting its significance in shaping the dynamics of the international system.

The capability of states to construct military prowess is indisputably affected by elements such as wealth, technological advancements, and the acquisition of human capital (Brooks, 2007). Even during the 18th century, Smith (1776) elucidated that the primary drivers of a nation's wealth are found within its economic structure. From this perspective, the contemporary trajectory of the correlation between economic progress and military prowess holds strategic

importance for scientific inquiry. From an economic perspective, a nation proficient in protecting its territorial integrity, resources, and trade pathways gains significant advantages, with military strength potentially catalyzing economic growth if properly employed. Furthermore, states with formidable military capacities can ensure the safety and growth of their populations, preserve environmental and natural assets, impact political stability, propel technological progress, and to some degree, enforce cultural standards on less powerful entities (ISA, 2018).

GDP encapsulates the overall monetary or market value of all completed goods and services manufactured within a nation’s boundaries during a defined timeframe, offering a comprehensive snapshot of the country’s economic condition and performance (Fernando, 2023). As the possessor of the largest economy globally, alongside its extensive network of overseas military bases and leadership roles within various international institutions, the United States undeniably commands a position of unparalleled global power and influence. In this regard, it is not incidental that the US has maintained its position as the top spender on military expenditure for many years. The Global Firepower ranking meticulously assesses more than 60 individual factors to determine and assign nations a power index score. These factors span various categories, including the quantity of military units, financial stability, logistical capabilities, and geographical advantages (GFP, 2024).

Table 1 presents the ranking of the ten most formidable military forces globally, alongside the positioning of South Caucasus nations within this ranking. This underscores the ongoing competition within the military sphere among countries endowed with significant global economic power and resources.

After the disintegration of the USSR, the countries of the South Caucasus embarked on a shift toward a capitalist economic model. With the demise of the socialist system characterized by centralized planning, the previously integrated economic framework unraveled, leading to heightened economic difficulties in the region during the initial decade of independence. However, a significant upturn in economic fortunes ensued following Azerbaijan’s signing of strategic oil agreements and subsequent initiation of extensive export activities. Georgia and Armenia have endeavored to bolster their economies through initiatives aimed at fostering growth in sectors such as agriculture, mining, tourism, and trade.

Table 1: Latest global firepower review

Rank	Country	Power index
1	US	0.0699
2	Russia	0.0702
3	China	0.0706
4	India	0.1023
5	S.Korea	0.1416
6	UK	0.1443
7	Japan	0.1601
8	Turkiye	0.1697
9	Pakistan	0.1711
10	Italy	0.1863
59	Azerbaijan	0.9934
84	Georgia	1.6969
102	Armenia	2.0583

Source: GFP (2024)

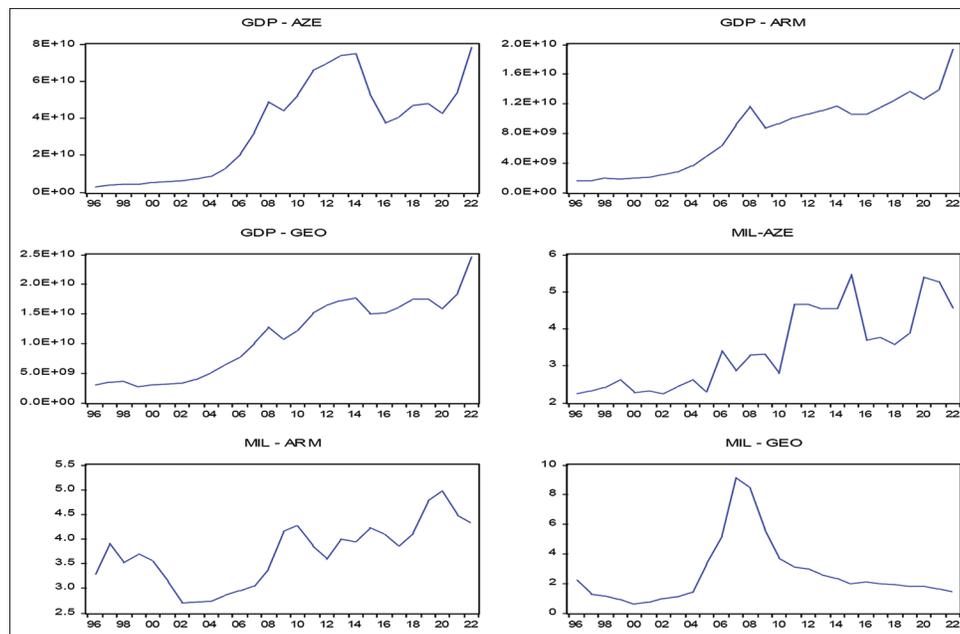
In 2022, Azerbaijan’s GDP attained \$78.7 billion, reflecting a 4.6% rise from the preceding year. Azerbaijan’s economy, as a major energy producer, has been substantially impacted by changes in oil prices (Gulaliyev, et al., 2024; Hasanov, et al., 2025). Noteworthy is the robust expansion of its non-oil GDP by 9.1% during this period, juxtaposed with a 2.7% decline in oil GDP. The industrial sector accounted for the largest share of Azerbaijan’s GDP at 51.1%, followed by trade and automotive repair at 8.2%, transport and logistics at 6%, construction at 4.8%, agriculture, forestry, and fisheries at 4.8%, hospitality services at 1.6%, information and communications at 1.4%, and taxes at 7.4%. Moreover, the country witnessed a significant uptick in foreign trade, amounting to 55.4% or \$52.7 billion in 2022 (ITA, 2023a).

Armenia, despite its small market size and ongoing geographical and geopolitical challenges, including the closure of two of its four international borders, has maintained a robust economic performance. In 2022, driven by substantial foreign exchange inflows, migrant remittances, and improvements in the business environment, the country achieved impressive real GDP growth of 12.6%. Imports into Armenia surged by nearly 64% to \$8.8 billion in 2022, with major categories including petrochemicals, precious stones, consumer goods, vehicles, equipment, and machinery. Key import partners for Armenia included Russia, China, Iran, the United Arab Emirates, Germany, Italy, Georgia, and the United States. Additionally, Armenian exports surpassed \$5.4 billion in 2022, representing a substantial 78% increase from the previous year (ITA, 2023b). Georgia, with a per capita GDP of \$6,672 in 2022, functions as a small transitional market economy strategically positioned between Europe and Asia. Its geographic location as a vital logistics and transit hub facilitates trade between Asia and Europe via the Caucasus. Notably, Georgia has sustained steady economic growth, expanding by 10.5% in 2021 and 10.2% in 2022. The country’s commitment to economic reforms is evident in its favorable rankings by reputable international organizations. Additionally, in 2022, the EU, China, Azerbaijan, Russia, and Turkey were among Georgia’s primary export markets (ITA, 2023c).

The Figure 1 illustrates GDP and military expenditure trends from 1996 to 2022 in Azerbaijan, Armenia, and Georgia, highlighting Azerbaijan’s significant economic growth and rising military spending, likely reflecting its regional influence and security needs. In contrast, Armenia and Georgia show more stable military expenditures correlated with their geopolitical challenges, indicating varying national priorities in response to historical conflicts and regional stability. The graphical depiction highlights that Azerbaijan’s GDP metrics notably surpass those of its counterparts. This disparity can be attributed to the upsurge in oil exports that began in the early 2000s.

The Caucasus region’s geopolitical dynamics have made it prone to conflict throughout history, with wars and disputes erupting in all three South Caucasus countries over the past three decades alone. As the Soviet Union collapsed, Azerbaijan and Armenia became locked in a conflict lasting more than 30 years, triggered by renewed separatist claims to Karabakh. This protracted state of warfare has inflicted considerable political, economic, and human costs on both nations and the broader region (Askerov, 2020).

Figure 1: Graphical descriptions of GDP and Military Expenditure (% of GDP) Trends in South Caucasus Countries (1996-2022)



Data source: World Bank

In the early 1990s, Azerbaijan’s economic and political underdevelopment had significant adverse repercussions on its military status. Consequently, Karabakh and its surrounding regions fell under the control of occupying Armenian forces. However, subsequent economic progress and political determination in Azerbaijan played a pivotal role in bolstering the military, ultimately leading to the liberation of the territories.

Another country in the region, Georgia, has similarly been impacted by warfare, with ongoing tensions initiated by Russia remaining unresolved (Beehner et al., 2018). The persistent warfare and geopolitical complexities in the region have underscored the significance of military power, particularly for Azerbaijan, which has faced territorial occupation by neighboring Armenia. The ongoing threat posed by the occupation of Karabakh represents a constant challenge to Azerbaijan’s state sovereignty, elevating it to the forefront of the country’s political agenda. Consequently, a substantial portion of Azerbaijan’s burgeoning economic resources has been allocated towards enhancing, modernizing, and technologically advancing its military capabilities.

The interplay of economic development and military factors has significantly influenced the evolution of specific frameworks and approaches. In the context of Azerbaijan, which is recognized as the leading military power in the region, distinctive ethical paradigms have emerged. These paradigms have been shaped by the intricate interaction between military-political strategies, the post-conflict realities following the liberation of territories occupied for over three decades, ethical considerations, and the humanitarian dimensions of post-conflict recovery.

The prolonged environment of military-political engagement has profoundly redefined Azerbaijan’s internal governance and external relations, fostering the development of novel ethical and political paradigms. In the post-war period, the government has

prioritized the rehabilitation, reconstruction, and reintegration of liberated territories. Central to these efforts is the commitment to ensuring the safe and dignified return of internally displaced persons to their ancestral lands, reflecting adherence to modern ethical standards rooted in international law and humanitarian principles. These initiatives aim to advance peacebuilding and sustainable development in the aftermath of conflict (MFA, 2022).

The complexities of the ethical, political, and social transformations emerging after the Second Karabakh War have garnered increasing scholarly attention globally. In particular, the ethical implications of peace negotiations are being analyzed in the context of their influence on national identity, sovereignty, and regional stability, offering significant insights into the broader ramifications of these developments.

2. LITERATURE REVIEW

The exploration of the interconnectedness between economic dynamics and military capabilities remains a vital focus of scholarly inquiry. Kapstein’s seminal research (1989) delved deeply into the theoretical foundations and political implications of this intricate relationship. Expanding upon Kapstein’s groundwork, Dumas (1990) conducted a strategic analysis, situating the discourse within the broader framework of national security concerns. These scholarly endeavors offer valuable insights into the multifaceted nature of the link between economic prosperity and military strength, enriching our understanding of strategic policymaking and decision-making processes. Beckley (2010) examines the determinants impacting a nation’s military strength, proposing that intangible factors such as democracy and cultural aspects might not substantially bolster military efficacy as previously presumed. Surprisingly, economic development emerges as the predominant factor shaping military capability, challenging conventional wisdom and highlighting the importance

of incorporating both resource quantity and economic progress in defense planning and scholarly examinations within the field of international relations. In their study, Aizenman and Glick (2006) examine a perplexing trend in economic growth literature: despite often yielding non-significant or negative effects on growth, many nations allocate a substantial portion of their GDP to defense and military expenditures. Through empirical analysis, the research delves into the nonlinear connections between military spending, external threats, corruption, and other pertinent variables. Apart from these, Yesilyurt and Yesilyurt (2019) conduct a meta-analysis to examine the impact of military expenditures on economic growth, employing diverse study samples and methodologies. Their study tests the null hypothesis that military expenditure does not have a significant effect on growth across different samples, revealing inconclusive evidence regarding a significant impact, with certain study characteristics influencing outcomes variably across samples.

Over the years, scholars have articulated numerous insights into the connection between defense expenditure and economic growth, considering a range of factors including military spending and GDP. The empirical investigation into the relationship between economic development and military expenditure is carried out utilizing methodologies found in various scholarly studies. Pieroni (2009) examines the impact of military spending on economic growth by incorporating both military and civilian components of government expenditure into an economic growth model with endogenous technology. Through empirical analysis, the study explores the hypothesis of a non-linear connection between military spending and economic growth, uncovering that the negative correlation between military expenditure and growth in countries with significant military burdens becomes significant only when accounting for a proxy for re-allocative effects within the growth framework. Moreover, an analogous methodology was explored, with *Turkiye* serving as a specific case study for further examination (Gokmenoglu et al., 2015). Various scientific studies have examined the analysis of different countries regarding the subject matter, all operating under the same underlying principle, as evidenced in numerous scholarly works (Abu-Bader and Abu-Qarn, 2003; Lobont et al., 2019; Gezer, 2022).

Dunne and Smith (2010) reviewed a substantial body of literature utilizing Granger non-causality (GNC) tests to examine the relationship between military expenditure and economic variables, specifically investigating the predictive capacity of one variable over another. Nonetheless, this study highlights the shortcomings of GNC tests, arguing that they may fail to adequately represent the substantive relationship between military spending and the economy. This inadequacy arises from concerns related to specification sensitivity, the necessity of a structural model to establish genuine causality, and the variability of results across different contexts and time frames. Su et al. (2020) investigated the causal relationship between defense expenditure and economic growth in China, uncovering a positive bidirectional causality that indicates increased defense spending can enhance economic growth and vice versa. By employing a rolling-window approach, their findings suggest that economic growth predominantly influences defense expenditure. However, this relationship is

subject to temporal fluctuations and is affected by various factors, including large-scale disarmament and institutional dynamics. Das et al. (2015) examined the causal relationship between GDP and military expenditure across a randomly selected sample of 20 countries from 1988 to 2013, employing appropriate time series econometric tools. Their findings revealed that GDP influenced military spending in seven countries, including France, Germany, and Italy, while military expenditure affected GDP in five nations, such as the USA, Canada, China, and India; bidirectional causality was observed in Italy and Australia, with no causality found in six countries, including the UK and Japan. Numerous research studies exist on similar topics across various research contexts. This article empirically analyzes the South Caucasus region from a comparable perspective.

3. DATA AND METHODOLOGY

For the research to proceed, several essential parameters needed to be established. This included acquiring data on military expenditure and total GDP for the countries under investigation, which could be sourced from a variety of global and local databases. Notably, prestigious international institutions such as the World Bank (2023) and IMF (2023) provided valuable datasets, while local state statistical offices like ARDSK offered pertinent information tailored to specific regions.

Table 2 presents a comprehensive statistical analysis of GDP and military expenditures for Azerbaijan, Armenia, and Georgia. It encompasses critical metrics, including mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque-Bera statistic, which are vital for assessing the distribution and variability of these economic indicators.

This study employed data on gross domestic product and military expenditures for Azerbaijan, Armenia, and Georgia to examine their interrelationships and causal dynamics. The GDP variables are specified as GDP_AZE for Azerbaijan, GDP_ARM for Armenia, and GDP_GEO for Georgia, while military expenditures are denoted as MIL_AZE, MIL_ARM, and MIL_GEO for their respective countries.

The initial fundamental methodological characteristic of the research involves elucidating the foundational economic and military components within the conflict zone and specialized strategic geopolitical domain. The central hypothesis posits the synthesis of military capability with economic advancement, thereby establishing essential coherence rooted in epistemological principles. When analyzed from this standpoint, the logical linkages between economic and military correlation become evident, taking into consideration the prevailing political circumstances. In the methodological underpinning of the research, comprehensive statistical assertions were formulated, accompanied by the differentiation of variables and the conduct of correlation analyses from multiple perspectives.

The connection between MIL and GDP has often been explored using Granger causality (1969), employing simple two-variable models. The Granger causality test, a statistical method utilized

Table 2: Descriptive analysis of variables

Statistic	GDP_AZE	GDP_ARM	GDP_GEO	MIL_AZE	MIL_ARM	MIL_GEO
Mean	3.52E+10	8.08E+09	1.11E+10	3.461490	3.710672	2.646732
Median	4.09E+10	9.26E+09	1.22E+10	3.325422	3.849731	1.969743
Maximum	7.87E+10	1.95E+10	2.48E+10	5.464877	4.982544	9.159117
Minimum	3.18E+09	1.60E+09	2.80E+09	2.243314	2.697715	0.615582
Standard deviation	2.59E+10	4.94E+09	6.47E+09	1.083209	0.632283	2.166546
Skewness	0.110972	0.109527	0.083526	0.456060	0.0000673	1.853519
Kurtosis	1.641261	2.153538	1.799638	1.865768	2.190118	5.765041
Jarque-Bera	2.132360	0.860042	1.652372	2.383250	0.737898	24.06103
Probability	0.344321	0.650495	0.437716	0.303727	0.691461	0.000006
Sum	9.51E+11	2.18E+11	2.99E+11	93.46022	100.1882	71.46176
Sum Sq. Dev.	1.75E+22	6.35E+20	1.09E+21	30.50689	10.39433	122.0420

to ascertain causal relationships between time series variables, examines whether one variable can predict future changes in another. In this framework, the null hypothesis posits the absence of such causality, indicating that past values of one variable do not aid in forecasting future values of the other. The significance of the test is determined by assessing the P-values associated with the null hypothesis, with values below a predefined threshold indicating rejection of the null hypothesis and presence of Granger causality. All variables considered in these analyses were stationary time series. This model evaluates whether prior observations of one variable are indicative of forthcoming values of another. We may contemplate a straightforward two-variable model within this methodology:

$$\Delta GDP_t = \alpha + \beta_1 \Delta MilitaryExpenditure_t + \epsilon_t \tag{1}$$

or

$$\Delta MilitaryExpenditure_t = \alpha + \beta_1 \Delta GDP_t + \epsilon_t \tag{2}$$

In this scenario, the symbol Δ represents initial differences, with ϵ_t symbolizing the error term; analyzing the estimated coefficients (β_1) and their significance could suggest a causal association between military expenditure and GDP.

The Toda-Yamamoto Granger Causality test is employed when the variables exhibit differences in stationarity, addressing these inconsistencies by applying the appropriate $k+d_{max}$ principle to ensure valid inference. The Toda and Yamamoto (1995) causality test formulas can be described as follows:

$$LY_t = \alpha_0 + \sum_{i=1}^k \alpha_i LY_{t-i} + \sum_{j=k+1}^{d_{max}} \alpha_j LY_{t-j} + \sum_{i=1}^k \phi_i LE_{t-i} + \sum_{j=k+1}^{d_{max}} \phi_j LE_{t-j} + v_{1t} \tag{3}$$

$$LE_t = \beta_0 + \sum_{i=1}^k \beta_i LE_{t-i} + \sum_{j=k+1}^{d_{max}} \beta_j LE_{t-j} + \sum_{i=1}^k \delta_i LY_{t-i} + \sum_{j=k+1}^{d_{max}} \delta_j LY_{t-j} + v_{2t} \tag{4}$$

In this system, Y_t and X_t represent the dependent variables, while k denotes the optimal lag length determined by information criteria. d_{max} refers to the highest order of integration among the variables. ϵ_t and u_t are the error terms.

In this study, the Toda-Yamamoto Granger causality test is employed to examine the causal relationships between military expenditure and GDP per capita in Azerbaijan, Armenia, and Georgia. The following hypotheses are formulated for each country:

Azerbaijan:

- Null Hypothesis (H_0): Military expenditure does not Granger cause GDP per capita.
- Null Hypothesis (H_0): GDP per capita does not Granger cause military expenditure.

Armenia:

- Null Hypothesis (H_0): Military expenditure does not Granger cause GDP per capita.
- Null Hypothesis (H_0): GDP per capita does not Granger cause military expenditure.

Georgia:

- Null Hypothesis (H_0): Military expenditure does not Granger cause GDP per capita.
- Null Hypothesis (H_0): GDP per capita does not Granger cause military expenditure.

4. ECONOMETRIC RESULTS

A scatter plot visually represents the relationship between two variables on a Cartesian plane. It presents the data directly without summarization, with users typically focusing on graphical decisions such as line connections and color choices (Sarkar, 2008). The scatter plot depicted in Figure 2 reveals an upward trend in the relationship between Azerbaijan’s military expenditures and GDP, as indicated by the regression line. This trend is also observable in Armenia, albeit less prominently compared to Azerbaijan. However, the correlation appears notably weaker in Georgia, suggesting a less distinct relationship between military expenditures and GDP in that context.

Analyzing the simple correlations between variables provides an alternative perspective on current trends, allowing for a digital visualization of their relationships. Table 3 presents a correlation matrix that reveals robust positive correlations among the GDP of Azerbaijan, Armenia, and Georgia, signifying a close interrelationship in their economic outputs. Furthermore, the matrix highlights significant correlations between GDP and

Figure 2: Inspection of scatter plots

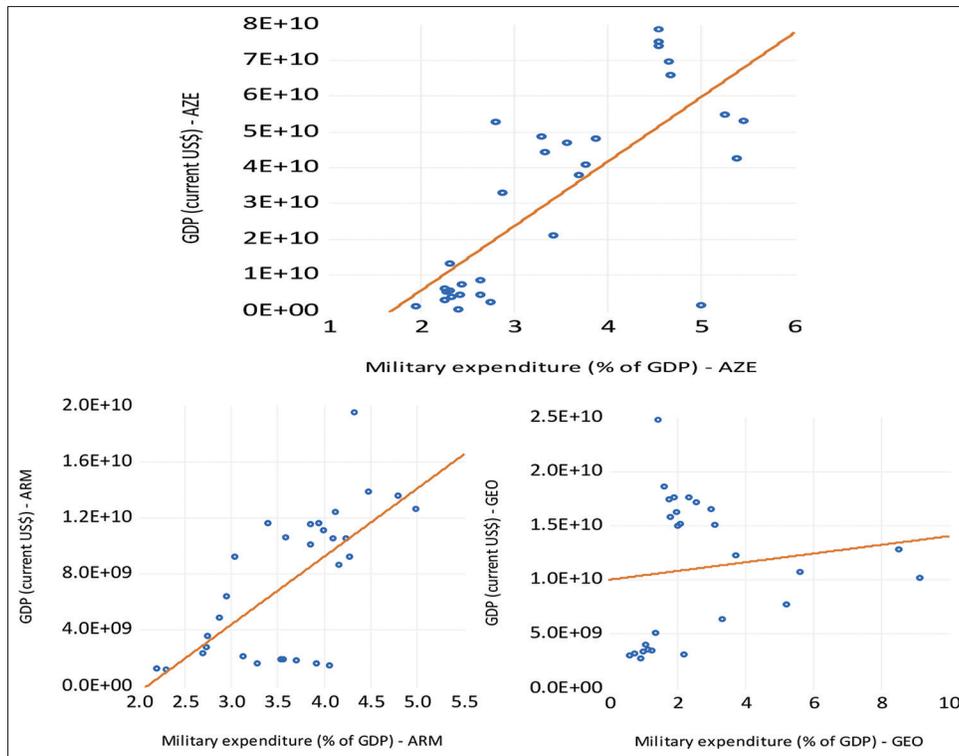


Table 3: Correlation analysis

Variables	GDP_AZE	GDP_ARM	GDP_GEO	MIL_AZE	MIL_ARM	MIL_GEO
GDP_AZE	1.000	0.900	0.934	0.829	0.608	0.242
GDP_ARM	0.900	1.000	0.982	0.808	0.673	0.242
GDP_GEO	0.934	0.982	1.000	0.848	0.694	0.134
MIL_AZE	0.829	0.808	0.848	1.000	0.684	0.020
MIL_ARM	0.608	0.673	0.694	0.684	1.000	-0.149
MIL_GEO	0.242	0.242	0.134	0.020	-0.149	1.000

military expenditure in each country, indicating that economic growth is associated with increased military spending.

The Augmented Dickey and Fuller (1979) test plays a significant role in econometric analysis as it assesses the stationarity of a time series, which is essential for reliable modeling and forecasting. The data is transformed into logarithmic form before conducting the ADF unit root test. The results of the ADF Unit Root Test presented in Table 4 demonstrate that the variables LGDP_AZE, LGDP_ARM, and LGDP_GEO are non-stationary in their levels but achieve stationarity after differencing, as indicated by the significant p-values at the first and second differences. Consequently, a simple Granger causality test is not applicable, necessitating the use of the Toda-Yamamoto Granger causality test.

The Toda-Yamamoto Granger Causality Test results in Table 5 analyze the causal relationships between military expenditure and GDP per capita in Azerbaijan, Armenia, and Georgia, using a lag length of 3 and K + dmax values ranging from 5 to 6.

In Azerbaijan, bidirectional causality is found as the null hypothesis that military expenditure does not Granger cause GDP per capita is rejected at the 5% significance level

Table 4: ADF unit root test

Variables	Level	1 st difference	2 nd difference
LGDP_AZE	-1.073 (0.709)	-2.467 (0.135)	-4.867 (0.0008*)
LGDP_ARM	-0.914 (0.767)	-3.168 (0.034*)	
LGDP_GEO	-0.537 (0.868)	-3.447 (0.018*)	
LMIL_AZE	-1.653 (0.442)	-7.193 (0.000*)	
LMIL_ARM	-1.248 (0.637)	-3.543 (0.015*)	
LMIL_GEO	-2.355 (0.163)	-2.904 (0.058)	-5.653 (0.0001*)

*Significant at 5% level

(Chi-squared = 9.811, P = 0.020), and the null that GDP per capita does not Granger cause military expenditure is rejected at the 1% level (Chi-squared = 30.725, P = 0.000).

In Armenia, no causality is found from military expenditure to GDP per capita (Chi-squared = 1.445, P = 0.229), but unidirectional causality is evident from GDP per capita to military expenditure (Chi-squared = 16.325, P = 0.000).

Table 5: The Toda-Yamamoto Granger causality test

Null hypothesis	Lag (k)	K+d _{max}	Chi-squared test	Conclusion
Military Expenditure in Azerbaijan (LMIL_AZE) does not Granger cause Gross Domestic Product Per Capita (LGDP_AZE)	3	5	9.811 (0.020*)	Reject
Gross Domestic Product Per Capita in Azerbaijan (LGDP_AZE) does not Granger cause Military Expenditure (LMIL_AZE)	3	5	30.725 (0.000*)	Reject
Military Expenditure in Armenia (LMIL_ARM) does not Granger cause Gross Domestic Product Per Capita (LGDP_ARM)	1	2	1.445 (0.229)	Fail to Reject
Gross Domestic Product Per Capita in Armenia (LGDP_ARM) does not Granger cause Military Expenditure (LMIL_ARM)	1	2	16.325 (0.000*)	Reject
Military Expenditure in Georgia (LMIL_GEO) does not Granger cause Gross Domestic Product Per Capita (LGDP_GEO)	2	4	2.628 (0.268)	Fail to Reject
Gross Domestic Product Per Capita in Georgia (LGDP_GEO) does not Granger cause Military Expenditure (LMIL_GEO)	2	4	6.587 (0.037*)	Reject

*Significant at 5% level

In Georgia, no causality is detected from military expenditure to GDP per capita (Chi-squared = 2.628, P = 0.268), but unidirectional causality is observed from GDP per capita to military expenditure (Chi-squared = 6.587, P = 0.037).

These results reveal bidirectional causality in Azerbaijan and unidirectional causality from GDP per capita to military expenditure in Armenia and Georgia.

The econometric analysis demonstrates a bidirectional causal relationship between military expenditure and economic growth in Azerbaijan, in contrast to Armenia and Georgia, where the relationship is unidirectional: GDP growth drives an increase in military spending. This one-sided relationship is typical in many countries, where military expenditure rises in response to economic growth, but conversely, military spending exerts a negative impact on economic growth (Desli and Gkoulgoutsika, 2021). Azerbaijan's distinctiveness lies in its developed military-industrial complex, which includes domestic arms production, military exports, and technological innovation. This enables military expenditure to function as an investment, driving economic growth by creating new industries, reducing unemployment, and fostering technological advancements. The defense sector's spillover effects enhance technological development across other industries, contributing to economic diversification and resilience. In contrast, the absence of a similar military-industrial infrastructure in Armenia and Georgia limits their ability to transform military spending into broader economic benefits, resulting in a more conventional fiscal relationship where military expenditure follows economic growth without significant feedback effects.

5. DISCUSSION

Econometric analyses serve as a cornerstone of contemporary economics, often producing results that challenge conventional theories. Traditional economic perspectives and logical reasoning generally suggest that military expenditure adversely affects economic development. However, empirical evidence from various countries has demonstrated the opposite. These findings are primarily attributed to the positive impacts of military spending, particularly the investments it generates indirectly, on economic growth. In Azerbaijan, this effect appears to be more pronounced

than in neighboring countries. The economic benefits of military production or related industries manifest primarily in areas such as exports, technological advancements, reduced unemployment, and innovation.

The Cold War and the post-colonial dynamics among major nuclear powers during the latter half of the 20th century, along with the alliances formed under these influences, significantly escalated global defense expenditures after the Second World War (SIPRI, 2024). The race for technological dominance among military alliances has driven small and medium-sized nations within these alliances—or those navigating between them politically—to increase their acquisition of military products. This trend ensures their preparedness for emerging technological shifts and new threats but simultaneously heightens their dependence on the central powers within these alliances. This dependency often restrains such nations' political and strategic autonomy. Initially reliant on purchasing finished military products, many of these nations gradually shift toward investments in research and development (R&D) and the creation of indigenous alternatives to reduce dependency over the medium to long term. Notable examples include Turkey and South Korea (Chun, 2017).

The proximity of conflict zones with high potential for military tension compels nations to align themselves with military alliances, often leading to substantial arms purchases driven by geopolitical considerations. In some instances, countries procure military assets from opposing sides to ensure political-military support in regional conflicts or to hedge against potential threats from their suppliers. For instance, countries such as Egypt, India, Pakistan, Saudi Arabia, and Thailand often adopt this dual approach. Over time, these recurring military expenditures catalyze the development of domestic capabilities. Initially, these countries establish local services for maintaining high-tech equipment, followed by the production of low-tech and subsequently high-tech spare parts. Eventually, they progress toward manufacturing complete systems and developing new indigenous products, thus retaining significant financial resources within their domestic economies (Auger, 2020; Hill, 2023). An illustrative example is Turkey's production of American F-16 jets alongside its development of the indigenous KAAN fighter jet. This kind of transition reduces foreign dependence, replaces costly imports with investments in the national economy, and eliminates restrictions on the deployment

and use of defense equipment. Moreover, it stimulates the growth of the domestic defense industry and its ancillary sectors (Deger and Smith, 1983). The technological expertise and industrial advancements acquired through such initiatives also benefit other sectors of the economy.

Consequently, the reduction of internal and external threats enhances national stability and security. These developments position nations as subregional or regional powers, enabling them to capitalize politically, socially, and economically on the opportunities available to central powers. Furthermore, as domestic military industries evolve, they diversify into international markets, expanding their customer base and generating foreign revenue. This growth necessitates additional labor, indirectly boosting employment and reducing unemployment.

In the context of Azerbaijan, econometric analyses can elucidate these dynamics and substantiate the potential contributions of military expenditures to economic development, demonstrating their multifaceted impact on national progress.

6. CONCLUSION

This study investigates the influence of conflict and the geopolitical context of the South Caucasus on military spending, analyzing these factors within the framework of political and economic dynamics. It offers a thorough examination of the interrelationships between military expenditure and economic growth in Azerbaijan, Armenia, and Georgia, all set against the region's intricate geopolitical landscape. By utilizing data on gross domestic product (GDP) and military expenditures, the research applies the Granger causality test to clarify the causal relationships among these variables. The findings indicate bidirectional causality between military expenditure and GDP per capita in Azerbaijan, with the Granger causality test producing a Chi-squared value of 9.811 ($P = 0.020$) for military expenditure's effect on GDP and a Chi-squared value of 30.725 ($P = 0.000$) for GDP's influence on military expenditure. In contrast, Armenia demonstrates unidirectional causality flowing from GDP to military expenditure, as evidenced by a Chi-squared value of 16.325 ($P = 0.000$), suggesting that economic growth informs military spending decisions. Likewise, Georgia shows unidirectional causality, with a Chi-squared value of 6.587 ($P = 0.037$) indicating the impact of GDP on military expenditures. These results highlight the distinct dynamics of military spending and economic growth across the three countries, reflecting varying strategic priorities and economic contexts. The robust positive correlations among the GDP figures suggest a certain level of economic interconnectedness within the region, while the significant relationships between GDP and military expenditures indicate that economic conditions significantly shape defense budgets.

This research offers essential insights for policymakers in the South Caucasus, emphasizing the importance of a nuanced understanding of the interdependencies between military expenditure and economic growth to guide strategic planning and budgetary decisions amid a shifting geopolitical landscape. In addition to the econometric results, military expenditure

is essential for reinforcing the macroeconomic framework by driving technological advancements, encouraging innovation, and generating employment within defense industries. The shift from reliance on imported military goods to the development of indigenous defense production strengthens national security, enhances economic stability, and improves geopolitical positioning. Furthermore, as domestic military industries mature, they contribute to economic diversification, foster job creation, and expand the nation's reach in international markets.

REFERENCES

- Abu-Bader, S., Abu-Qarn, A.S. (2003), Government expenditures, military spending and economic growth: Causality evidence from Egypt, Israel, and Syria. *Journal of Policy Modeling*, 25(6-7), 567-583.
- Aizenman, J., Glick, R. (2006), Military expenditure, threats, and growth. *Journal of International Trade and Economic Development*, 15(2), 129-155.
- ARDSK. (2023), Economic statistics. State Statistics Committee of the Republic of Azerbaijan. (In Azerbaijan language). Available from: <https://www.stat.gov.az>
- Askerov, A. (2020), The Nagorno Karabakh Conflict. Post-Soviet conflicts: The Thirty Years' Crisis, 55. *Post-Soviet Conflicts: The Thirty Years' Crisis*. Mayland: Lexington Books.
- Auger, M. (2020). Defense Procurement Organizations Worldwide: A Comparison. Library of Parliament. Available from: <https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/BackgroundPapers/PDF2019-52-e.pdf>
- Beckley, M. (2010), Economic development and military effectiveness. *The Journal of Strategic Studies*, 33(1), 43-79.
- Beehner, L., Collins, L., Ferenzi, S., Person, R., Brantly, A.F. (2018), Analyzing the Russian Way of War: Evidence from the 2008 conflict with Georgia. United States: VTechWorks Archives.
- Brooks, R. (2007), *Creating Military Power: The Sources of Military Effectiveness*. United States: Stanford University Press.
- Chun, I. (2017), Korean Defense Reform: History and Challenges. Brookings. Available from: <https://www.brookings.edu/articles/korean-defense-reform-history-and-challenges>
- Das, R.C., Dinda, S., Ray, K. (2015), Causal link between military expenditure and GDP-A study of selected countries. *International Journal of Development and CONFLICT*, 5(2), 114-126.
- Deger, S., Smith, R. (1983), Military expenditure and growth in less developed countries. *The Journal of Conflict Resolution*, 27(2), 335-353.
- Desli, E., Gkoulgkoutsika, A. (2021), Military spending and economic growth: A panel data investigation. *Economic Change and Restructuring*, 54(3), 781-806.
- Dickey, D.A., Fuller, W.A. (1979), Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a), 427-431.
- Dumas, L.J. (1990), Economic power, military power, and national security. *Journal of Economic Issues*, 24(2), 653-661.
- Dunne, J.P., Smith, R.P. (2010), Military expenditure and granger causality: A critical review. *Defence and Peace Economics*, 21(5-6), 427-441.
- Fernando, J. (2023), Gross Domestic Product (GDP): Formula and how to Use it. Available from: <https://www.investopedia.com/terms/g/gdp.asp>
- Gezer, M.A. (2022), The causality relationship between military expenditure and GDP in 12 NATO member countries based on per capita values. *Sosyoekonomi*, 30(52), 157-181.
- GFP. (2024), 2024 Military Strength Ranking. Available from:

- <https://www.globalfirepower.com/countries-listing.php>
- Gokmenoglu, K.K., Taspinar, N., Sadeghieh, M. (2015), Military expenditure and economic growth: The case of Turkey. *Procedia Economics and Finance*, 25, 455-462.
- Granger, C. (1969), Investigating causal relations by econometric models and cross-spectral methods. *Econometrica* 37(3), 424-438.
- Gulaliyev, M., Musayeva, J., Musayeva, F., Jabbarova, A., Hatamov, F. (2024), Effects of oil price shock on the exchange rate of national currencies in oil-rich countries: In the case of some Arab countries and Azerbaijan. *WSEAS Transactions on Business and Economics*, 21, 44-58.
- Hasanov, R.I., Vasa, L., Guliyeva, S., Giyasova, Z., Shakaraliyeva, Z. (2025). Assessing the impact of oil prices and inflation on bank deposits in Azerbaijan. *Banks and Bank Systems*, 20(1), 11-22.
- Hill, J. (2023), Top-performing Nations Across Defence in 2023. *Army Technology*. Available from: <https://www.army-technology.com/features/top-performing-nations-across-defence-in-2023>
- IMF. (2023), DATA. International Monetary Fund. Available from: <https://www.imf.org/en/data>
- ISA. (2018), The Importance of Military Power in the 21st Century. *International Strategic Analysis*. Available from: https://www.isa-world.com/news/?tx_ttnews%5bbackpid%5d=1&tx_ttnews%5btt_news%5d=411&chash=3c3785562e7d5a836189b87d09c8182e
- ITA. (2023c), Georgia-Market Overview. International Trade Administration. Available from: <https://www.trade.gov/country-commercial-guides/georgia-market-overview>
- ITA. (2023a), Azerbaijan-Market Overview. International Trade Administration. Available from: <https://www.trade.gov/country-commercial-guides/azerbaijan-market-overview>
- ITA. (2023b), Armenia-Market Overview. International Trade Administration. Available from: <https://www.trade.gov/country-commercial-guides/armenia-market-overview>
- Kapstein, E.B. (1989), Economics and military power. *Naval War College Review*, 42(3), 97-111.
- Lobont, O.R., Glont, O.R., Badea, L., Vatavu, S. (2019), Correlation of military expenditures and economic growth: Lessons for Romania. *Quality and Quantity*, 53, 2957-2968.
- MFA. (2022), Post Conflict Rehabilitation, Reconstruction and Reintegration. Republic of Azerbaijan Ministry of Foreign Affairs. Available from: <https://mfa.gov.az/en/category/end-of-the-conflict-in-november-2020-and-post-conflict-situation/post-conflict-reconstruction-rehabilitation-and-reintegration>
- Pieroni, L. (2009), Military expenditure and economic growth. *Defence and Peace Economics*, 20(4), 327-339.
- Sarkar, D. (2008), Scatter Plots and Extensions. *Lattice: Multivariate Data Visualization with R*. p67-90.
- SIPRI. (2024), Military Expenditure Database. Military Expenditure Database. Available from: <https://www.sipri.org/databases/milex>
- Smith, A. (1776), *The Wealth of Nations*. London: W. Strahan; and T. Cadell in the Strand.
- Su, C., Xu, Y., Chang, H.L., Lobont, O.R., Liu, Z. (2020), Dynamic causalities between defense expenditure and economic growth in China: Evidence from rolling Granger causality test. *Defence and Peace Economics*, 31(5), 565-582.
- Toda, H.Y., Yamamoto, T. (1995), Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66(1-2), 225-250.
- Troxell, J.F. (2004), Military Power and the use of Force. *US Army War College Guide to National Security Policy and Strategy*. p187-210.
- World Bank. (2023), Open Data. Available from: <https://data.worldbank.org>
- Yesilyurt, F., Yesilyurt, M.E. (2019), Meta-analysis, military expenditures and growth. *Journal of Peace Research*, 56(3), 352-363.