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DEFENCE EXPENDITURE: A NECESSARY EVIL AND ITS IMPACT ON EUROPEAN ECONOMIES

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Abstract

Defence expenditure is usually considered a necessary evil. Politicians and economists discuss on how to address common defence challenges and how defence can be financed. Preparation for war is viewed not only as amassing more and stronger weapons in depots but also as building capacities for production and maintenance. The purpose of this paper is to estimate the effect of defence expenditure on economic performance in EU member states. The effect is predicted under several scenarios for the ratio of defence expenditure to GDP. The regression study covers the period from 2014 to 2023. The estimated results suggest that the lower the defence expenditure, the more compatible with economic growth the expenditure would be. The relation is negative so the empirical result is in line with the existing evidence in literature.

Keywords: *Defence expenditure; Economic growth; Social welfare expenditure; Jupyter notebook.*

JEL Codes: *E62; H21; O47*

Introduction

Defence expenditure is usually considered a necessary evil. This conventional assumption gets new attention on the background of the geopolitical developments over the last few years. Wars are neither an anachronism nor unthinkable on the European continent. Lots of policy-makers came to consensus on the principle that preparation is the best way to get away with war.

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Preparation seemed to be the key word on most discussions on how to address the common defence challenges. Of course, the preparation is viewed not only as amassing more and stronger weapons in depots. It also means building capacities for production and maintenance of weapons and military technical devices. Thus, the governments would invest and spend money that would benefit private enterprises in industries with big value added. These industries will also be influenced by the overall digital transformation trend and thus have provide a bigger value added (Filipova et al., 2023; Stavrova et al., 2021). Said in other words, preparation for war leads to stimulation and development the domestic economy of a country. Taking into account all these things, the purpose of this paper is to study the effect of defence expenditure on economic performance in EU member states. This empirical study uses panel regression on data from all EU member states over the past decade. The paper is structured as follows: a literature review section that situates the present study within existing research; a methodology section outlining the approach adopted; a section presenting the empirical estimates and their discussion; and finally, a conclusion.

Literature review

The relation of defence expenditure and economic growth is a very popular topic of econometric studies. Publications on the topic are distinguished by the empirical results found (Saeed, 2023). Thus, there are two large groups of studies - the first group includes ones that find a positive effect of defence expenditure on economy and second group of studies estimated a negative effect due to the crowding-out with respect to the productive investment of private sector (Saeed, 2023; Dunne & Tian, 2013). There are studies dedicated only on the discussion of the results of the empirical studies that have been published. For example, the review of Dunne and Uye (2009) compared 37 studies indicating a negative relation versus 20 studies that find a significant positive effect of defence expenditure on economic growth. The literature review of Saeed (2023) put a special emphasis on the methodological problem with endogeneity of defence expenditure that has the potential to compromise the unbiasedness of the results found in a study. In essence, this issue has been discussed as part of the efforts for achieving deep understanding of the relation of interest in the study of d'Agostino et al. (2019). They found out that endogeneity could be caused by reverse causality between both variables and propose the use of instrument variables to deal with the endogeneity (d'Agostino et al., 2019). Despite the originality of this approach, the effect was "a larger significant negative effect of military spending on growth than OLS would" (d'Agostino et al., 2019). Said otherwise, the negative effect could be estimated successfully by a simple technique but

the more complex technique provided the estimation of the same effect in a better way. This approach, however, brings the challenge of the misspecification of regression model and wrong selection of instruments.

The things said above have the potential to imply that the negative effect is the more frequently found empirical result. At first glance, that's true. However, there are too many specifics which are determined by the sample of the countries, areas, periods of study, level of income and development of the countries in sample, etc. Other specifics have been added by the approach adopted and methodology applied to achieve the goals of the study.

Well, there are too many examples of studies which find a negative relation (Saeed, 2023; d'Agostino et al., 2019; DeRouen, 2000; Blomberg, 1996; Lebovic & Ishaq, 1987). Nonetheless, there are ones that have found a positive relation (Kollias et al., 2007; Aizenman & Glick, 2006). And finally, there are examples of studies that have found non-linear regression relationship (Landau, 1996). These results are found in terms of both – single-country studies and cross-country studies. For example, the study of Saeed (2023) samples data on 133 countries for the period of 1960-2012 and found significant negative effect of defence expenditure on economic growth in developing and conflict-affected countries as well as in countries with low respect of human rights (Saeed, 2023).

The findings are mixed (Dunne & Tian, 2013; Saeed, 2023) and will remain mixed. This would be the most suitable conclusion after reviewing the literature on the topic of interest.

Methodology and Data

The relation between defence expenditure and economic performance has been a subject of regression analysis over the last few decades.

$$(1)\ Y_{it} = \beta_0 + \beta_1 DF_{it} + \beta_2 WS_{it} + \varepsilon$$

The model (1) includes defence expenditure and a set of social welfare-state variables in its right-hand side. These variables are measured as a ratio to GDP. The annual (percentage) rate of change of the gross domestic product at market prices is placed on the left side of the model as a result variable. The β_0, β_1, β_2 are parameters of the regression model.

It is not an arbitrary decision for the model to include social welfare-state variables as explanatory variables. Batifoulier et al. (2019) consider the social welfare-state expenditure as part of the preparation for war of a country. Along with this assumption, the governments spend significant parts of their budgets on social policies and programmes so

including this spending in a regression model would give a more detailed explanation of government spending in its totality.

The OLS technique has been applied on a panel data for the EU27 members. The data includes annual observations for the period from 2014 to 2023. Data have been derived from the Eurostat. The raw panel data have been proceeded via the tools which are accessible on Jupyter Notebook.

Regression results and discussion

The following tables provide quantitative indicators to describe the model variables and the regression relation among them. The first table presents each variable's mean and autocorrelations. Autocorrelations are calculated as Pearson correlation of a variable with its lagged values. At first lag, annual rate of change in GDP is the only variable that is free of autocorrelation dependencies. The other variables have too high values of the proxy for autocorrelation that could be explained by the specifics of budgetary process in each country. Conventional practice is the budget for the next year to be prepared and voted in the current year on the basis of forecast for main relevant variables. The forecast usually is based on the economic performance and budgetary implementation in the current year.

Table no. 1. Mean and Autocorrelations of each variable

Variable	Mean	Autocorrelation
Annual rate of change in GDP	2.692	-0.039
Defence expenditure	1.243	0.749
Health care expenditure	6.402	0.874
Recreation and sport expenditure	0.387	0.852
Education expenditure	4.934	0.885

Source: Authors' own calculations; Eurostat.

Second table regresses each right-side variable with the annual rate of change in GDP. All regressions have too low explanatory power. Health care expenditure is the only variable whose relation with economic performance is not statistically significant.

Defence expenditure's relation with economic performance is strongly visible - seen by its statistically significant coefficient. Moreover, the coefficient has a close to zero p-value at which the null-hypothesis was rejected. As expected, the relation is negative so the empirical result is in line with the existing evidence. There are lots of studies which have found negative regression relation. The review of literature pointed out that Dunne and Uye (2009) have reviewed 37 studies estimating negative relation versus 20 studies finding a positive effect of defence expenditure on economic growth. Saeed (2023) found a similar

result in terms of a sample of 133 countries. What is more, Saeed (2023) estimated that "one percentage point of increase in military expenditures as a percentage of GDP leads to approximately 1.10 percentage of reduction in economic growth". Therefore, the value the present paper estimated (-1.134) seemed to be in full accordance with the result of Saeed (2023) which is far more representative and reliable.

Table no. 2. Regression estimates

Variable	Model 1	Model 2	Model 3	Model 4
(Constant)	4.102	6.887	4.336	6.630
Defence expenditure	-1.134*			
Health care expenditure		-0.655		
Recreation and sport expenditure			-4.240*	
Education expenditure				-0.798*
R-squared	0.027	0.065	0.038	0.041
Residuals Standard Deviation	0.415	0.151	1.288	0.234

Source: Authors' own calculations; Eurostat.

Third table provides predictions for economic performance under different levels of defence expenditure. Gradually from one to five percent of GDP ratios are pledged into prediction procedure as possible levels of defence expenditure. The other variables remain unchanged at their average levels because the model has been trained to predict the GDP growth rate on the base of the variables in the regression model specified above.

Table no. 3. Economic growth predictions under different levels of defence expenditure

Scenario	GDP growth rate
Defence expenditure at 1 percent of GDP	3.003
Defence expenditure at 2 percent of GDP	1.710
Defence expenditure at 3 percent of GDP	0.418
Defence expenditure at 4 percent of GDP	-0.874
Defence expenditure at 5 percent of GDP	-2.166
Score	0.126

Source: Authors' own calculations; Eurostat.

The rates predicted are not far from the insights of conventional economic wisdom. The results suggest that a typical member state can afford to increase its defence expenditure up to 3 percent of its GDP without harming economic performance. Exceeding this threshold, the growth of economy turns into shrinking and declining.

Conclusions

The study on the relation between defence expenditure and economic performance in the EU member states provided one more argument in favor of the conventional economic wisdom for a negative effect of military expenditure on economies. The sign and value of the regression coefficient in current paper are too close to the ones found in other studies. The predictions proved that member states can afford to increase their defence budgets up to three percent of GDP. After rising above that threshold, the economic performance is worsening and the rates of economic growth turn into rates of shrinking.

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