

THE ANALYSIS OF THE RELATIONSHIP BETWEEN THE GLOBAL PEACE INDEX AND MILITARY SPENDING IN EUROPEAN STATES

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Abstract

This study aims to analyze the relationship between military spending, fiscal balance, and the level of peace in the member states of the European Union and NATO during the period 2014–2024. By applying panel econometric methodologies, the study seeks to assess whether military spending is a significant determinant of the budget deficit and whether a higher level of peace, as measured by the Global Peace Index (GPI), contributes to greater fiscal stability. Using data collected from the SIPRI, the Institute for Economics and Peace, and Quality of Government databases, fixed-effects and random-effects panel models were employed, with the optimal model selected based on the Hausman test. The results indicate that, when controlling for country-specific factors, military spending does not have a statistically robust impact on the budget deficit. In contrast, a higher level of peace is consistently associated with lower budget deficits. These findings suggest that fiscal sustainability is influenced to a greater extent by institutional and structural factors associated with peace than by the absolute level of military spending. The study helps fill a gap in the literature on the economics of peace and sustainable development, highlighting the role of peace as a stabilizing factor for public finances.

Keywords: Global Peace Index; Military Expenditure; Budget Deficit; Panel Data Analysis; Sustainable Development

1. Introduction

Security, considered essential by prominent figures such as Abraham Maslow, is currently a topic of global interest, given the military conflicts occurring worldwide. At the same time, the world's economies are undergoing major transformations, attempting to address historical inequalities, combat waste, manage rising budget deficits, labor strikes, and other challenges.

This study examines whether reducing military expenditure could be a viable solution from both an economic perspective and a peace-maintenance perspective within the European Union, using three indicators:

- military expenditure as a share of GDP,
- the budget deficit, with military spending excluded, and
- the Global Peace Index (GPI).

The analyzed elements aim to clarify whether military spending constitutes an important component of the budget deficit and whether, by controlling it, an optimal level of peace can be maintained in NATO and EU member countries. The theories discussed indicate that the financial resources allocated to defense have a significant effect on economic growth, and that the level of such spending depends on political orientation and the policymakers' conceptions. Moreover, for reducing the budget deficit, fiscal policies play a more important role than simply cutting military expenditure.

The purpose of this study is to assess whether military spending represents a significant determinant of the budget deficit and whether the level of peace is associated with fiscal stability.

The study aims to analyze how military spending, treated as a parametric indicator, influences the budget deficit and GPI, using an econometric research method. Determining how military expenditure affects the level of the budget deficit and of peace is particularly relevant in the current context, in which society is trying to return to the economic stability that existed prior to the COVID-19 pandemic, the war in Ukraine, and global political fluctuations. The period analyzed

is 2014–2024, because in 2014 the 2% of GDP threshold for military spending was established for NATO member states.

Reducing military spending in EU and NATO member states does not significantly influence the level of the budget deficit. Instead, there is a strong negative relationship between the budget deficit level and the level of peace, suggesting that a smaller deficit is associated with a higher level of peace. The results confirm that reducing military expenditure does not have a significant impact on the budget deficit, but that a strong negative relationship exists between the budget deficit and the level of peace.

To ensure the achievement of the objectives and the testing of the hypotheses, the article is structured as follows: literature review; methodology and data analysis; results and discussion; and conclusions.

2. Literature Review

Specialized literature indicates that an increase in military expenditures, when these are absorbed at levels higher than those of other categories of spending, may reduce their social impact and produce tangible effects only on inequalities in a limited sense, especially within low-income families (Mbewe et al., 2026). From the perspective of sustainable development, reducing inequalities and ensuring an adequate level of education are fundamental objectives. Military spending may be relevant for maintaining a stable path toward achieving these objectives, provided that allocations are carefully balanced in order to avoid compromising social resources (Alptekin & Levine, 2012; Aizenman & Glick, 2006).

Regarding economic growth, the literature suggests that the relationship between military spending and growth is ambiguous: some studies do not find a robust correlation, and the effects may be negative in both the short and the long run, particularly when higher military spending translates into crowding out of investments in health and education (Kollias et al., 2004; Dunne & Tian, 2015; Aziz & Asadullah, 2017). At the same time, the type of military spending growth plays a crucial role, since an increase in military production intended for export may mitigate the impact on growth (Yakovlev, 2007). Effects can also vary depending on the conflict context: in the case of internal conflicts, the impact may become positive, unlike threats from external actors (Aziz & Asadullah, 2017).

At the regional level, studies on Europe show mixed results. For some low-income countries, the negative effect on growth is significant, indicating that the direction of causality may, in part, be determined by existing economic dynamics (Chang et al., 2011; Kollias et al., 2004). In addition, a structural analysis suggests that results may reflect an association between political orientations and spending levels: social spending tends to be higher in left-leaning administrations, while military spending increases in right-leaning administrations (Bove et al., 2017). In conflict contexts, the effects on economic growth may become significantly stronger in the presence of internal conflicts, while external threats may generate different dynamics (Aziz & Asadullah, 2017). Moreover, at the level of NATO member states, the consistency of the determinants of military expenditures is weakened by institutional differences and national contexts (Odehnal & Neubauer, 2020).

In the more recent macroeconomic dimension, the increase in military expenditures in 2022 reached an all-time historical maximum of approximately \$2.24 trillion, driven by the war in Ukraine and regional and global dynamics, with significant contributions from allies and, in particular, from the United States in supporting Ukraine (Tian et al., 2023).

This evolution highlights the fragility of public finances and the relevance of prudent fiscal policy, meant to manage sectoral priorities without undermining the absorption of resources in other essential areas, such as health and education (Liu & Ren, 2024; Chugunov et al., 2025). Finally, the literature on peace and sustainability argues that the relationship between these

dimensions is interdependent and complex, requiring systemic approaches—integrating environmental indicators into peace studies and engaging in international collaboration to understand the dynamics between peace and sustainability (McConaghy, 2012; Simangan et al., 2022; Sharifi et al., 2021).

Specialized literature highlights a complex, heterogeneous, and context-dependent relationship between military expenditures and macroeconomic performance. Comparative analysis of empirical studies indicates that a universal positive relationship between increases in defense spending and economic growth cannot be supported. On the contrary, in most cases, the effects identified are negative or statistically insignificant. In both the short and the long term, high levels of military spending tend to exert pressures on economic growth, especially through the opportunity cost mechanism. Resources allocated to the defense sector may reduce the fiscal space available for productive investments—education, infrastructure, health, and innovation—areas widely recognized as having a direct impact on human capital and total factor productivity. This finding is particularly relevant for low-income or emerging economies, where budget constraints are more severe and substitution across spending categories produces stronger structural effects.

Globally, peace is a state of mind, carefully monitored by specialists in order to make forecasts that may determine a certain attitude of states regarding the level of resources allocated for a potential future conflict. The Institute for Economics and Peace weighs this “state of mind” through three priority areas: the level of safety and security, the degree of involvement of countries in internal and international conflicts, and the level of militarization. One component of militarization is military expenditure. At the European level, the steps for allocating budgetary funds for military spending are stratified, requiring analyses both at the level of each nation and according to the organizations they belong to. In Europe, the most important military organization is the presence of the North Atlantic Alliance, founded in 1949 in Washington. For standardizing the needed financial resources, in 2014 the Alliance established that a target of 2% of each member’s GDP is sufficient to ensure society’s safety and security. In 2024, NATO’s military expenditures accounted for approximately 55% of total global military spending (Xiao Liang et al., 2024). As a politically assumed rule—where the 2% share is treated as a target to be achieved—the definition was based on the fair-sharing principle of burdens according to existing capabilities and productivity levels over the last 5 years per capita (Chereș S., 2021).

Military expenditures made by NATO member states have a positive effect on economic growth (Dimitriou et al., 2024). This category of budget spending has not represented a major element in analyses of national priorities, which is why its contribution has not been uniform across the Alliance (Amara, J., 2008). Nevertheless, it can be argued that the NATO-established percentage has had a satisfactory deterrence effect on military conflicts from 2014 to the present—not because of the contributions of member states, but due to the support provided especially by the U.S. Army. From 2014 to the present, none of the member countries has been attacked or involved in any military conflict on European territory. In the context of the Russia–Ukraine war, there is an emerging need to rethink the amount of military expenditures in the event of an attack in the future. Military expenditure expansion policy must also take into account fiscal policies (Alozious, J., 2021). Given that revenue and expenditure budgets—especially expenditures—are planned and managed at the government level through political power, the composition of military spending, including at the NATO level, is dictated according to the orientations of elected officials. This creates cycles of growth in equipment and armament, or cycles of growth in the capabilities of human resources (Olejnik, 2025).

The proposed approach is important because it sheds light on the complex relationship between military expenditures, the budget deficit, and the level of peace, showing that a higher level of peace is associated with lower budget deficits than a unilateral focus on military spending might suggest. By using panel models based on EU/NATO data for 2014–2024 and selection through the Hausman test, the research controls for cross-country heterogeneity and identifies the mechanisms

through which peace influences fiscal stability. Thus, the study contributes to the literature on peace economics and sustainable development and provides policy implications for strengthening institutions and directing spending toward sustainability purposes in an increasingly volatile geopolitical context.

3. METHODOLOGY AND DATA ANALYSIS

The study aims to answer the question: in the context of SDG 16, “Peace, Justice and Strong Institutions,” can reducing military spending significantly contribute to lowering the budget deficit without affecting the level of peace in the EU and NATO member countries?

Working hypothesis (H1): Reducing military spending in EU and NATO member states does not significantly influence the level of peace, but it has positive effects on the budget deficit.

The study will provide an overview of how a decrease in military spending can serve as a solution for reducing the budget deficit, and it will analyze the impact of this action on the Global Peace Index (GPI) over the period 2014–2024.

The empirical analysis is based on an unbalanced panel dataset that includes 22 European countries that are members of both the European Union and NATO for the specified timeframe. Therefore, the countries analyzed—members of both NATO and the EU—are: Belgium, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and Hungary. Luxembourg was excluded from the research due to the lack of reliable data and its negligible statistical influence, considering its small population, small area, and relatively favorable geographic position with respect to major military conflicts.

To control for the unobserved heterogeneity specific to each country, panel econometric analyses were conducted (fixed-effects and random-effects models), with the optimal model selected using the Hausman test. The test results indicate that individual effects are correlated with the explanatory variables, which supports the use of the fixed-effects model. This approach makes it possible to capture structural differences between countries, such as institutional frameworks, fiscal policies, and security priorities.

The data were collected from the SIPRI Military Expenditure Database and Quality of Government, and the processing was carried out using E-views.

The indicators used in the analysis are:

- Country – NATO and EU member countries;
- Ch militare – military expenditures as a share of GDP for the period 2014–2024;
- DEFFCH – the budget deficit from which military expenditures were excluded, as a share of GDP for the period 2014–2024;
- GPI – the Global Peace Index for the period 2014–2024.

The collected, transformed, and processed values for the 22 analyzed countries are presented in Annex No. 1.

After collecting and processing the data, they were entered into E-views to perform the panel econometric analysis, and the statistical significance of the coefficients was evaluated at the 5% level. The analysis is associative in nature, and the results should therefore be interpreted as statistical relationships, not as strict causal relationships. The obtained statistical values are detailed in the following sections.

	CH MILITARE	DEFFCH	GPI
Mean	0.016210	-0.007223	1.605121
Median	0.014315	-0.007220	1.598000
Maximum	0.041544	0.069162	2.088000
Minimum	0.008572	-0.085457	1.233000
Std. Dev.	0.005984	0.028039	0.169208
Skewness	1.479776	-0.319724	0.575515
Kurtosis	5.653482	3.024685	3.617414
Jarque-Bera	152.0742	3.941456	16.42092
Probability	0.000000	0.139355	0.000272
Sum	3.744526	-1.668557	370.7830
Sum Sq. Dev.	0.008235	0.180819	6.585181
Observations	231	231	231

Figure no.1. Primary data statistics

Source: compiled by the author

The dependent variable used in the analysis is the budget deficit, from which military expenditures were excluded, expressed as a percentage of GDP (DEFFCH). The main explanatory variables are military expenditures as a share of GDP (CH_MIL) and the Global Peace Index (GPI), a composite indicator that reflects the overall level of peace at the national level.

Military expenditures – % of GDP

Budget deficit – % of GDP, from which military expenditures were deducted, and which is also expressed as a percentage of GDP

Global Peace Index – calculated according to the methodology established by the Institute for Economics and Peace.

The result of calculating the intensity of the relationship among deficit, military expenditures, and the peace indicator using multiple regression is presented in (Figure No. 2).

Fig. 2 Regression Analysis of the Deficit, Military Expenditures, and the Peace Index for the Period 2014–2024

Method: Panel Least Squares
Date: 11/02/25 Time: 12:16
Sample: 1 231
Periods included: 11
Cross-sections included: 21
Total panel (balanced) observations: 231

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.032809	0.017724	1.851156	0.0654
CH MILITARE	0.579859	0.341522	1.697868	0.0909
GPI	-0.030796	0.012077	-2.549969	0.0114
R-squared	0.029357	Mean dependent var	-0.007223	
Adjusted R-squared	0.020843	S.D. dependent var	0.028039	
S.E. of regression	0.027745	Akaike info criterion	-4.318621	
Sum squared resid	0.175511	Schwarz criterion	-4.273915	
Log likelihood	501.8008	Hannan-Quinn criter.	-4.300589	
F-statistic	3.447934	Durbin-Watson stat	0.842995	
Prob(F-statistic)	0.033480			

Source: compiled by the author

The constructed model takes the following form:

$$\text{DEFFCH}_{it} = 0.0328 + 0.5799 \cdot \text{Militaryspend}_{it} - 0.0308 \cdot \text{GPI}_{it} + \varepsilon_{it} \quad (1)$$

The analysis of the obtained data shows that, when military expenditures increase by 1% of GDP, the budget deficit increases by approximately 0.58%. Although the coefficient associated with military expenditures has a positive sign, this relationship is not statistically robust enough.

The dominant relationship is the negative one between GPI and the budget deficit, since the statistical probability associated with it is lower than the reference threshold of 0.05.

The overall significance of the model indicates that it explains only 2.9% of the variation in the budget deficit. The low explanatory power suggests that the budget deficit is determined mainly by other macroeconomic and institutional factors that are not included in the model. The economic implications indicate that an increase in military expenditures does not substantially affect the evolution of the budget deficit; the p-value is 0.09. The deficit situation cannot be explained exclusively by this model, meaning that additional economic, social, and environmental factors should be considered.

It can be observed that in countries with a higher level of peace, the budget deficit tends to decrease, which supports the overall financial situation. The main hypothesis can only be partially validated, because the relationship between military expenditures and the budget deficit is in the same direction, but the statistical significance is borderline.

At the same time, the hypothesis that reducing military budget expenditures does not significantly affect the level of peace is confirmed, being associated with improved efficiency of tax collection.

The correlation of the data in a linear relationship was carried out using the Pearson correlation coefficient to test the links among GPI, military expenditures, and the budget deficit. The obtained results are presented in Figure No. 3.

Covariance Analysis: Ordinary
Date: 11/04/25 Time: 17:38
Sample: 1 231
Included observations: 231

Correlation t-Statistic Probability	CH MILITA...	GPI	DEFFCH
CH_MILITARE	1.000000 ----- -----		
GPI	0.445603 7.532365 0.0000	1.000000 ----- -----	
DEFFCH	0.040931 0.619913 0.5359	-0.130708 -1.995091 0.0472	1.000000 ----- -----

Fig. 3 The Linear Relationship Between GPI, Military Expenditures, and the Budget Deficit.
Source: Data processed by the author

The conclusion drawn from Figure 3 is that there is a strong positive correlation between military spending and the Global Peace Index (GPI), and a strong negative correlation between the level of the budget deficit and the GPI. Statistically, a territory with a high peace index also has a low budget deficit, calculated excluding military spending.

Dependent Variable: DEFFCH
 Method: Panel Least Squares
 Date: 11/04/25 Time: 17:52
 Sample: 1 231
 Periods included: 11
 Cross-sections included: 21
 Total panel (balanced) observations: 231

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.030878	0.046642	-0.662017	0.5087
CH MILITARE	-0.520333	0.393468	-1.322428	0.1875
GPI	0.019992	0.028611	0.698755	0.4855

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.398636	Mean dependent var	-0.007223
Adjusted R-squared	0.335030	S.D. dependent var	0.028039
S.E. of regression	0.022864	Akaike info criterion	-4.624219
Sum squared resid	0.108738	Schwarz criterion	-4.281467
Log likelihood	557.0973	Hannan-Quinn criter.	-4.485975
F-statistic	6.267284	Durbin-Watson stat	1.367879
Prob(F-statistic)	0.000000		

Fig. 4 Cross-sectional panel analysis with fixed effects

Source: processed by the author

None of the explanatory variables is statistically significant at the 5% level, which means that there is no clear evidence that they significantly influence the budget deficit within this model. As for the overall quality of the model, it is significant, meaning that although the individual coefficients are not significant, country-level fixed effects play an important role in explaining variations in the budget deficit. To determine the optimal type of panel model—specifically, whether country-specific individual effects should be treated as fixed or random—the Hausman test was applied (Figure 5).

Correlated Random Effects - Hausman Test

Equation: RANDOMPANEL

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.175805	2	0.0277

Figure 5: The Hausman Test

Source: Adapted by the author

The Hausman test yielded a p-value of 0.0277 (< 0.05), indicating that the null hypothesis—that individual effects are uncorrelated with the explanatory variables—is rejected.

Consequently, the cross-sectional fixed-effects model is the most appropriate for analyzing the panel data. This result confirms that structural differences between countries—such as the institutional framework, fiscal policy, and priorities for the allocation of public resources—significantly influence the relationship between military spending, socioeconomic stability, and the budget deficit.

Results and Discussion

The premise of this research was based on the information collected regarding gross domestic product at the level of the European Union and the manner in which Sustainable Development Goal 16 is achieved. The methodological considerations took into account the fact that the existence and monitoring of the level of peace can influence all three dimensions of sustainability, both in the short and long term, through the lens of structural changes in budgetary expenditures, particularly through the increase or decrease of military spending. The ways in which military expenditures are determined have shown that they are politically estimated, depending on the economic situation, as reflected by gross domestic product.

For a systematic approach to the issue under analysis, it is essential to clearly define the methodology and the composition of the indicators used. Another relevant perspective concerns the origin of the data, some of which are strictly military in nature, while others have a mixed, civilian and military character. Regarding the composition of the GPI, according to the 2025 report, approximately 40% of this indicator's structure is represented by external peace, and in Europe, NATO is the organization responsible for maintaining this dimension. Thus, at the decision-making level, the adjustment of military expenditures at national and alliance level should take this 40% share into account as a priority. In the event of long-term internal conflicts occurring in member states, it may be necessary to adjust military expenditures by redistributing financial resources toward the public order sector. The qualitative information provided by the GPI can be used in the decision-making process regarding the adjustment of military expenditures at national level, with an impact on the level established through official treaties.

With regard to the adjustment of military expenditures in relation to GDP, it can be observed that, in order to obtain a complete picture of the state of security, it is necessary to analyse qualitative indicators, such as the external dimension of the GPI. The results obtained may provide a basis for future research on the manner and extent to which the structural model of the state influences military expenditures, the level of peace, and the budget deficit. For a broader perspective on the phenomenon under analysis, topics such as the structure of the economy, the level of economic development, fiscal-budgetary policies, as well as geographical and historical factors may be addressed.

The study conducted has a number of limitations that must be taken into account when interpreting the results. First, the relatively low explanatory power of the econometric models suggests that the budget deficit and the level of peace are influenced by a larger number of macroeconomic and institutional factors that are not included in the analysis. Second, the use of aggregate indicators, such as military expenditures and the Global Peace Index, may conceal important qualitative differences between states. Third, the panel-type structure does not allow for firm causal conclusions to be drawn, as the results are associative in nature. Last but not least, limitations regarding data availability restricted the inclusion of additional relevant control variables. Future research could extend the analysis by including additional macroeconomic and institutional variables, such as gross domestic product per capita, the efficiency of tax collection, the level of public debt, or governance indicators. Furthermore, decomposing the Global Peace Index into its internal and external components could provide a more detailed understanding of how the different dimensions of peace interact with military expenditures and fiscal performance. In addition, the use of dynamic panel models or approaches based on instrumental variables could help address potential endogeneity issues and strengthen the econometric interpretation.

Conclusion

The econometric analyses conducted highlight, in an intuitive and rigorous manner, the existence of two types of relationships between the model's variables: positive and negative relationships. At the individual level, the model's components do not generate effects that produce statistically significant changes. However, at the aggregate level, the model's fixed effects can explain a significant portion of the variation in the budget deficit. The application of

complementary tests, such as the Hausman test, demonstrates that structural differences among NATO and European Union member states influence the relationship between budget expenditures, social stability, and the budget deficit.

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