MILITARY EXPENDITURE AND UNEMPLOYMENT IN SELECTED NATO MEMBER STATES

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Abstract: The paper is concerned with the relationship between military expenditure and unemployment. The purpose of the paper is to discover the relationship between military expenditure and the unemployment rate using NATO economies as examples and to analyse possible stabilizing effects of military expenditure by means of the ARDL model. The empirical results reveal a negative correlation between military expenditure and the unemployment rate indicating possible important influence of the armed forces as an employer on the labour market in Albania, Bulgaria, Poland and Romania. However, the model results do not confirm that military expenditure could have a stabilizing effect on the state economic policy across NATO member states.

Keywords: military expenditure, labour market, unemployment, personnel economics, ARDL model.

1 Introduction

Unemployment as a sign of imbalance in the labour market is one of crutial issues having an impact on pursuing the economic policy of the state consisting in accomplishing economic objectives of the government. The government through its fiscal policy uses government spending to stimulate the economic growth which has a positive effect on the demand in the labour market and, therefore, unemployment decrease as one of the objectives of the government economic policy. Military expenditure is a substantial part of government spending and forms almost 10 per cent of government spending in the USA and several per cent in the European NATO member states depending on trends in security and economic determinants of military expenditure.

According to the (SIPRI) definition, military expenditure can be understood as total personnel expenditure payable to military and civil personnel, pensions and retirement pays regularly paid to retired soldiers and reservists, expenses connected with social welfare services for the employees and their family members, operating expenses and expenses relating to maintenance, purchase of military equipment, material and services, military construction, military aid, and conducted military research. According to the structure military expenditure can be classified into three groups, namely mandatory spending, current expenditure, and capital expenditure. According to (Kollias et al., 2004) military expenditure as part of government spending can influence the economy among other things through the multiplication effect of government spending during periods when the economy is under the so called potential product. Military Keynesian economics as an economic policy type applied e.g. in Germany in the first half of the 20th century or in the USA at the end of the 20th century represented extensive use of military expenditure to stimulate economic growth and employment. (Garrett-Pollin and Pollin, 2007) describe economic impacts of military expenditure using the USA as an example where thanks to the multiplication effect 8,000 job positions were created as a result of 1 billion of military expenditure. On the other hand, the authors simultaneously demonstrate that 1 billion of government spending in health service, education or transportation, where the multiplication effect is higher in comparison with military expenditure, leads to the creation of a higher number of new job positions in the labour market. (Dunne and Nikolaidou, 2001) simultaneously emphasize that an increase in military expenditure as a possible stimulus to the economy is often accompanied by an increase in taxes, and state budget deficit increase, which can be seen in countries facing public finance deficits experiencing intense pressure on military expenditure reduction especially during the economic crisis; the same trend can be observed in the NATO member states where only a small group of member states meets the requirement for the recommended 2 per cent of military expenditure as GDP percentage. According to (Sanso-Navarro and Cabello, 2015) and similarly according to (Tang et al., 2009) several channels can be observed through which military expenditure can influence supply and demand in the labour market and, therefore, the economic development of a country. Firstly, military expenditure can have a positive effect on labour demand through productivity-improving effects where investments as a component part of military expenditure, if invested in domestic economy, e.g. in the arms industry, naturally increase demand in the labour market. The mandatory part of military expenditure consisting primarily of personnel expenditure has a positive effect on the economic development through the consumption of products and services in the economy. The reallocation effect can have a similar effect in the labour market as it generates frictional unemployment and has an effect on labour supply in individual sectors influenced by military expenditure. Supply and demand in the labour market is further influenced by the tax-distortion effect meaning that military expenditure is financed through the tax system where a possible increase in the tax burden brought about by an increase in military expenditure has an effect on both supply and demand in the labour market.

The purpose of this paper is to explore the relationship between military expenditure and the unemployment rate and to analyse stabilizing (countercyclical) effects of military expenditure by means of the ARDL model.

2 Literature Overview

The analysis of the relationship between military expenditure and selected economic variables is the subject-matter of many economic studies exploring e.g. the analysis of the relation between military expenditure and economic growth (Dunne and Nikolaidou, 2001; Kollias et al., 2004), the analysis of economic determinants of military expenditure (Odehnal and Neubauer, 2020) and also the analysis of the relation between military expenditure and unemployment (Bäckström, 2019; Holcner et al., 2021; Smith, 1977) and shows a positive correlation between military expenditure (share of GDP) and the unemployment rate on the example of eight economies. The authors (Dunne and Smith, 1990) use the Granger causality test to analyse the relation between military expenditure and unemployment and its results fail to prove an effect of military expenditure on unemployment in the analysed OECD countries. The study results (Paul, 1996) confirm the conclusions concerning an ambiguous relation between military expenditure and unemployment on the example of OECD countries where, according to the author, uniform results relating to the analysed economies cannot be expected. In Germany and Australia military expenditure has a positive effect on the unemployment rate while in Denmark military expenditure has a rather negative effect on the labour market. The author fails to prove any significant relation between the analysed economic variables in the USA, Canada, Sweden, New Zealand, Austria, Spain, Italy, the Netherlands and Japan. (Tang et al., 2009) apply the Granger causality test to analyse 46 developing and developed countries from 1988 to 2004. The study results prove a significant relation between military expenditure and the unemployment rate on condition that military expenditure measured as share of GDP and only in developing countries having low GDP. As for OECD countries, the results (Dunne and Smith, 1990) confirm independent analysed variables. The research of the development of military expenditure and the unemployment rate in France from 1975 to 2008 is the subject-matter of the paper (Malizard, 2014). The ARDL model results analysing the unemployment rate, economic growth rate, share of military expenditure of GDP, and share of non-military expenditure of GDP reveal that as for France an increase in military expenditure results in rising unemployment; the author considers a practical implication of

this result where decreased military expenditure could have a positive effect on the unemployment rate. The author reveals a similar correlation between non-defence spending and unemployment; however, its adverse effect is less dramatic than that of military expenditure. The authors (Sanso-Navarro and Cabello, 2015) examine the correlation between military expenditure and unemployment in 15 EU states. The results of the Granger causality test reveal a very low correlation between military expenditure and unemployment where the authors admit that the use of military expenditure as an instrument of stabilization policy in relation to the rising unemployment rate in a country is very limited. Nevertheless, they simultaneously present Austria as an example where the highest correlation can be observed and they admit a possible effect of compulsory military service on the analysed relation in this country. Similar results confirming an increase in the unemployment rate if military expenditure rises are obvious from an analysis of selected 10 Central European countries. On the basis of panel data analysis results the authors (Korkmaz, 2015) confirm the results achieved by the authors (Sanso-Navarro and Cabello, 2015) and they consider government spending invested in education and the infrastructure to be more growth initiating spending. The study (Khan et al., 2015) analysing the relationship on the example of selected Asian countries (Cambodia, China, Malaysia, Pakistan) arrives at similar conclusions. Empirical results confirm that the effect of government spending invested in other industries is by far more positive on the economy of analysed countries than military expenditure.

The conclusions of the above authors are verified in the below text by means of the ARDL model (Gökçeli et al., 2022, Tolasa et al., 2022) where the authors analyse the correlation between military expenditure and the unemployment rate using NATO member states from 1999 to 2020 as an example.

3 Data

To analyse the relation between military expendituere and unemployment, data characterizing military expenditure of the NATO member states (military expendure per capita) and the unemployment rate indicator are used. Data describing military expenditure is acquired from the SIPRI database and data characterizing the unemployment rate development from the WDI database published by the World Bank.

Data characterizing the unemployment rate in 29 NATO member states from 1999 to 2020 describe the lowest unemployment rate at the beginning of the analysed period primarily in the "traditional" NATO member states, where the unemployment rate in Luxembourg was only 2.3%, in Norway 3.2%, in the Netherlands 3.6%, in Denmark 3.1%, in Portugal 4.6%, in the United Kingdom 6%, and in Belgium 8.6%. On the other hand, the highest unemployment rate at the end of the 1990s was reported in France 11.9% and in Italy 11.6%. In 2005 the unemployment rate in Germany was high too, namely 11%. The unemployment rate in North America was 4.2% in the USA and 7.5% in Canada. The analysed traditional member states did not experience any wide fluctuations in the unemployment rate during the following years; more considerable fluctuations occurred as late as 2008 in consequence of the economic crisis faced by the majority of NATO members. The highest increase in the unemployment rate was recorded in Greece and Spain where the unemployment rates in 2013 were 27.4% and 26% respectively. The causes of high unemployment in Greece lay in economic problems of the country connected with the debt crisis and cost-saving measures imposed by the Greek government.

As far as the new member states are concerned (accession at the beginning of the analysed period), the lowest unemployment rate of 6.9% was recorded in Hungary in 1999. The Czech Republic was faced with unemployment of 8.4% and Poland 12.2%. During the economic crisis the unemployment rate increased by 2 per cent on average in the Czech Republic and Hungary. The highest unemployment rate of 19.8% was recorded in Poland in 2002. Constantly falling investments and public finance imbalance were persistent problems in Polish economy. In 2004 new member states acceded to the NATO, out of the former Warsaw Pact the Alliance was joined by Bulgaria, Estonia, Lithuania, Latvia, Romania, and Slovakia. In 2009 the new member states were Albania and Croatia. In 1999 before joining the Alliance the lowest unemployment rate of 6.3% was measured in Romania, followed by Slovenia 7.3%, Estonia 11.5%, Lithuania 13.3%, Croatia 13.5%, Latvia 13.7%, Bulgaria 14.1%, Slovakia 15.9% and Albania 16.6%. The economic crisis had a similar impact on both the traditional and new NATO member states where the unemployment rate increased in the majority of them in 2010: Slovakia 14.3%, Estonia 16.7%, Lithuania 17.8% and Latvia 19.4%. The consequences of the economic crisis became apparent in Croatia and Albania as late as 2015 when the unemployment rates grow to 17.2% and 17.4% respectively. In the last analysed year 2020 the unemployment rate stabilized at 3.8% in Slovenia, Bulgaria and Romania. These countries were followed by Slovakia, Croatia, Estonia, Lithuania, and Latvia where the unemployment rates varied from 5 – 7%. The unemployment rate in Albania was 12.8%. The last two countries that joined NATO were Montenegro in 2017 and North Macedonia in 2020. The unemployment rates measured in these countries before joining were high: more than 30% in 1999. In 2020 the unemployment rates measured in Montenegro and North Macedonia were 14.7% and 16.4% respectively.

Data characterizing military expenditure development (per capita) has been acquired from the SIPRI database. At the beginning of the analysed period, in 1999, military expenditure increased in many countries following a long period of reductions in military expenditure. The USA and France experienced the biggest increase. In 1999 the USA incurred military expenditure (per capita) of the United States dollar (hereinafter abbreviated as USD) 1070.2, Norway USD 739.6, the United Kingdom USD 694.2, and France USD 556.6. On the other hand, Central European countries which were not members of NATO yet incurred the lowest military expenditure (Albania, Lithuania, Latvia, Bulgaria and North Macedonia).

Per capita military expenditure grew in almost all analysed countries from 1999–2004. On the other hand, Belgium reduced military expenditure from USD 350.9 per capita in 1999 to USD 303.6 in 2002 but increased the expenditure significantly to USD 372 per capita in 2003. Military expenditure grew in North Macedonia in 2000 and 2001. In 2000 North Macedonia spent USD 34.3 per capita and in the following year USD 110.8 per capita. It was caused by an armed conflict between the government of North Macedonia and Albanian rebels in 2000–2001 which brought the country to the edge of civil war. Per capita military expenditure went down from USD 158 to USD 112.4 in Turkey in 2001.

In 2004 average world military expenditure corresponded to USD 162.0 per capita and 2.6% of Gross World Product or global GDP. Military expenditure in the USA increased in consequence of massive expenditure on the Global War on Terror, primarily military operations in Afghanistan and Iraq from 2002–2004. The USA spent USD 1686.3 per capita on military purposes, Norway USD 1062.9, the United Kingdom USD 1006.3, France USD 733.5, and Denmark USD 662.4 per capita followed by Greece, the Netherlands, Germany, Italy and Luxembourg. In 2004 seven countries joined NATO. The new members failed to achieve the world average with the exception of Slovenia with USD 247.8 per capita. Bulgaria had per capita military expenditure of USD 80.2, Estonia USD 150.3, Latvia USD 100.6, Lithuania USD 80.1, Romania USD 70.9, Slovakia USD 131.7, and Slovenia USD 247.8. In 2004 Albania had the lowest per capita military expenditure of USD 32.5 a North Macedonia USD 65.8; however, these countries were not NATO members in the given year.

In 2005 the majority of countries reduced military expenditure with the exception of the USA where military expenditure increased from USD 2164 in 2004 to USD 2304 in 2005. That year also saw an increase in per capita military expenditure in Portugal from USD 454.2 to USD 466.8, in Greece from USD

957.8 to USD 971.0, and France from USD 890.0 to USD 902.4. This situation developed in reaction to the economic crisis experienced by the Allies.

The global economic crisis had only a minimal impact on global military spending in 2009. The majority of advanced economies maintained or increased the military expenditure level, the USA increased military expenditure to USD 2304.6 per capita. France maintained the level of USD 902.4 and so did Greece with USD 971.0. All the other analysed countries showed a reduction. The United Kingdom demonstrated a reduction from USD 1173.3 in 2008 to USD 1018.8 in 2009. The new member states joining NATO in 2009 announced reductions in per capita military expenditure, namely Albania from USD 85.1 in 2008 to USD 61.5 in 2009, and Croatia from USD 297.7 in 2008 to USD 260.1 in 2009.

Global military spending did not rise in 2011, for the first time from 1998, primarily due to economic policies adopted in the majority of western countries in consequence of the global economic crisis. Governments in Western and Central European countries imposed austerity measures including cuts in military spending. Greece, Italy and Spain were unable to discharge their debt obligations and in exceptional cases even required financial support from the European Union and the International Monetary Fund. Out of these three countries Greece recorded the biggest fall, it had per capita military expenditure of USD 971.0 in 2009, USD 749.8 in 2010, and USD 658.3 in 2011.

Military expenditure of the USA went down for the first time in 2012. In 2011 it amounted to USD 2414.4, and in 2012 it fell to USD 2309.2. Military spending in the USA actually fell by 5.6%. It was a period of stagnation or rather reduction in military expenditure in all analysed countries.

The US military spending showed a downward trend up to 2015; in 2015 it amounted to USD 1975.3 and stagnated for the two following years. It was a consequence of the withdrawal of the US armed forces from Iraq at the end of 2011 and the effect of the Budget Control Act of 2011.

In 2016 the US military spending increased and it was the first year-on-year increase from 2010, per capita military expenditure amounted to USD 1980.9 in 2016.

In 2017 military expenditure in Western Europe increased and this trend continued in these countries in the subsequent analysed period. One of the reasons was the NATO Wales Summit 2014. The majority of analysed countries showed a modest increase in military expenditure from 2017–2020; in 2020 it was connected with the Covid–19 pandemic. Hungary increased its military spending as part of fiscal stimuli in reaction to the pandemic in 2020. It led to an increase in military expenditure. In 2019 Hungary incurred per capita military expenditure of USD 211.8, and in 2020 USD 249.4.

The relationship between military expenditure and the unemployment rate in selected NATO economies is analysed using the ARDL model in the below sections.

4 Models and Methods

For econometric modeling purposes, we first use panel data models, subsequently we apply ARDL models for individual states. The general panel model can be written in the form

$$y_{it} = \alpha_{it} + \beta_{it}{}'X_{it} + u_{it}, \quad (1)$$

where $i = 1, 2, \dots, n$ is the individual index (for example group, country,…), $t = 1, 2, \dots, T$ is the time index and u_{it} is a random zero mean error term, X_{it} is a $k \times 1$ vector of explanatory variables, β_{it} is a $k \times 1$ vector of unknown parameters. The parameters β_{it} are not estimable with $N = n \times T$ data points, therefore, a number of assumptions is usually made about the parameters, the errors and the exogeneity of regressors. Firstly, let us assume that $\alpha_{it} = \alpha$ for all i, t and $\beta_{it} = \beta$ for all i, t. We get the model

$$y_{it} = \alpha + \beta' X_{it} + u_{it}, \quad (2)$$

which is a standard linear model *pooling* all data across i and t, it can be estimated by the ordinary least squares (OLS) method. To model individual heterogeneity, let us assume that the error term has two separate components $u_{it} = \mu_i + \varepsilon_{it}$, where μ_i is specific to the individual and does not change over time

$$y_{it} = \alpha + \beta' X_{it} + \mu_i + \varepsilon_{it}. \quad (3)$$

The error term ε_{it} is usually assumed independent of both the regressors X_{it} and the individual component μ_i. If the individual component is correlated with the regressors, it usually treats the μ_i as next n parameters to be estimated. This is called the *fixed effect* model (Hsiao 2014; Wooldridge 2002). If we denote $\alpha_i = \alpha + \mu_i$ we obtain the model

$$y_{it} = \alpha_i + \beta' X_{it} + \varepsilon_{it}. \quad (4)$$

This model is usually estimated by OLS. If the individual component μ_i is uncorrelated with the regressors, the model is termed *random effect*, μ_i are not treated as fixed parameters, but as random drawings from a given probability distribution. One of the assumptions related to OLS is that the error term is independently and identically distributed. In the context of panel data it means that $E(u_{it}^2)$ equals a constant σ_u^2 for all i and t, the covariance $E(u_{is}, u_{it})$ is equal to zero for all $s \neq t$ and the covariance $E(u_{jt}, u_{it})$ equals zero for all $j \neq t$. If these assumptions are not met, and they are unlikely to be met in case of panel data, OLS estimator is not the most efficient estimator. To get greater efficiency, the generalized least squares (GLS) method, taking into account the covariance structure of error term, may be used.

A dynamic linear panel data model can be written in the form

$$y_{it} = \rho y_{i,t-1} + \beta' X_{it} + \mu_i + \varepsilon_{it}. \quad (5)$$

The model is first differenced to get rid of the individual effect. First differencing (5) yields

$$\Delta y_{it} = \rho \Delta y_{i,t-1} + \beta' \Delta X_{it} + \Delta \varepsilon_{it}. \quad (6)$$

The error term $\Delta\varepsilon_{it}$ is autocorrelated and also correlated with lagged dependent variable $\Delta y_{i,t-1}$. A generalized method of moments approach is used to get estimates of equation (6), see (Arellano and Bond, 1991).

To model individual countries we apply the autoregressive distributed lag model ARDL($p, q_1, q_2, \dots, p_k$), where p is the number of lags of the dependent variable Y_t, $q_1, q_2, \dots, q_k$ are numbers of lags of explanatory variables X_{it}, $i = 1,2, \dots, k$. The model can be written in the form

$$Y_t = \alpha + \sum_{i=1}^{p} \gamma_i Y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} \beta_{j,i} X_{j,t-i} + \varepsilon_t,$$

where ε_t is a one-dimensional zero mean error term. The lag lengths in the model can be determined by the standard information criterion such as Akaike, Schwarz or Hannan-Qiunn information criterion (see for example Baltagi, 2011).

5 Results

The purpose of statistical analysis is to identify the relation between military expenditure and unemployment. We use the below denotations in the following models:

Milex	logarithm of military expenditure per capita
Unempl	logarithm of unemployment rate

Data about 29 selected NATO member states from 1999–2020 are analysed.
First, we calculate tests of individual roots for the given panel, see Table 1. Total 4 tests are used (see for example Hsiao, 2014) and it arises from their results that the analysed time series can be considered stationary at a 0.05 level of significance.

Tab. 1: Panel unit roots

	Levin,Lin & Chu	Im, Pesharan and Shin	ADF-Fisher	Maddala-Wu
Unempl	0.0357	0.0024	0	0
Milex	0	0.0038	0.0051	0

Source:https://milex.sipri.org/sipri, https://databank.worldbank.org/source/world-development-indicators#, authors‘ calculation.

We also analyse possible causal relationship between variables. The Dumitrescu Hurlin Panel Causality Test (Dumitrescu and Hurlin, 2012) is carried out for lag 1 and 2, see Table 2. As for lag 1, it can be stated that there is a mutual causal relationship between the variables, and as for lag 2, it can be stated that there is only one-way causal relationship when military expenditure has a causal influence on unemployment in Granger‘s sense.

Tab. 2: Granger causality test

	lag 1	lag 2
Unempl does not homogeneously cause Milex	0	0.0024
Milex does not homogeneously cause Unempl	0	0.7009

Source: https://milex.sipri.org/sipri, https://databank.worldbank.org/source/world-development-indicators#, authors‘ calculation.

To perform a detailed analysis of the identified relationship the fixed effect model (Table 3) and the GMM dynamic panel (Table 4) are used. In both models delayed values of the Unempl variable and values of the Milex variable are selected as regressors. In the fixed effect model an autocorrelation analysis of residues is performed and it can be stated that the residues are not correlated (p-value of Breusch-Godfrey/Wooldridge test for lag 1 is 0.09411, for lag 2 is 0.1665; Durbin-Watson test p-value is 0.1617, Wooldridge's test p-value is 0.1772). The autocorrelation structure of residues in the GMM model also complies with the model assumption (Arellano-Bond test AR(1) p-value is 0.00018, AR(2) p-value is 0.42219). The results of the fixed effect model confirm a negative relationship between the analysed variables in the group of NATO member states where the increased military expenditure algorithm (military expenditure per capita) causes a decrease in the unemployment rate by 0.05%. A similar conclusion can be reached in the GMM dynamic model where an increase in the military expenditure algorithm causes a decrease in the unemployment rate by 0.089%.

Tab. 3: Panel data – fixed effect model

Coefficients	Estimate	Std. Error	*t*-value	*p*-value
const	0.709	0.130	5.444	0.00000
$Unempl_{t-1}$	1.347	0.036	37.638	0.00000
$Unempl_{t-2}$	–0.551	0.037	–14.855	0.00000
$Milex_t$	–0.050	0.019	–2.642	0.00847

Source: https://milex.sipri.org/sipri, https://databank.worldbank.org/source/world-development-indicators#, authors‘ calculation.

Tab. 4: Panel data – dynamic GMM model

Coefficients	Estimate	Std. Error	*z*-value	*p*-value
$Unempl_{t-1}$	1.314	0.069	18.992	0.00000
$Unempl_{t-2}$	–0.559	0.059	–9.524	0.00000
$Milex_t$	–0.089	0.031	–2.821	0.00479

Source: https://milex.sipri.org/sipri, https://databank.worldbank.org/source/world-development-indicators#; authors‘ calculation.

We use the ARDL model to perform a detailed analysis of the relationship between military expenditure and the unemployment rate enabling us to analyse the results for every of the NATO member states which are part of the research. The results identify a statistically significant relationship confirming the anticipated relationship concerning Albania, Bulgaria, Poland and Romania (0.05 level of significance). It can also be found in Germany at 0.10 level of significance.

The estimated parameter is negative for states like Belgium, Canada, Croatia, Estonia, Latvia, Lithuania, Luxembourg, North Macedonia, Norway, Romania, and Slovakia; however, it is statistically insignificant. The estimated parameter is positive for the remaining countries; however, the estimates are not statistically significant.

Tab. 5: ARDL model

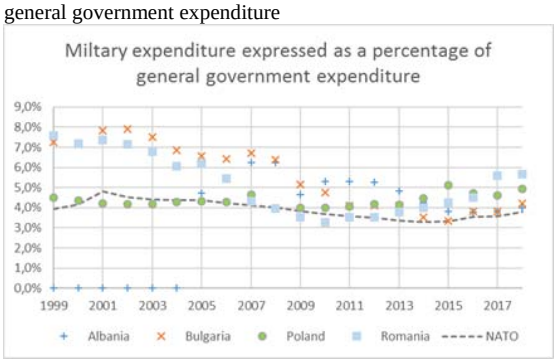
	Coefficients				*p*–values				R^2
	const	$Unempl_{t-1}$	$Unempl_{t-2}$	$Milex_t$	const	$Unempl_{t-1}$	$Unempl_{t-2}$	$Milex_t$	
Albania	2.005	0.975	–0.580	–0.095	0.00433	0.00022	0.01529	0.03572	0.757
Belgium	1.046	1.028	–0.443	–0.035	0.21762	0.00012	0.06635	0.77854	0.631
Bulgaria	2.509	1.295	–0.718	–0.339	0.01184	0.00000	0.00047	0.02309	0.936
Canada	1.450	0.940	–0.372	–0.100	0.06083	0.00083	0.16243	0.19502	0.601
Croatia	1.062	1.614	–0.940	–0.046	0.20914	0.00000	0.00001	0.70305	0.938
Czech Republic	–0.659	1.389	–0.402	0.118	0.59659	0.00002	0.17643	0.56290	0.898
Denmark	0.236	1.039	–0.386	0.053	0.86957	0.00035	0.11072	0.80612	0.650
Estonia	1.958	1.033	–0.585	–0.145	0.04143	0.00014	0.01007	0.20335	0.724
France	0.089	0.825	–0.152	0.094	0.94137	0.00304	0.54391	0.49661	0.511
Germany	1.387	1.423	–0.479	–0.211	0.07800	0.00000	0.04416	0.07702	0.976
Greece	–0.386	1.724	–0.807	0.096	0.60653	0.00000	0.00003	0.35245	0.966
Hungary	–0.226	1.612	–0.700	0.078	0.77601	0.00000	0.00645	0.55913	0.927

Italy	–0.288	1.396	–0.507	0.087	0.87782	0.00000	0.04544	0.72547	0.862
Latvia	2.387	1.038	–0.667	–0.178	0.01316	0.00015	0.00313	0.08588	0.781
Lithuania	1.993	1.158	–0.703	–0.156	0.01251	0.00001	0.00062	0.10310	0.832
Luxembourg	0.525	0.843	–0.071	–0.023	0.72855	0.00381	0.75829	0.93057	0.737
Montenegro	0.587	1.206	–0.415	0.001	0.54249	0.00045	0.08809	0.99376	0.866
Netherlands	0.306	1.424	–0.730	0.025	0.77753	0.00000	0.00021	0.88568	0.882
North Macedonia	–0.118	1.395	–0.287	–0.066	0.73692	0.00002	0.34464	0.26554	0.964
Norway	1.709	1.066	–0.593	–0.147	0.07417	0.00005	0.00575	0.23447	0.721
Poland	1.816	1.347	–0.545	–0.265	0.04177	0.00000	0.00611	0.04781	0.970
Portugal	0.036	1.407	–0.578	0.057	0.96924	0.00000	0.00376	0.74481	0.926
Romania	1.240	0.441	0.332	–0.180	0.04836	0.08802	0.19171	0.01329	0.842
Slovakia	0.171	1.441	–0.505	–0.009	0.87359	0.00003	0.05513	0.94739	0.920
Slovenia	0.449	1.464	–0.724	0.005	0.62696	0.00000	0.00677	0.96666	0.831
Spain	–1.169	1.348	–0.486	0.262	0.38017	0.00001	0.03854	0.22174	0.893
Turkey	1.340	0.780	–0.472	0.050	0.04204	0.00078	0.04226	0.71739	0.533
UK	–1.235	1.183	–0.384	0.230	0.33643	0.00024	0.14995	0.23154	0.855
USA	0.329	1.436	–0.712	0.020	0.77015	0.00000	0.00154	0.89859	0.857

Source: https://milex.sipri.org/sipri, https://databank.worldbank.org/source/world-development-indicators#, authors' calculation.

The ARDL model results do not confirm the stabilizing effect of military expenditure in the NATO member states where military expenditure has a positive effect on the unemployment rate demonstrated in the form of a decrease in the rate in a small group of the new member states. It is also not possible to consider the results uniform within the Alliance and no general conclusion can be reached that an increase in military expenditure causes a decrease in unemployment. A closer analysis of Albania, Bulgaria, Poland and Romania indicates that military expenditure as part of the prioritization of the army (measured as a share of military expenditure of government spending) in these countries is above-average in the current form of the Alliance, see Figure 1. Figure 1 illustrates that the highest share of military expenditure of government spending can be seen in Bulgaria and Romania in the first half of the analysed period and in Poland in the latter half of the period.

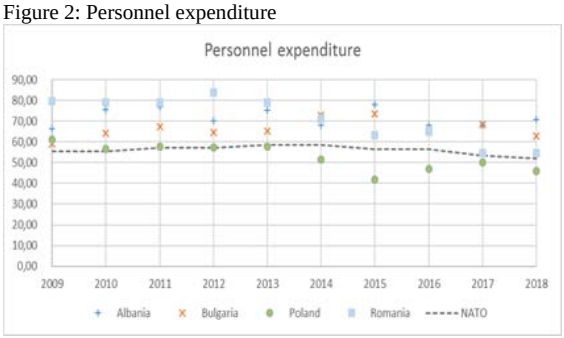
Figure 1: Military expenditure expressed as a percentage of general government expenditure



Source: https://milex.sipri.org/sipri, adjusted by the authors.

Figure 2 shows that in countries where the reducing effect of military expenditure on unemployment has been detected, more than 60% of military expenditure arises primarily from personnel expenditure for almost the entire analysed period, provided that military expenditure is classified into mandatory spending (personnel expenditure), current expenses, and investment. The only exception is Poland where the recommended military expenditure structure has been followed since the NATO Wales Summit.

Figure 2: Personnel expenditure



Source: https://milex.sipri.org/sipri, adjusted by the authors.

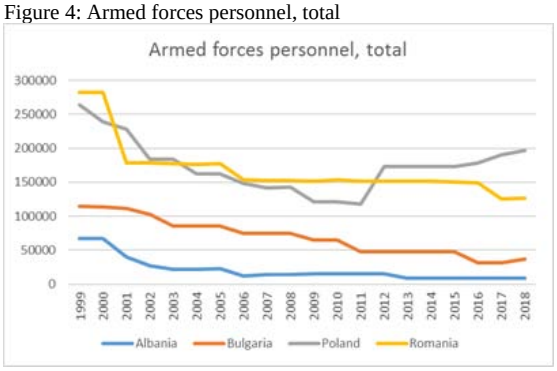
Figure 3 shows that the share of armed forces personnel of total labour force compared with the Alliance average is above-average in the 4 analysed countries (with the exception of Poland and Albania starting from 2013), which demonstrates the position of the armed forces as an employer in the labour market. A higher share of the military personnel can be seen especially in Bulgaria and Romania if compared with the NATO average. The armed forces as an employer in the labour market employ a higher share of people in comparison with the NATO average in countries where a relationship between military expenditure and the unemployment rate has been discovered.

Figure 3: Armed forces personnel

Source: https://databank.worldbank.org/source/world-development-indicators#, adjusted by the authors.

Figure 4 shows the development in the number of personnel in the 4 analysed NATO member states. Figure 4 shows a significant reduction in the personnel especially at the beginning of the analysed period. The development was influenced by the transition to a professional army in the majority of countries. An increase in the number of personnel in Poland can be clearly seen from 2014 in connection with the policy of Russia.

Figure 4: Armed forces personnel, total



Source:https://databank.worldbank.org/source/world-development-indicators#, adjusted by the authors.

The analysis of the development of selected indicators characterizing military expenditure, its structure, and selected labour market indicators shows possible causes of the relationship between military expenditure and the unemployment rate in Albania, Bulgaria, Poland and Romania. It primarily concerns the position of the armed forces as an employer in the labour market because the share of armed forces personnel is higher in the analysed countries in comparison with the NATO average. It also shows the structure of military expenditure in this group of countries where the majority of military expenditure is represented by mandatory spending, i.e. expenses covering salaries of soldiers, which is one of the factors making armed forces attractive as an employer in the labour market. The share of employed military personnel of the total labour force, however, is only one of the channels through which military expenditure can influence unemployment in individual regions and entire countries. The economic consequences of military expenditure in the form of a multiplication effect and its effect on the economic development of a country, e.g. in the form of investments and, therefore, also acquisitions of military hardware and equipment or conducted research significantly stimulate employment in domestic armaments industry.

6 Discussion and Conclusion

The relationship between military spending and unemployment is a controversial aspect of the National Defence Economy. This relationship has been examined by many authors but the studies have not indicated any uniformity in empirical results. Previous publications have investigated the economic relations between military recruitment and its effect on the labour market in the Czech Republic (Holcner et al., 2021). The results have not confirmed that a higher share of military expenditure of GDP has a positive effect on army recruitment and a higher number of new employees in armed forces. A hypothesis suggesting that a higher unemployment rate has a positive effect on army recruitment and a higher number of recruited soldiers has also been rejected. The publication (Bäckströma, 2019) explored the relationship between the conditions in the civil labour market and the labour force offer in the Swedish army.

To identify possible relations between the two aforementioned variables in selected NATO member states, the authors have used the ARDL model. The time series relating to the time period from 1999 – 2020 has been selected in the SIPRI and World Bank databases. The empirical results have indicated a negative correlation between economic growth and military expenditure in 4 countries (Albania, Bulgaria, Poland, and Romania). The results, therefore, have not confirmed agreement among the NATO member states and provide only limited support for the idea about military expenditure having a positive effect on unemployment reduction and a stabilizing effect on the economy. The results have not confirmed the idea about a reduction in military expenditure leading to a reduction in unemployment due to a reallocation of public spending to other industries which can be considered industries having a more positive effect on the employment in the country in view of the situation in the labour market. The economy of every country has a whole range of determinants influencing the unemployment rate. The purpose of this article was to analyse one of these factors, namely military expenditure as part of government spending. Despite the aforementioned, military expnditure also has a positive effect on the economy which should be examined and analysed, e.g. the multiplication effect of military expenditure and its macroeconomic consequences, or the effect of military expenditure on regional labour markets.

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