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THE IMPACT OF MILITARY EXPENDITURE ON ECONOMIC GROWTH IN NATO COUNTRIES: EVIDENCE FROM PANEL DATA

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Abstract:
This paper examines the relationship between military expenditure and economic growth in NATO member states within the institutional framework of collective security obligations. The analysis is based on a panel dataset of 31 countries covering the period from 2002 to 2024. A fixed effects panel model with Driscoll–Kraay standard errors is employed to ensure robust inference in the presence of heteroskedasticity, serial correlation, and cross-sectional dependence. Defence expenditure is included in natural logarithmic form and includes lagged values to capture potential delayed effects on economic performance. The empirical results indicate that military expenditure does not exert a statistically significant or robust effect on economic growth once dynamic adjustments and cross-country interdependencies are properly controlled for. In contrast, foreign direct investment inflows and domestic growth factors remain consistently positive and statistically significant across all model specifications. The evidence suggests that, for NATO economies, military expenditure has a largely neutral impact on short- and medium-term economic growth, while structural and investment-driven factors play a dominant role. The study provides updated empirical evidence and highlights the importance of applying robust econometric techniques when assessing the economic implications of defence policies.

Keywords:
military expenditure; economic growth; panel data; NATO countries; defence economics.

JEL Classification:
H56, O47

INTRODUCTION

In NATO member states, the debate on the economic and development implications of military expenditure is shaped by institutional and fiscal obligations arising from collective security.

In recent years, these obligations have become increasingly important due to rising geopolitical tensions. These trends have intensified the policy debate regarding the economic implications of defence budgets, particularly in the context of fiscal sustainability and long-term economic growth.

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The NATO framework implies a high degree of coordination in defence policies and common spending expectations, while simultaneously emphasising macroeconomic stability, fiscal sustainability, and long-term growth. As a result, policymakers increasingly face a complex trade-off between allocating resources to military expenditure and preserving fiscal space for productive investment.

Military expenditure has long occupied a central place in theoretical and empirical debates on economic growth. Keynesian and demand-side perspectives argue that military expenditure may stimulate economic activity through higher aggregate demand, employment, and technological spillovers, particularly in the short run. In contrast, neoclassical and opportunity-cost approaches emphasise potential crowding-out effects, suggesting that military expenditure may divert scarce resources away from productive sectors such as education, innovation and infrastructure. Consequently, the theoretical effect of military expenditure on growth remains ambiguous and strongly context dependent.

Empirical evidence is similarly mixed. While some studies report positive or negative growth effects depending on institutional quality, development levels or geopolitical conditions, others find weak or insignificant relationships once methodological issues such as endogeneity, heteroskedasticity, serial correlation and cross-sectional dependence are properly addressed. In panels of countries exposed to common shocks and institutional synchronisation, conventional estimators may underestimate standard errors and overstate statistical significance.

Despite the growing literature, evidence focusing specifically on NATO as an economically and institutionally integrated alliance remains limited, particularly when robust inference techniques are applied. Many existing studies rely on standard panel approaches that fail to account for cross-sectional dependence and dynamic interactions characteristic of allied economies. This raises concerns about the robustness of previously reported effects.

This study addresses this gap by analysing the relationship between military expenditure and economic growth in 31 NATO countries over the period 2002–2024, using a fixed effects panel model with Driscoll–Kraay standard errors. Lagged military expenditure is included to capture potential delayed effects, while key growth determinants, namely foreign direct investment, domestic growth channels, and trade openness, are controlled for.

Based on the theoretical and empirical background, the study tests the following hypothesis:

H1: Military expenditure does not have a statistically significant effect on economic growth in NATO countries.

H2: Foreign direct investment and domestic growth factors have a positive and statistically significant impact on economic growth.

The remainder of the paper is organised as follows: Section 2 reviews the relevant literature, while Section 3 outlines the data and methodology. Section 4 presents the empirical results, followed by a discussion of the findings and their policy implications in Section 5. Finally, Section 6 offers concluding remarks.

LITERATURE REVIEW

The relationship between military expenditure and economic growth has long been one of the most debated topics within defence economics and development economics. Early contributions, particularly those rooted in Keynesian economics, emphasized the potential stimulative effects of military spending on aggregate demand through increased employment, industrial capacity utilization, and infrastructure development, especially in developing countries (Benoit, 1978; Brauer, 1991). In contrast, neoclassical and endogenous growth frameworks highlight the opportunity costs of military expenditure, suggesting that excessive military expenditure may crowd out productive investment, reduce capital accumulation, and hinder long-term economic growth (Barro, 1991). Subsequent theoretical developments further explore the relationship between military expenditure, investment, and economic growth, emphasizing the importance of distinguishing between productive and non-productive components of public spending (Dunne & Smith, 2020). More recent theoretical contributions further expand this perspective by incorporating alternative macroeconomic frameworks, including Post-Keynesian approaches that emphasize demand-side dynamics and structural constraints (Elveren *et al*., 2023).

Over time, empirical research has produced mixed and often inconclusive results, largely depending on the sample of countries, time horizon, and econometric techniques applied. Early empirical models frequently reported negative or growth-constraining effects of military expenditure, particularly in economies with limited fiscal capacity (Dunne *et al*., 2005). However, subsequent studies have demonstrated that these findings are sensitive to model specification and underlying assumptions. Comprehensive surveys of the literature indicate that the relationship between military expenditure and growth is far from uniform, ranging from negative to neutral or even positive depending on structural and institutional conditions (Dunne & Tian, 2013; Alptekin & Levine, 2012). Furthermore, causality-oriented approaches suggest that the direction of influence may be bidirectional, particularly in countries with significant military capacity (Putra *et al*., 2024).

More recent contributions emphasize the importance of methodological rigor and the treatment of econometric issues such as endogeneity, heterogeneity, and cross-sectional dependence. Studies employing advanced panel techniques show that once these factors are properly accounted for, the previously identified effects of military spending often diminish or become statistically insignificant (Dunne & Nikolaidou, 2012; Yildirim & Öcal, 2016). In addition, the presence of global shocks and interconnected economic dynamics suggests that countries cannot be treated as independent units, reinforcing the need for robust estimators and dynamic modeling approaches (Elbargathi & Al-Assaf, 2023; Hou *et al*., 2025).

Another important strand of literature explores the broader macroeconomic and structural channels through which military expenditure affects economic performance. Some studies extend the analysis beyond growth and examine fiscal and macroeconomic stability, including the effects on public debt, budget balances, and inflation (Durucan & Yeşil, 2022; Öksüz & Yılmaz, 2025; Dunne & Smith, 2020). Others incorporate additional variables such as political instability, international arms trade, and environmental factors, demonstrating that the impact of military expenditure is highly context-dependent and mediated by external and institutional conditions (Elbargathi & Al-Assaf, 2023; Chary, 2024; Wu *et al.,* 2023).

Moreover, recent empirical research has increasingly focused on the heterogeneity of effects across different groups of countries. Studies examining developed economies, including the G7 and OECD countries, generally find weaker or neutral relationships between military expenditure and economic growth, suggesting that mature institutional frameworks and diversified economic structures reduce

the potential growth-enhancing effects of military expenditure (Kollias *et al*., 2021; Hou *et al.*, 2025; Wang *et al*., 2022). Similarly, research on European Union countries indicates that military expenditure is more closely linked to fiscal constraints and policy coordination than to growth dynamics (Dunne & Nikolaidou, 2012).

The NATO context represents a particularly relevant framework for analyzing this relationship. Member states are expected to allocate at least 2% of their GDP to military expenditure, reflecting a collective commitment to burden-sharing and security provision, although actual spending levels vary significantly across countries. These institutional targets and strategic considerations shape defence expenditure decisions beyond purely economic factors. Within the Alliance, defence expenditure is primarily driven by collective security considerations, geopolitical risks, and institutional commitments rather than purely economic objectives. Empirical studies focusing on NATO and comparable alliances suggest that military spending in such settings does not function as a conventional tool of economic policy but rather reflects strategic and political priorities (Dimitriou *et al*., 2025; Aizenman & Glick, 2006). Institutional analyses further highlight the evolution of military expenditure concepts within NATO and their implications for member states' fiscal behavior (Wołkonowski, 2023). Furthermore, evidence from Southeast European countries indicates that increases in defence expenditure following NATO accession are largely associated with institutional adjustment and compliance with alliance standards rather than with measurable improvements in economic growth (Šare & Avramović, 2025).

In addition, recent literature highlights the importance of considering indirect and multidimensional effects of military expenditure. For instance, studies examining the interaction between defence, education, and social spending suggest that military expenditure may influence income distribution and the effectiveness of other public policies (Mbewe *et al*., 2025; Olejníček *et al.*, 2025). Bibliometric and methodological reviews further confirm the growing complexity of this research field, pointing to an increasing use of advanced econometric techniques and interdisciplinary approaches (Alsmadi *et al.,* 2024; Tsvirova, 2025).

Taken together, the contemporary literature increasingly converges toward the view that the impact of military expenditure on economic growth is conditional, context-specific, and highly dependent on institutional, economic, and geopolitical factors. In economically developed and security-integrated environments such as NATO countries, the effect of military expenditure on growth is often found to be weak or statistically insignificant. Instead, broader determinants such as investment, macroeconomic stability, and institutional quality appear to play a more decisive role in shaping long-term economic performance.

Despite the extensive and growing body of literature, several important gaps remain. First, empirical findings are still highly sensitive to model specification and often fail to adequately address cross-sectional dependence and dynamic heterogeneity, particularly in the context of closely integrated economic and security systems such as NATO. Second, while a growing number of studies focus on developed economies, relatively limited attention has been paid to the specific institutional characteristics and strategic constraints that shape defence expenditure within NATO countries. Third, existing research rarely combines these methodological and contextual aspects within a unified empirical framework.

This study aims to address these limitations by providing a comprehensive panel data analysis of NATO member states, explicitly accounting for cross-sectional dependence and heterogeneity across countries. By focusing on a homogeneous group of security-integrated economies and employing robust econometric techniques, the paper contributes to the literature by offering more reliable evidence on the relationship between military expenditure and economic growth in the NATO context.

DATA AND METHODOLOGY

This study is based on a balanced panel dataset comprising 31 NATO member states over the period 2002–2024. The chosen time horizon allows for the analysis of both short- and medium-run economic effects of defence expenditure within a relatively stable institutional and security framework, while simultaneously capturing major global shocks, financial crises, and periods of heightened geopolitical tension. By focusing exclusively on NATO members, the study benefits from a shared framework of collective security and coordinated fiscal expectations, enabling a more consistent comparison of national economic dynamics under common alliance obligations. In addition, the high degree of institutional and economic interconnectedness among member states increases the likelihood of cross-sectional dependence, which has important methodological and policy implications for the selection of appropriate econometric techniques.

The empirical analysis covers the following NATO member states: Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, the United Kingdom, and the United States.

The composition of the sample reflects data availability and ensures broad coverage of both advanced and emerging NATO economies. It includes both long-standing members and more recent entrants, thereby allowing the analysis to capture potential differences in economic dynamics associated with varying levels of institutional maturity and defence integration. Such diversity enhances the robustness of the empirical framework and enables a more comprehensive assessment of the relationship between military expenditure and economic growth within a common institutional setting.

The dependent variable is the growth rate of gross domestic product (GDP), used as a standard indicator of overall economic performance. The key explanatory variable is military expenditure, expressed in natural logarithms (lnTROD). Military expenditure reflects the allocation of public resources toward security-related functions and is widely employed in the literature as a proxy for security-oriented fiscal priorities. To account for the possibility that the effects of military spending on economic activity materialize with a delay due to procurement cycles, institutional rigidities, and indirect spillover effects, the empirical analysis incorporates lagged values of military expenditure (L1–L3).

The variable domestic growth channels (KANALRAST) is proxied by broad money expressed as a percentage of GDP, obtained from the World Bank's World Development Indicators database. Broad money includes currency in circulation, demand deposits, and other liquid financial assets that can be readily used as a medium of exchange or store of value. Expressed relative to GDP, this indicator captures the depth and development of the domestic financial system and reflects the capacity of the economy to mobilize savings, support credit expansion, and facilitate investment activity. In this context, KANALRAST serves as a proxy for domestic financial development and credit intermediation capacity rather than a single isolated monetary aggregate. From a theoretical perspective, a more developed financial system enhances the efficiency of resource allocation, reduces transaction costs, and improves access to capital, thereby supporting economic growth.

Most variables are transformed into logarithmic form to reduce the influence of extreme values and allow for elasticity interpretation. However, domestic growth channels (KANALRAST), expressed as a percentage of GDP, are kept in levels due to their bounded nature and standard usage in the literature. Descriptive statistics indicate substantial cross-country and time heterogeneity across all variables, reflecting divergent development paths and varying resilience of NATO economies to global and regional

shocks. Military expenditure is relatively stable within individual countries but varies considerably across member states, particularly during periods of heightened security demand. Inflows of foreign direct investment display pronounced volatility, while trade openness and domestic growth channels also differ significantly across countries, underscoring the need for a multivariate panel framework. All variables used in the empirical analysis are obtained from internationally recognized and widely used databases. Data on gross domestic product (GDP), foreign direct investment (FDI), trade openness, and broad money (used as a proxy for domestic growth channels) are sourced from the World Bank's World Development Indicators (WDI) database. These indicators ensure consistency, comparability, and high data quality across countries and over time. Data on military expenditure are obtained from the Stockholm International Peace Research Institute (SIPRI) database, which provides one of the most comprehensive and internationally comparable datasets on military expenditure. SIPRI data are widely used in empirical research on defence economics due to their methodological consistency and coverage. The combination of these data sources allows for a reliable and harmonized panel dataset, suitable for cross-country econometric analysis of the relationship between military expenditure and economic growth.

Pairwise correlation analysis reveals that GDP growth is positively associated with foreign direct investment, domestic growth channels, and trade openness, whereas the contemporaneous correlation between military expenditure and GDP growth is weak and statistically insignificant. These patterns further motivate the inclusion of lagged military spending and the use of dynamic specifications.

Prior to estimation, panel unit root tests were conducted to assess the stationarity properties of the variables. The Fisher type test based on augmented Dickey–Fuller procedures allows for heterogeneity in autoregressive parameters across panel units. The results indicate that GDP growth, foreign direct investment, domestic growth channels, and trade openness are stationary in levels, while military expenditure exhibits weaker evidence of stationarity, consistent with its fiscal and institutional persistence in NATO countries. To reduce the risk of spurious regression and enhance robustness, military expenditure is therefore included in logarithmic form and with time lags, following standard practice in macro-panel analysis.

The empirical strategy is based on a fixed-effects panel regression framework specified as:

$$GDP_{it} = \alpha_i + \beta_1 lnTROD_{i,\,t-k} + \beta_2 lnFDI_{it} + \beta_3 KANALRAST_{it} + \beta_4 lnTRG_{it} + \varepsilon_{it} \quad (1)$$

where i denotes the country, t the time period, and α_i captures unobserved, time-invariant country characteristics such as institutional quality, structural economic differences, and historical development patterns. The parameter k represents the length of the lag applied to military expenditure. The fixed effects approach identifies the relationship using within-country variation over time, which is particularly appropriate in a sample of economies operating under a shared security framework.

A battery of diagnostic tests was performed to examine the structure of the error terms. Pesaran's test strongly rejects the null hypothesis of cross-sectional independence, indicating the presence of common shocks and economic spillovers across NATO member states. This finding is economically important, as alliance members are simultaneously exposed to global security events, energy price shocks, and synchronized fiscal and monetary responses. Ignoring such interdependence would likely result in underestimated standard errors and misleading inferences regarding the growth effects of military expenditure.

Although the Wooldridge test does not provide evidence of first-order serial correlation, additional tests indicate the presence of heteroskedasticity across panels. Taken together, these diagnostics clearly justify the use of an estimator that is robust to heteroskedasticity, serial correlation, and cross-sectional dependence. Accordingly, the baseline model is estimated using fixed effects with Driscoll–Kraay standard errors, which provide consistent statistical inference in the presence of cross-sectionally correlated and temporally dependent disturbances. This is particularly relevant in macro panel settings where countries are jointly affected by global and regional shocks.

Dynamic GMM estimators are not employed, as the primary objective of the study is not causal identification through instrumental variables, but rather the robust estimation of within-country dynamic relationships in a panel with a moderate time dimension. In such settings, GMM approaches are often vulnerable to instrument proliferation and weak identification, which can compromise the reliability of the results and complicate economic interpretation for policy purposes.

As an additional robustness check, the analysis also applies the Common Correlated Effects Mean Group (CCEMG) estimator proposed by Pesaran (2006). The CCE approach augments standard panel regressions by including cross-sectional averages of the dependent and independent variables, thereby controlling for unobserved common factors and global shocks that may simultaneously influence all countries. Moreover, the CCEMG estimator allows for heterogeneous slope coefficients across countries, which is particularly relevant in a sample that encompasses economically and institutionally diverse NATO members. Both static and dynamic specifications are estimated within the CCE framework. By incorporating military expenditure in logarithmic form and with time lags, this approach captures potential delayed effects on economic growth while explicitly controlling for cross-sectional dependence.

EMPIRICAL RESULTS

The empirical analysis begins with a presentation of basic descriptive statistics for all variables included in the model. Table 1 reports the number of observations, means, standard deviations, as well as minimum and maximum values for GDP growth, military expenditure, foreign direct investment, domestic growth channels, and trade openness.

Table 1. Descriptive statistics of the variables

Variable	Observations	Mean	Std. Dev.	Min	Max
GDP	736	2.312	3.607	-16.040	13.043
ln_trod	679	0.415	0.386	-1.026	1.590
lnFDI	668	1.219	1.119	-6.399	5.457
kanalrast	735	23.423	4.729	11.888	43.666
ln_trg	736	4.522	0.475	3.104	6.021

Source: Author's calculations

The descriptive statistics reveal substantial heterogeneity among NATO member states, both in terms of economic performance and in their fiscal and structural characteristics. GDP growth exhibits pronounced variability, with sharp negative values during crisis periods and strong positive growth rates during recovery phases. Military expenditure, expressed in logarithmic form, displays moderate dispersion, reflecting differences in the scale and dynamics of military expenditures across NATO members.

Foreign direct investment is characterized by high volatility, including negative values, indicating its sensitivity to global financial cycles and domestic institutional conditions. Domestic growth channels and trade openness exhibit relatively more stable patterns, although with clear cross-country and time variation. These features further justify the use of a panel regression framework that explicitly accounts for unobserved heterogeneity across observational units.

Prior to estimating the regression models, a set of diagnostic tests was conducted to examine the structure of the error terms in the panel data.

Table 2. Panel diagnostic tests

Test	Test statistic	p-value	Conclusion
Modified Wald test (FE)	$\chi^2(31) = 261.07$	0.000	Heteroskedasticity present
Wooldridge test	$F(1,30) = 0.214$	0.647	No first-order autocorrelation
Pesaran CD test	$CD = 52.255$	0.000	Cross-sectional dependence present

Source: Author's calculations

The Modified Wald test strongly rejects the null hypothesis of homoskedasticity, indicating pronounced heteroskedasticity across panel units. This suggests that the variance of the error terms differs significantly across NATO member states, which is consistent with their heterogeneous economic structures, fiscal capacities, and institutional frameworks. Consequently, the use of robust standard errors is warranted.

In contrast, the Wooldridge test does not indicate the presence of first-order serial correlation. However, given the macroeconomic nature of the data and the relatively long time dimension, the possibility of higher-order serial correlation cannot be fully ruled out, particularly in the presence of common cyclical movements and global shocks.

The Pesaran cross-sectional dependence test provides strong evidence of interdependence among the countries in the sample. This result is expected in the NATO context, where national economies are linked through trade flows, investment networks, financial markets, and common security and geopolitical shocks. Cross-sectional dependence implies that economic growth in one country cannot be treated as an independent process but rather as part of a broader interconnected system.

Taken together, the diagnostic results indicate that conventional fixed effects models with standard (clustered or non-clustered) standard errors may yield biased and inconsistent inference. Therefore, the primary estimator employed in this study is the fixed-effects model with Driscoll–Kraay standard errors, which is robust to heteroskedasticity, serial correlation, and cross-sectional dependence.

Table 3 presents the results of the baseline fixed effects model with Driscoll–Kraay standard errors, in which military expenditure is included contemporaneously.

Table 3. Effects of military expenditure on economic growth: FE models with Driscoll–Kraay standard errors

Variable	(1) FE-DK	(2) FE-DK (L1)	(3) FE-DK (L2)
ln_trod	0.605	–	–
	(1.246)		
ln_trod_L1	–	1.837	–
		(1.276)	
ln_trod_L2	–	–	1.843
			(1.610)
lnFDI	0.459**	0.473***	0.528***
	(0.189)	(0.144)	(0.123)
kanalrast	0.322***	0.336***	0.336***
	(0.051)	(0.051)	(0.053)
ln_trg	2.996	4.095	5.769
	(3.328)	(3.816)	(4.269)
Constant	−19.375	−25.280	−32.978
	(15.598)	(17.717)	(19.635)
Observations	623	619	589
Countries	31	31	31
Within R^2	0.149	0.175	0.190

*Notes: Driscoll–Kraay standard errors in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. All models include country fixed effects.*
Source: Author's calculations

The results in Table 3 indicate the absence of a statistically significant effect of military expenditure on economic growth in NATO member states, both contemporaneously and when lagged values are introduced. In the baseline specification (Model 1), the coefficient on military expenditure is positive but statistically insignificant, suggesting that changes in military expenditures do not produce a measurable short-term effect on GDP growth.

When one-year (Model 2) and two-year (Model 3) lags are included, the estimated coefficients remain positive but statistically insignificant. These findings imply that potential delayed effects of military expenditure arising from procurement cycles, technological spillovers, or institutional adjustments do not exert a robust influence on economic growth in the sample. The stability of the results across alternative lag structures further supports the conclusion of a statistically insignificant and economically negligible impact of military expenditure in the NATO context.

In contrast, foreign direct investment inflows and domestic growth channels exhibit strong, positive, and statistically significant effects on economic growth in all model specifications. These results indicate that investment dynamics and internal drivers of economic expansion are the primary engines of growth, whereas military expenditure within an institutionally and security-integrated alliance such as NATO functions primarily as a fiscal obligation with limited macroeconomic implications.

To further examine robustness, alternative standard error structures were applied. The results are reported in Table 4.

Table 4. Robustness checks: alternative standard errors

Variable	(1) FE – conventional SE	(2) FE – robust SE	(3) FE-DK
ln_trod	0.605	0.605	0.605
	(0.728)	(1.246)	(1.246)
lnFDI	0.459***	0.459**	0.459**
kanalrast	0.322***	0.322***	0.322***
ln_trg	2.996***	2.996	2.996
Obs	623	623	623

Source: Author's calculations.

The results in Table 4 confirm the robustness of the baseline findings across alternative standard error specifications. Regardless of whether conventional, heteroskedasticity-robust, or Driscoll–Kraay corrections are applied, the coefficient on military expenditure remains statistically insignificant. In contrast, the effects of foreign direct investment and domestic growth channels remain positive and significant, reinforcing the stability of the key growth determinants.

Finally, Table 5 reports the Common Correlated Effects Mean Group (CCEMG) estimates, which explicitly control for unobserved common factors and cross-sectional dependence.

Table 5. Common Correlated Effects (CCEMG) estimates

Variable	(1) CCEMG	(2) Dynamic CCEMG
ln_trod	−0.275	
	(1.210)	
L.ln_trod		0.098
		(1.099)
lnFDI	20.901	23.225
	(35.114)	(36.741)
ln_trg	6.100	6.712
	(4.176)	(4.507)
kanalrast	0.440***	0.423***
	(0.134)	(0.151)
Observations	677	647
Countries	31	31
CD test (p-value)	0.190	0.099

*Notes: Standard errors in parentheses. *** denotes significance at the 1% level.*
Source: Author's calculations

The CCEMG results confirm the baseline findings obtained from the fixed effects models with Driscoll–Kraay standard errors. The coefficient on military expenditure remains statistically insignificant in both the static and dynamic specifications, indicating the absence of a robust short- and medium-term effect of military expenditure on economic growth in NATO member states.

Overall, the empirical evidence consistently suggests that military expenditure is not a robust determinant of economic growth in NATO countries, while structural and investment-related factors play a central role in shaping economic performance. In particular, domestic growth channels exhibit stable and statistically significant effects across all model specifications, even after explicitly controlling for cross-sectional dependence and unobserved common factors. Similarly, foreign direct investment remains positive and statistically significant throughout the estimations. However, the unusually large coefficients obtained for FDI in the CCEMG framework should be interpreted with caution, as this estimator allows for heterogeneous slope coefficients and is sensitive to cross-country scaling differences.

CONCLUSION AND POLICY IMPLICATIONS

This study empirically examined the relationship between military expenditure and economic growth in NATO member states over the period 2002–2024, with a particular focus on short- and medium-term within-country dynamics. By concentrating on economies integrated into a collective security framework, the analysis provides insight into how alliance commitments shape the economic relevance of military expenditures in institutionally mature and highly integrated countries.

The application of a fixed-effects panel regression framework with Driscoll–Kraay standard errors allowed for the explicit treatment of key econometric challenges typical of macro-panel data, including country-specific unobserved heterogeneity, heteroskedasticity, serial correlation, and cross-sectional dependence. This methodological approach ensures more robust and reliable inference compared to conventional panel estimators.

The empirical results consistently indicate that military expenditure does not exert a statistically significant or economically meaningful effect on economic growth, whether measured contemporaneously or through lagged specifications. This finding remains stable across alternative model specifications and different lag structures, suggesting that, in the NATO context, neither growth-stimulating nor growth-constraining effects dominate. In contrast, variables associated with productive economic activity, most notably foreign direct investment inflows and domestic growth channels, emerge as strong and statistically significant determinants of GDP growth.

From a broader analytical perspective, these findings contribute to the ongoing debate on the defence growth nexus by highlighting the role of institutional maturity, economic structures, and alliance arrangements. In developed economies integrated into security alliances, military expenditure appears to function primarily as an instrument of collective security rather than as an effective macroeconomic policy lever. Incremental changes in military budgets are largely absorbed within existing fiscal, institutional, and industrial frameworks, thereby limiting their measurable impact on aggregate economic performance.

Several important policy implications follow from these results. First, the absence of a robust effect of military expenditure on economic growth suggests that increases in military expenditures should not be viewed as an effective instrument for stimulating short- or medium-term economic growth. Although defence outlays remain essential for fulfilling alliance commitments and safeguarding national and collective security, their economic role should not be normatively framed as development-enhancing.

Second, the strong and consistent positive effects of foreign direct investment and domestic growth channels underscore the importance of investment-oriented development strategies. Policies aimed at improving the investment climate, strengthening institutional quality, enhancing productivity, and deepening integration into global value chains are likely to generate substantially greater long-term growth benefits than reallocating public resources toward additional military expenditure. In this sense, economic resilience and security objectives should be pursued as complementary rather than substitutive goals.

Third, the empirically identified neutrality of military expenditure implies that the economic costs of meeting NATO commitments may be lower than often assumed, provided that resources are used efficiently. An emphasis on joint procurement, technological cooperation, interoperability, and burden sharing within the alliance can help reduce fiscal pressures and avoid inefficient duplication of capabilities. Such an approach enables member states to meet security requirements without undermining long-term fiscal sustainability and economic performance.

Despite its empirical and methodological contributions, this study is subject to certain limitations that open avenues for future research. The analysis focuses on short- and medium-term effects and does not explicitly model long-run relationships or potential nonlinearities in the defence growth nexus. Future studies could employ dynamic panel techniques, threshold models, or panel cointegration approaches to explore whether the impact of military expenditure varies with income levels, institutional quality, or the intensity of security threats.

Moreover, disaggregating defence expenditures into their main components, such as personnel, equipment procurement, infrastructure, and research and development, could provide deeper insights into the mechanisms through which military spending may affect economic performance. Such an approach may reveal differentiated effects of specific spending categories that remain concealed at the aggregate level.

In conclusion, the empirical evidence presented in this paper indicates that military expenditure does not play a decisive role in shaping short- and medium-term economic growth rates in NATO member states. While military expenditures remain a key pillar of collective security and geopolitical stability, their macroeconomic effects appear largely neutral compared to alternative uses of public resources. Policymakers should therefore prioritize growth strategies based on investment, productivity, and institutional development, while ensuring that military expenditure adheres to principles of efficiency, coordination, and long-term fiscal sustainability. Overall, the findings confirm that, although defence expenditures are necessary for collective security, sustainable economic growth in NATO countries primarily depends on the quality of investment, institutional strength, and integration into global economic flows, rather than on increases in military spending.

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