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Armed Forces and Society

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# Do Elections Cause Military Spending to Go Up or Down? New International Evidence

Armed Forces &amp; Society

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## Abstract

This study explores whether the level of military expenditures is affected by the occurrence of elections. From a theoretical perspective, it is not immediately clear whether, and if so, in which direction, upcoming elections shift military expenditures. On the one hand, the incumbent may try to enhance the likelihood of being re-elected by supporting the domestic defense industry. On the other hand, it might be more attractive to cut defense spending and increase non-defense spending. It is also possible that both effects coexist. We therefore apply the finite mixture model (FMM), which is able to test competing hypotheses. Our results, based on a panel of 93 democratic countries between 1980 and 2018 and Stockholm International Peace Research Institute (SIPRI) data on military spending, yield support for both hypotheses. Countries facing security risks or having a significant defense industry are most likely to expand their defense spending in an election year, while other countries are more likely to reduce their defense expenditure.

## Keywords

political budget cycles, military spending, non-military government spending, finite mixture models

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## Introduction

National security is regarded as one of the most important policy aims of any government because a stable and peaceful environment is a necessary condition for economic prosperity.<sup>1</sup> For this reason, most countries allot a substantial part of their government budgets to defense. However, earlier studies have shown that the size of the annual defense budget is not only determined by national security considerations but is also affected by political economy variables (see, for instance, Bove et al., 2017; Mintz, 1988). According to the political budget cycle (PBC) literature, the primary aim of incumbents is to get re-elected (Nordhaus, 1975; Tufte, 1978). There is evidence that incumbents—under certain conditions—use fiscal policy to improve their prospects to get re-elected (see De Haan & Klomp, 2013; Dubois, 2016; Franzese, 2002; Klomp, 2023, for reviews of the literature).

However, the direction of opportunistic electoral cycles in defense spending is not clear. On the one hand, increasing the defense budget before an election may boost the economy, notably in regions with a large defense industry, which may increase the incumbent's electoral support because voters reward politicians for high economic growth rates and low unemployment. Meanwhile, in many arms-producing countries, there are close connections between politicians, the armed forces, and the defense sector (Luechinger & Moser, 2014). This creates an environment where political support is traded in return for political favors to the defense industry. Buying from the national defense industry is typically justified by the substantial industrial benefits that accrue from these procurement decisions.

On the other hand, most countries lack a defense industry, so that higher defense spending will mainly lead to higher imports that do not boost the domestic economy. Although politicians prefer to spend more on the military as national defense is perceived as a general measure of international status and prestige (Beckley, 2018), voters generally assign low priority to military spending, especially in periods of peace. Under those circumstances, it may therefore be more attractive for the incumbent to cut defense spending and increase other public spending categories that voters may prefer, such as social welfare, health care, infrastructure, or education, notably if there is no clear threat to national security.

Empirical literature on the impact of elections on defense spending yields conflicting results. Several studies find a positive effect of elections, suggesting that governments increase military expenditures or domestic defense procurement contracts shortly before elections (Cusack & Ward, 1981; Mayer, 1992, 1995; Nincic & Cusack, 1979). In contrast, other studies conclude that there is no election cycle in defense spending (Zuk & Woodbury, 1986) or that the defense budget is cut when elections are approaching to finance expansions in other public spending categories (e.g., Bove et al., 2017; Yalta & Tüzün, 2021; Zuk & Woodbury, 1986). This inconclusive picture is not so surprising as there are two competing theories as outlined above, which, depending on the national security situation and the prevalence of a defense industry, may both be true.

Most previous studies on election cycles in defense spending use either a time series model for one country (notably the United States) or cross-country panel models. However, standard econometric models are unable to test for the possible coexistence of contrasting effects of elections on the defense budget as they assume that one theory explains all observations. This issue can partly be mitigated by using interaction terms, but the problem still exists when the variation is caused by a complex function of multiple variables or even unobservable variables. Consequently, the conclusions that can be drawn from these earlier studies are rather limited as researchers can only empirically demonstrate the dominance of one theory over rival theories. However, it is possible that both effects coexist in one sample, as some observations are better explained by one theory, while other observations are more consistent with another theory. Finite mixture models (FMMs) provide a good alternative for panel models with interaction effects (Imai & Tingley, 2012). FMMs allow for heterogeneous processes to drive outcomes as they combine elements from mixed effect models together with cluster analysis methods to account for country-specific unobserved heterogeneity (Chen et al., 2008). This methodology is widely used in political science for explaining voting behavior (see, e.g., Bonica & Cox, 2018; Canes-Wrone & Kistner, 2022; Zhirkov, 2021). The basic idea of mixture models is that each observation is assumed to be generated by one of the rival theories. FMMs estimate the probability that a particular observation is consistent with either of the competing theories. These observation-specific probabilities can be averaged to serve as an overall performance measure for each model.

The contribution of this study is to test two competing hypotheses—that is, elections increase or decrease the defense budget—using FMMs. To address heterogeneity within the sample, we use different political variables related to the underlying assumptions of both theories. Our results suggest that both hypotheses find support in the data: countries that suffer from security risks or have a major defense industry increase defense spending when elections are upcoming, while other countries are more likely to decrease defense expenditures during election times. These findings fit a more general pattern within the defense economics literature arguing that the external and domestic political situation influence defense spending (see, e.g., Becker, 2021; Kuokštytė et al., 2021).

The remainder of the paper is structured as follows. Section “Theoretical Background” provides a theoretical discussion, while section “Research Design” describes the data and methodology used. Section “Empirical Results” presents our findings. The final section offers the conclusions.

## **Theoretical Background**

According to the PBC theory (Nordhaus, 1975; Tufte, 1978), recent economic outcomes affect voting behavior. This, in combination with the assumption that incumbents aim to get re-elected, leads to the prediction that fiscal policy will be expansionary before elections. More recent versions of the theory, combining rational expectations and information asymmetry, lead to the same prediction

(see, e.g., Franzese, 2002; Persson & Tabellini, 2003; Rogoff & Sibert, 1988; Shi & Svensson, 2006). These assumptions suggest that there is an incentive for governments to implement expansionary fiscal measures toward the end of their term to boost economic activity. For instance, increasing the defense budget prior to an election could generate employment opportunities in the defense industry and bolster corporate earnings (Becker, 2021; Klomp, 2023), thereby signaling the competence of the incumbent leader in handling the economy (Mayer, 1992).

Moreover, this inclination could be reinforced by politicians prioritizing the defense sector in view of its crucial role in ensuring national security through self-sufficiency in weapon supply (Heidenkamp et al., 2015). Notably, there exists a close nexus between politicians and defense corporations in numerous arms-producing states (Mayer, 1992, 1995). This relationship is particularly evident in the United States where a revolving door dynamic can be observed. Former high-ranking executives from the defense industry often secure significant governmental positions, while retired military officials and former congress members frequently find themselves appointed to the boards of defense companies (Luechinger & Moser, 2014; Moore, 2010; Rundquist, 1978). In addition, defense-related corporations make substantial campaign contributions to political parties and actively engage in lobbying efforts for support. For instance, in the United States, the defense industry consistently ranks among the top 10 sectors in terms of presidential election campaign expenditures. In return, presidents may provide political favors to this industry, such as augmenting the defense budget or increasing domestic procurement (e.g., Brender, 2018; Fleisher, 1993; Kim, 2019; Tripathi, 2000). Having a military background may also affect politicians' votes received (Richardson, 2022).

The preceding considerations provide the basis for the first hypothesis that will be tested in this study.

**H1:** *Governments increase defense expenditures when elections are upcoming.*

However, several other studies pose that defense spending decreases for electoral reasons. This alternative view is based on three arguments. First, most countries lack an economically meaningful defense industry. In fact, more than three-quarters of the arms market turnover is concentrated in only seven countries—the United States, the United Kingdom, Russia, China, France, Germany, and Italy. As a result, in most countries, the benefits of higher defense expenditures will mainly flow abroad so that the fiscal multiplier of defense spending is much lower than the multiplier of other public spending categories (Barro & De Rugy, 2013).

Second, voters may punish politicians who finance higher government spending by higher taxes or borrowing (Peltzman, 1992). This argument implies that upcoming elections give the incumbent an incentive to target some pivotal groups of voters at the expense of others. In other words, elections will not lead to higher budget deficits but in the composition of revenues and spending (see De Haan & Klomp, 2013; Drazen & Eslava, 2010; Kneebone & McKenzie, 2001; Potrafke, 2010). Traditionally, military expenditures tend to receive lower priority from voters, particularly during

times of peace. Consequently, governments are inclined to reduce military spending during an election year to allocate funds towards other public expenditure categories such as social security, education, health care, or infrastructure projects, which are deemed more visible and valuable to the electorate and are likely to garner more votes (Cusack & Ward, 1981; Efthyvoulou, 2012; Kamlet & Mowery, 1987; Mintz, 1988; Nincic & Cusack, 1979; Su et al., 1993; Zuk & Woodbury, 1986).

Finally, the benefits of higher defense spending in terms of bolstering national security are only realized in the long run, whereas the costs are manifested in the short run. Consequently, incumbents are incentivized to underinvest in such policies when elections are upcoming. Empirical evidence indicating that participation in peacekeeping missions or foreign military operations falls in election times (Buts et al., 2017; Marinov et al., 2015) fits this logic.

These considerations yield the alternative hypothesis that will be tested in this study.

**H2:** *Governments reduce defense expenditures when elections are upcoming.*

The opposing hypotheses and the mixed empirical evidence found in previous studies make it clear that applying the PBC theory to military spending is complicated. Indeed, in a recent meta-analysis of this literature, Klomp (2023) demonstrates that there is only weak evidence in support of the second hypothesis. One explanation for the lack of robust evidence is that former studies are mostly based on the implicit presumption that election cycles do not differ across countries. However, in line with the recent PBC literature as surveyed by De Haan and Klomp (2013), a better question to ask is not whether election cycles in defense spending occur, but under which circumstances. That is precisely what the current paper aims for. For instance, threats to national security or the presence of a large defense industry may cause the impact of elections on defense spending not to be the same everywhere and at all times.

In testing our hypotheses, it is important to take some special characteristics of the defense sector into account. Unlike most other economic sectors, firms in the defense sector only produce for governments. Furthermore, there are often close ties between the government and the defense sector. A driving force behind this tight relationship is that both sides benefit from this connection—one side from obtaining weaponry and the other from being paid to supply them. The defense industry may have political influence, via several channels such as the revolving door (Luechinger & Moser, 2014; Moore, 2010; Griffiths & Simon, 2021), and lobbying and campaign contributions (e.g., Fleisher, 1993; Kim, 2019; Tripathi, 2000).

## Research Design

### Data

The relationship between elections and military expenditures is estimated for an unbalanced panel dataset between 1980 and 2018. As the PBC theory presumes that elections take place in a competitive, fair, and democratic way, we only include

country years with a Polity IV democracy score of at least six. Applying this filter leaves us with 93 countries.<sup>2</sup> Data on military spending are taken from the Military Expenditure Database published by the Stockholm International Peace Research Institute (SIPRI). Military expenditures data from SIPRI are based on the North Atlantic Treaty Organization (NATO) definition, which covers all current and capital expenditures on the armed forces, including spending on operations (interventions, training, peacekeeping), procurement, maintenance, military R&D, defense ministries and other government agencies engaged in defense projects, rewards for civil and military personnel (including pension and social security), military aid, paramilitary forces trained and equipped for military operations, and military space activities. On average, the countries considered in our sample spend annually about 260 U.S. dollars per person on defense. However, there is substantial heterogeneity over time. On average, military spending is about a quarter higher in the Cold War period compared with more recent years. Military spending also differs across countries. Major spenders are, for instance, the United States and Israel which spend annually well above 2,000 U.S. dollars per capita on military expenditures. On the other side, Ghana and Senegal spend less than 20 U.S. dollars per capita on defense.

Information on the election dates was mainly collected from the Database of Political Institutions (DPI). We follow Klomp and De Haan (2016) in identifying elections relevant to our study: If the president lacks legislative powers over fiscal policy and is accountable to a parliamentary majority that can bring the government down by voting “no confidence,” only elections for parliament are considered; otherwise, also presidential elections are taken into account. Furthermore, following Shi and Svensson (2006), we consider elections only if they: (1) are held on a fixed date that is specified by the constitution; (2) are held in the final year of a constitutionally fixed term for the legislature; or (3) are publicly announced at least 1 year in advance. It is common practice in the PBC literature to employ dummies for election years, but this ignores the timing of elections (Franzese, 2000). Following Franzese (2002), our election variable is therefore computed as  $M/12$  in an election year and  $(12 - M)/12$  in a year preceding an election, where  $M$  is the month of the election. Its value is set equal to zero in all other years.

As a preliminary statistical test, we compute the pairwise correlation between military expenditure and the election variable. The  $p$ -value of .13 suggests that the correlation is insignificant. This is not surprising in view of the ambiguous theoretical predictions discussed above. However, this non-parametric test is only suggestive, as unobserved country heterogeneity, as well as other confounding variables, are not taken into account.

### *Finite Mixture Models*

Most previous studies typically assume that the election effect on defense spending is homogeneous across countries. However, the assumption that all observations are the outcome of one data-generating process may not be true (Morduch & Stern, 1997).

Incumbents in different countries may face different constraints and incentives and therefore behave differently. To examine possibly heterogeneous election effects, previous studies primarily resort to the inclusion of interaction effects. However, this approach has some limitations, making it inadequate for testing multiple competing theories (Van Horn et al., 2015). In particular, interaction terms take a confirmatory approach and test for deviations from a general effect based on a moderating variable—examining differential effects as a linear function of interacting variables. For instance, following Brender and Drazen (2005), several studies test whether the effect of elections on fiscal policy is conditioned by how long a country has been a democracy (see De Haan and Klomp, 2013 for a discussion of this literature). However, interactions models assume that all observations fit one data distribution and that the significance, magnitude, and sign of the interaction term only determine the position on this distribution. Interaction terms are, therefore, not adequate when there are multiple data distributions within the sample. A second weakness of the interaction approach is that the interacting variables are selected based on priors of the researchers. However, the multiple data distributions may be based on unobserved or latent factors or a combination of variables so that a single interaction term would not capture the actual distribution. Finally, interaction terms are difficult to interpret, as the statistical significance and size effect should be based on the estimated cross-partial derivative (see, e.g., Beiser-McGrath and Beiser-McGrath, 2023; Berry et al., 2012; Brambor et al., 2006; Hainmueller et al., 2019).

An alternative approach applied by many researchers to explore conditionality is to split the sample of countries. However, this raises several new concerns. For instance, when the sample is split based on an endogenous factor, it raises the problem that the data on which the estimation results for the different samples are based, are not drawn from the same distribution. This complicates comparing estimation results across the different categories. An underlying problem is the source of variation in the dataset. Is the variation observed between countries or within countries over time? A sample split can easily pick up the first type of variation, but not the latter. A final issue is that using sample splits makes the estimates less efficient as the number of observations drops.

We therefore apply FMMs to estimate the relationship between elections and military expenditures. This estimation technique is a semi-parametric method for modeling unobserved heterogeneity in the sample that allows us to relax the assumption of one data-generating process as parameters may vary across groups of observations, which makes it possible to determine the conditions under which competing theories apply (see also Bagozzi et al., 2014; Lee & Wang, 2021; Wang & Lee, 2021). Mixture models generate endogenous group membership and permit explaining group membership with several concomitant variables (Van Horn et al., 2015). Each observation has a probability of belonging to one group or another. The FMM method endogenously assigns observations across subgroups based on the information provided by the concomitant variables. This feature is far more attractive than exogenous membership selection, which could be highly sensitive to arbitrariness, data mining, and sample selection biases (Di Vaio & Enflo, 2011).

More specifically, Van Horn et al. (2015) argue that interaction models are appropriate for direct tests of specific hypotheses about differential effects, but finite mixture regressions are better able to explore heterogeneity. When the models become more complicated, such as multiple predictors and multiple latent groups, FMMs are preferred as they more clearly identify heterogeneous effects that are difficult to identify using interaction effects. Generally, FMMs are preferred when: (1) more than two subgroups are identified in case of multiple interaction terms with dummy variables; (2) group membership is not perfectly related to a single interaction variable as the group classification is a function of multiple variables or a complex function of a few variables; (3) residual variances differ for different groups; and/or (4) the interaction variable is not a reliable proxy for the phenomenon it intends to measure.

FMMs are estimated in two stages. In our case, in the first stage, country-year observations of defense spending are clustered in different groups based on a set of concomitant variables that may explain why voter preferences for defense spending differ. In the second stage, we estimate the effect of elections on defense spending for each group found in the first stage. The basic assumption is that this election effect differs across groups. More formally, assume that each observation belongs to one of a set of latent groups  $c = 1, \dots, C$ , and that observations are heterogeneous across groups. Conditional on the observed covariates, there is homogeneity within a given group  $c$ . The mixture model is defined by

$$f(y | x, z) = \sum_{c=1}^C \pi_c(z, \alpha_c) \varphi_c(m | x, \beta_c^x, \sigma_c) \quad (1)$$

where  $y$  is the dependent variable (in our case: real government military expenditure per capita),  $z$  denotes the vector of concomitant variables on which the classification in groups is based with the coefficients  $\alpha_c$ , while  $\pi_c(z, \alpha_c)$  denotes the posterior probability of a country belonging to the latent group  $c$ , and  $\varphi_c(m | x, \beta_c^x, \sigma_c)$  represents the distribution of military spending conditional on belonging to group  $c$  and on a vector of covariates  $x$  with the corresponding coefficients  $\beta_c^x$ . Finally, the parameter  $\sigma_c$  is the standard deviation of the error term in group  $c$ .

The probability of belonging to a given group  $m$  is estimated by a multinomial logit model

$$\pi_m = \frac{\exp(\alpha_m + z\alpha_m)}{\sum_{c=1}^C \exp(\alpha_c + z\alpha_c)}, \text{ with } 0 < \pi_c < 1 \text{ and } \sum_{c=1}^C \pi_c = 1 \quad (2)$$

Intuitively, the finite mixture approach allows us to endogenously determine the groupings of observations by including characteristics that do not affect the dependent variable directly but may influence this variable by determining the probability

of group membership. Following the assumption that the error term is normally distributed, the log-likelihood function is given by

$$\max_{\pi} \log L = \sum_{i=1}^N \left[ \log \left( \sum_{c=1}^C \pi_c(z, \alpha_c) \prod_{t=1}^T \varphi_c(m | x, \beta_c^x, \sigma_c) \right) \right] \quad (3)$$

We estimate this using maximum likelihood. Based on Bayes' rule, we next compute the posterior possibility of an observation belonging to a particular group as

$$\hat{\pi}(m | z_i, m_i) = \frac{\pi_m(z, \hat{\alpha}_m) \varphi_m(m | x, \hat{\beta}_m^x, \hat{\sigma}_m)}{\sum_{c=1}^C \pi_c(z, \hat{\alpha}_c) \varphi_c(m | x, \hat{\beta}_c^x, \hat{\sigma}_c)} \quad (4)$$

Following previous studies (Liu et al., 2020; Owen et al., 2009), observations are assigned to the group with the largest posterior possibility.

### Our Approach

The first step is to decide on the appropriate number of latent groups into which the sample can be divided. In FMMs, countries are endogenously classified based on concomitant variables instead of ad hoc guidelines or priors. We base this selection on two commonly used theories—median voter theory and special interest group theory. The set of variables capturing the special interest group theory refers to power relations among politicians, the defense industry, and the armed forces, and how this nexus affects policy decisions. In turn, the variables related to the median voter theory describe the preference for defense spending by the electorate of a specific country.

The first concomitant variable employed is the size of the defense industry.<sup>3</sup> As reliable data for the size of the defense sector are lacking for most countries, we use arms exports as reported by the SIPRI as a proxy.<sup>4</sup> In addition, we use a dummy variable taking the value one for major military powers (and zero otherwise) as a concomitant variable. Voters in countries that are recognized as military powers are likely to attach a higher value to defense spending as a kind of national prestige. At the same time, leaders of these superpowers have an incentive to increase their arsenal of offensive weapons because otherwise, it would weaken their position vis-à-vis other states (Bueno de Mesquita et al., 1999).

To capture the military's influence on public policy, we use the military in politics index reported by the International Country Risk Guide (ICRG). When the (non-elected) military becomes more involved in the political process, then it is likely that the interests of the armed forces are more represented in actual policies. Defense

spending priorities will shift in favor of the armed forces' interest, rather than the population in general (Bove & Nistico, 2014).

To capture voters' support for military spending,<sup>5</sup> a dummy variable is included that takes the value one when a country belongs to the most patriotic nations around the world based on the survey outcomes reported by Gallup and YouGov. In addition, the share of seats assigned to nationalistic political parties in the previous elections, the number of peace and anti-war movements, and the response on survey questions taken from the World Values Survey on the "willingness to fight" and "trust in the military" are included as concomitant variables. Finally, we take up the number of regional violent conflicts based on the UCDP/PRIO Armed Conflict Dataset to proxy regional security risks. Earlier evidence shows that the preferences between politicians and voters become more similar when national security is at risk (Bove et al., 2017). Unfortunately, there are quite a few missing observations for some of the concomitant variables. We have therefore applied the algorithm of Dempster et al. (1977) that is commonly used to compute missing observations.

In the second step of our FMM estimation procedure, the relationship between elections and military spending is estimated for the different groups. The model takes the following form

$$\Delta \ln \text{milexp}_{it} = \alpha_i + \gamma \ln \text{milexp}_{it-1} + \beta \text{elec}_{it} + \phi \mathbf{x}_{it-1} + \tau_R + \tau_i + \varepsilon_{it} \quad (5)$$

where  $\text{milexp}_{it}$  measures the real government military expenditure per capita for country  $i$  in year  $t$ . The 1-year lag of the dependent variable controls for path dependence, reflecting that military spending involves contracts that cannot be executed immediately and that there are continuous costs such as maintenance, personnel, and prevailing war costs (Yalta & Tüzün, 2021). The parameter  $\alpha_i$  is a country-specific intercept that controls for time-invariant, country-specific characteristics.

The variable  $\text{elec}_{it}$  is the election variable discussed above. The vector  $\mathbf{x}_{it-1}$  is a set of commonly used (lagged) control variables and includes economic variables (real gross domestic product (GDP) growth, real GDP per capita, real interest rate, and the KOF globalization index), political variables (the level of democracy and government's political ideology), and strategic variables (NATO membership dummy, number of alliance memberships, foreign military intervention dummy, participation in peacekeeping missions dummy, national security risk, and the size of the armed forces). Table A2 in the online Appendix provides the sources and definitions of the control variables used.

As there is a clear declining global time trend in military expenditures after the end of the Cold War, regional time trends  $\tau_R$  together with year dummies,  $\tau_i$ , are included to control for common time effects. Finally,  $\varepsilon_{it}$  is the independent and identically distributed (i.i.d.) error term.

**Table 1.** Optimal Number of Groups.

Number of groups	AIC	BIC
$C = 1$	6,575.25	6,614.25
$C = 2$	5,917.72	5,952.82
$C = 3$	5,621.84	5,655.18
$C = 4$	5,481.29	5,513.80
$C = 5$	5,755.36	5,789.49
$C = 6$	6,043.12	6,078.97

Note. This table shows the value of Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) using a different number of groups identified in the data.

## Empirical Results

### *Number of Classes in the Sample*

There is no general rule for choosing the appropriate number of groups. Therefore, we consider two information criteria—Akaike's information criterion (AIC) and the Bayesian information criterion (BIC)—to ensure the appropriate selection of the number of groups (see also Hawkins et al., 2001). Table 1 reports the AIC and BIC values for each number of groups. A lower value of the AIC and BIC indicates a better fit. The results show that the values for both information criteria are minimized when the number of groups is four, so we select the mixture model with four groups.

As explained above, we calculate the posterior probability that a particular country-year observation belongs to one of the groups using Bayes' rule. Next, we assign observations to a given group only when the probability of being a member of that group is larger than that of being in other groups. The share of the observations in the separate groups is, respectively, 7%, 32%, 41%, and 20%. The residuals for the full sample are non-normally distributed (the Shapiro-Wilk test rejects the normality hypothesis;  $p$ -value = .000), but the normality hypothesis cannot be rejected for the four separate groups.<sup>6</sup>

We now turn to the composition of the four groups. Table 2 reports the mean value of the various concomitant variables in the four groups. To enhance interpretation, we have first standardized these variables using the  $z$ -score transformation. We can summarize the classification of groups, as shown in Figure 1, along two axes. The vertical axis captures whether countries face security threats, while the horizontal axis reflects the size of the military sector.<sup>7</sup>

The distributions of military expenditure are normally distributed in each group, but the median value differs significantly among the groups. In particular, countries included in Groups 2 and 4 typically have lower military spending, while those in Groups 1 and 3 spend more than the median country. Table A1 in the online Appendix shows how the countries in our sample are classified most of the time.

**Table 2.** Concomitant Variables and Group Means.

Variable	Group 1	Group 2	Group 3	Group 4
Arms exports	1.913	-1.760	1.813	-1.670
Military in politics	-0.052	0.055	0.111	0.212
Major military power	1.684	-1.708	0.021	0.019
Patriotic country	1.820	-0.324	1.747	-0.486
Nationalistic vote share	-0.436	0.079	-0.388	-0.485
Anti-war and peace movements	-1.832	0.402	-1.863	1.989
Willingness to fight	1.833	0.084	-0.216	-1.743
Trust in the military	1.647	0.419	-1.914	0.474
Regional security risks	1.749	1.822	-1.798	-1.868
Share of observations	7.1%	32.1%	41.2%	19.5%
Median defense spending (in real U.S. dollars)	885	92	1,315	448

Note. This table shows average z-scores for the concomitant variables for the different identified groups.

**Figure 1.** Country Classification.

As the group classification is based on country-year observations, countries may switch between groups over time. However, only less than 10% of the countries switch between classes. Most countries that switch moved from Groups 2 and 3 to

**Table 3.** Elections and Defense Spending—FMM Estimation.

	Group 1	Group 2	Group 3	Group 4
Group	(1)	(2)	(3)	(4)
<b>Panel A</b>				
Election year	0.022* (0.012)	-0.019 (0.020)	0.041** (0.013)	-0.022** (0.009)
Number of countries		93		
Number of observations		2,423		
<b>Panel B</b>				
<i>Cold War effect</i>				
Cold War elections	0.033** (0.012)	-0.015 (0.010)	0.071** (0.020)	-0.016* (0.009)
Post-Cold War elections	0.019* (0.010)	-0.026 (0.018)	0.034* (0.018)	-0.036** (0.009)
Number of countries		93		
Number of observations		2,423		
<b>Panel C</b>				
<i>Defense expenditures as share of government spending</i>				
Election year	0.057* (0.034)	-0.064 (0.056)	0.211* (0.122)	-0.074** (0.021)
Number of countries		93		
Number of observations		2,423		
<b>Panel D</b>				
<i>Defense expenditures as share of GDP</i>				
Election year	0.023* (0.012)	-0.026 (0.017)	0.085* (0.045)	-0.029** (0.014)
Number of countries		93		
Number of observations		2,423		

Note. This table shows the election effect on military spending across the four identified groups using the FMM method. \*\* and \* indicate significance levels of 5% and 10%, respectively. Bootstrapped standard errors are shown in parentheses.

Group 4, especially after 1990. This may reflect that the fall of the communist regimes in Eastern and Central Europe decreased perceived security risks, reducing the priority given to defense spending.<sup>8</sup>

### *Impact of Elections on Defense Spending*

Panel A in Table 3 displays the FMM estimation results.<sup>9</sup> As the dataset is highly unbalanced and the number of observations substantially differs among countries, we apply the bootstrap estimator with 1,000 replicators and cluster them at the country level to obtain robust standard errors. The coefficient of the election variable is

positive in Groups 1 and 3 and statistically significant at the 90% confidence level or more, suggesting that governments increase defense expenditures when elections are upcoming. Countries included in Group 1 typically face security threats and have major defense industries. On average, governments of countries in this group raise their defense spending by about 2% in the year before the elections. Countries in Group 3 also have a large defense sector. On average, governments of countries in this group raise their defense spending by about 4% in the year before the elections. These results thus confirm Hypothesis H1 and reject Hypothesis H2.

In countries in Group 2, upcoming elections have no impact on defense spending. This group is dominated by many low- and middle-income countries that face, from time to time, security risks. Incumbents can, therefore, not afford to cut defense expenditures much, even though they might have increased their re-election chances by relocating defense spending toward other government spending categories. These two opposing effects apparently cancel out, making the overall effect insignificant. This finding rejects Hypotheses H1 and H2.

Finally, in Group 4, there is a significant negative effect of upcoming elections on defense expenditures. These countries typically lack a defense industry that has a nationwide economic impact and face no serious security threats. In such a situation, the incumbent has an incentive to cut defense spending and increase spending in other domains when there are elections. On average, governments of countries included in this group reduce their defense spending in an election year by about 2%. These results thus confirm Hypothesis H2 and reject Hypothesis H1.

As security perceptions in most countries changed since the end of the Cold War (Jervis, 2017), we check whether this affects incumbents' behavior by splitting our election indicator into Cold War and post-Cold War elections (defined as elections after 1990). The findings in panel B of Table 3 confirm the results for the four groups of countries. However, for the groups with a positive impact of elections on defense expenditure, the effect is more pronounced during the Cold War period, while for Group 4, the negative effect is more pronounced after the Cold War period. This suggests that after the end of the Cold War, the need to spend on defense decreased. As a result, it has become more beneficial for the incumbent to reallocate military spending to other public spending categories that are favored more by voters.

So far, we have used real military spending per capita as the dependent variable. Arguably, it may be more informative to examine how military spending as share of total government spending is affected by elections. Therefore, in Panel C of Table 3, military spending as a share of total government spending is used as the dependent variable, while in Panel D, military expenditures are expressed as a share of GDP. Using alternative scaling variables does not change our conclusions substantially. The only difference is that the coefficient of the election variable turns insignificant for Group 3.

Our results so far suggest that elections have a different impact among the various groups of countries. Indeed, simple Chow tests reject the null hypothesis that the coefficients of the election variable are equal in two groups at conventional

**Table 4.** Elections and Defense Spending—Alternative Estimators.

	(1)	(2)
<i>OLS-FE</i>		
Election year	-0.017 (0.025)	-0.028 (0.039)
Election year × arms exports		-0.005 (0.005)
Election year × national security risk		-0.008 (0.006)
Countries	93	93
Number of observations	2,544	2,544
<i>LSDVC</i>		
Election year	-0.030 (0.023)	-0.020 (0.027)
Election year × arms exports		-0.006 (0.005)
Election year × national security risk		-0.002 (0.002)
Countries	93	93
Number of observations	2,398	2,398

Note. This table shows the (conditional) election effect in military spending using alternative estimation approaches (Fixed effects in Columns (1) and (2) and Least Squares Dummy Variable in Columns (3) and (4)). \*\* and \* indicate significance levels of 5% and 10%, respectively. Bootstrapped standard errors are shown in parentheses.

significance levels.<sup>10</sup> To examine whether our findings deviate from previous studies because we employ FMM, we use alternative estimators to estimate the main model. Table 4 shows the outcomes using OLS-FE (Columns (1) and (2)) and LSDV (Columns (3) and (4)), respectively. The results suggest that elections have no significant effect on military spending. In Columns (2) and (4), we include interaction terms between the election indicator and the security risk indicator or arms exports measure in one specification. The results again indicate that elections have no effect on defense spending. These findings suggest that panel interaction models lead to very different outcomes than those based on FMM, thus providing further evidence for the approach employed in this paper.

### *Electoral and Political Systems and Constraints on the Executive*

So far, we assumed that the electoral incentives of the incumbent are independent of the electoral and political system in place. However, recent studies indicate that the impact of elections may differ between majoritarian and proportional electoral systems, and between parliamentary and presidential political systems. Furthermore,

there is evidence suggesting that military spending differs across electoral systems (Hunter and Robbins, 2016).

In a majoritarian electoral system, electoral districts tend to be relatively small, with the winning candidate representing the district in parliament. This electoral system provides politicians with a significant motivation to tailor their policies to cater to specific constituencies. Conversely, in proportional representation systems, politicians aim to garner support from broader segments of the electorate through comprehensive spending programs (Lizzeri & Persico, 2001; Milesi-Ferretti et al., 2002; Persson & Tabellini, 2002).

Presidential systems are characterized by separate and direct elections for the executive and the legislature. Conversely, in parliamentary systems, the executive is indirectly formed through the legislature. In presidential systems, the executive cannot be removed by the legislature but is directly accountable to the voters. Therefore, in such a regime, the president is better able to target specific voter constituencies, particularly if those constituencies are well-organized and have common interests (Hunter and Robbins, 2016).

To capture all these issues, we have split our election measure into four categories along the two dimensions described above. The results in the top part of Table 5 demonstrate that elections in presidential regimes are likely to boost military expenditures in countries with a large defense industry (Groups 1 and 3). In parliamentary regimes, elections cause a drop in military spending in countries without a significant defense industry and that do not face severe security risks. In turn, there is no statistically significant difference between proportional and majoritarian electoral systems in any of the country groups.

Institutional checks and balances may also limit the incumbent's room for maneuvering over economic policies (Hallerberg & Basinger, 1998; Henisz, 2004; Streb et al., 2009; Streb & Torrens, 2013). We control for checks and balances in the political system by including a variable that captures the number of legislative veto players. A veto player is an actor whose agreement is required for a policy change. The data is taken from the Database of Political Institutions (DPI) of the Inter-American Development Bank (Scartascini et al., 2021). Based on the number of veto players, we have split our sample into countries with an above median level of checks and balances and countries with a below level of checks and balances. The findings reported in the bottom of Table 5 indicate that institutional checks and balances in particular restrain governments that have an incentive to spend more during election periods. In other countries, this restraining effect is largely absent.

### *Disaggregated Military Spending*

Different components of the defense budget may affect economic growth differently (Becker & Dunne, 2023), thus providing different electoral incentives. Furthermore, not all types of defense spending can be adjusted for electoral reasons. For instance, pension payments are fixed. Likewise, personnel expenditures are determined by the

**Table 5.** Political System and Constraints.

Group	Group 1	Group 2	Group 3	Group 4
	(1)	(2)	(3)	(4)
<i>Political and electoral system</i>				
Pres-Maj elections	0.036** (0.017)	-0.030** (0.011)	0.059** (0.025)	-0.030** (0.009)
Pres-Prop elections	0.040** (0.012)	-0.027** (0.010)	0.047** (0.017)	-0.035** (0.013)
Parl-Maj elections	0.028** (0.008)	-0.023* (0.014)	0.042* (0.024)	-0.016* (0.009)
Parl-Prop elections	0.029* (0.016)	-0.021** (0.010)	0.045* (0.026)	-0.014* (0.007)
Number of countries	93	93	93	93
Number of observations	2,423	2,423	2,423	2,423
<i>Checks and balances</i>				
Elections with many veto players	0.019* (0.010)	-0.017 (0.012)	0.036** (0.010)	-0.021** (0.007)
Elections with only a few veto players	0.032* (0.017)	-0.017 (0.019)	0.058* (0.036)	-0.024 (0.039)
Number of countries	93	93	93	93
Number of observations	2,423	2,423	2,423	2,423

Note. This table shows the moderating effect of particular elements of the political system in place for the election effect on defense spending. \*\* and \* indicate significance levels of 5% and 10%, respectively. Bootstrapped standard errors are shown between brackets.

number of people in uniform, their distribution in rank, and salary levels, all of which are fairly stable from year to year. Manipulating this account would require changes in overall force levels—an implausible instrument for short-term manipulation (Mayer, 1992).

To have a more detailed assessment on the election effect on the different military spending categories, we re-estimate the FMM model using disaggregated military spending data for NATO countries for which comparable disaggregated military spending is readily available. As a result, the groups identified in the first stage regression differ from the classification reported for the full sample. We now identify three groups. In Group 1, are the NATO countries that have a larger defense industry, including the United States, France, Italy, Spain, and Germany. Group 2 is dominated by former communistic countries such as Estonia, Latvia, and Poland. Finally, Group 3 consists of the remaining countries.

The results in Table 6 indicate that only capital investments are affected by elections. However, this effect is not uniform across groups. For countries in Groups 1 and 2, there is a significant positive effect of elections on capital investments, while in countries in Group 3, the capital investments drop in the year running up to the

**Table 6.** Elections and Disaggregated Defense Spending in NATO Countries.

Group	Group 1	Group 2	Group 3
	(1)	(2)	(3)
<i>Personnel expenditures</i>			
Election year	0.017 (0.019)	0.012 (0.012)	0.017 (0.024)
<i>Capital investments</i>			
Election year	0.031* (0.018)	0.022* (0.013)	-0.021** (0.006)
<i>Other expenditures</i>			
Election year	-0.003 (0.005)	-0.007 (0.007)	-0.012 (0.017)
Number of countries		29	
Number of observations		802	

Note. This table shows the election effect in different categories of military spending in NATO countries across the three identified groups using the FMM method. \*\* and \* indicate significance levels of 5% and 10%, respectively. Bootstrapped standard errors are shown in parentheses.

elections. This finding confirms the previous results indicating that countries that have a substantial defense industry or have to deal with a security risk—in this case being a neighbor of Russia—increase military spending in an election year. In turn, in other countries, the government is likely to cut military spending when elections are upcoming.

## Conclusions

This research tries to answer the intriguing question of whether governments tend to increase or decrease military spending when elections are upcoming. The answer to this question is not straightforward due to conflicting incentives faced by incumbent leaders. On one hand, the incumbent may try to improve the likelihood of being re-elected by boosting the performance of the national economy through additional procurement from the domestic defense industry. On the other hand, ruling parties might opt to curtail defense spending during election years, reallocating funds to public spending categories that are preferred more by voters. It is possible that both hypotheses could be true in a diverse panel of countries. However, traditional econometric techniques are inadequate to reveal this as voter preferences are largely unobservable for the incumbent. Therefore, we apply an FMM, which is able to handle multiple data distributions nested within one data series.<sup>11</sup> Based on the estimation results, we can draw several conclusions. First, voter preferences regarding defense expenditure are likely to differ across countries, as the concomitant variables classify our sample into four groups. Among other factors, the degree of security risk a

country faces and the size of the defense sector largely determine the allocation of countries among these groups. Second, we find robust support that both hypotheses should be accepted. This finding implies that while some countries increase their military expenditures when elections are near, others reduce these expenditures. Third, and more specifically, it appears that countries that face security risks or have a significant defense industry are most likely to expand their defense spending when elections are upcoming. In turn, countries where these conditions are absent, are more likely to reduce their defense expenditure.

Based on these findings, one can argue that defense spending is used in some countries for rent-seeking purposes of the incumbent leader. This opportunistic behavior might have important consequences for collective security provisions, such as NATO, or even impede on (inter)national security. One solution to curb this behavior is to lay down the defense expenditure in a law.

One limitation regarding our conclusions is that we zoom in on two elements driving the classification of countries, namely security risks and the economic importance of the defense industry. However, the first stage of our empirical exercise shows that there are many more variables shaping voter preferences. So, future research might have a more detailed look at these other significant factors.

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## Supplemental Material

Supplemental material for this article is available online.

## Notes

1. National security traditionally refers to the military capabilities of the state needed for the protection of its territory, population, and political integrity from the use of force by an adversary state or non-state actors such as terrorists.
2. See Table A1 in the online Appendix for a list of all countries.
3. See Table A2 in the online Appendix for a description of the variables used.
4. SIPRI arms export figures are denoted in trend-indicator values (TIVs) to observe trends in the flow of arms to particular countries and regions over time. TIV measures transfers of military capability rather than the financial value of arms transfers. As a consequence,

they should therefore not be directly compared with GDP in an attempt to measure the economic benefits of exports.

5. For a recent analysis of citizens' support for military spending in the United States, see Simon et al. (2018). As comparable data are not available for most other countries, we use a patriotism dummy to proxy citizens' support for military spending.
6. To be precise, the  $p$ -value for this test statistic is .234 for Group 1, .384 for Group 2, .497 for Group 3, and .219 for Group 4.
7. Note that this figure is a stylized reflection of the first-stage outcomes, as we take more concomitant variables into account than proxies for perceived security and the economic importance of the defense industry which capture voter preferences (such as the degree of patriotism or willingness to fight).
8. As a robustness test, we have also performed Stage 2 of the estimation using only the countries that always stay within the same group. The results do not change substantially and our main conclusions still hold (results are available upon request).
9. Complete regression results are shown in Table A3 in the online Appendix.
10. The  $p$ -values of the Chow test statistics comparing the estimated coefficients in two groups range between .01 and .07. This indicates that the coefficients are not equal.
11. The FMM estimation technique is useful for many research questions within the economic sciences. In the last decade, the assumption that responses of economic agents (consumers, producers, government) to economic shocks, crises, or events are uniform has been challenged, arguing that responses might be context-specific or differ among agents. However, most traditional empirical models are still built on the assumption that responses are homogeneous. Consequently, these empirical methods can only estimate which response dominates and cannot examine whether multiple responses coexist. Despite the advantages of FMM, so far, this technique has been largely neglected in the economics literature. A first step could be by replication of some canonical studies that analyze the impact of election on military spending.

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