Factors Influencing NATO Military Spending: A Geopolitical Analysis

Bachelor thesis in political science

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Abstract

This assignment highlights NATO'S two percent national GDP expenditure towards the collective military guideline established in 2006 and investigates the determinants for its incompliance. Specifically underscoring geopolitical determinants such as bordering Russia and historic influence from the Soviet Union. The variables and hypothesises were developed through existing literature and theoretical frameworks. This additionally led to the conclusion of implementing a time-series cross-sectional analysis, by splitting the regression into two groups one representing the years 1991-2022 and the other containing data from 2010-2022. The findings of this study are heterogeneous and do not discover a causal linkage between the geopolitical variables and military expenditure. My analysis does however highlight the significance of variables such as national GDP, GDP per capita and political stability, and slightly broadens the determinants for military expenditure within NATO member's discourse.

Preface

This assignment marks the closing chapter of my journey in Stavanger, a significant segment in my life. I've encapsulated three transformative years filled with invaluable experiences and profound growth. With genuine appreciation, I dedicate this thesis to all those who have shared in this adventure, infusing it with memories that will forever resonate within me. I extend my deepest gratitude to my steadfast supervisor, Tevfik Murat Yildrim, whose unwavering guidance has been instrumental throughout this process. Additionally, I am profoundly grateful to Carlo Michael Knotz for his invaluable insights and support.

*Michael Alexander Strøm 14.05.2024.*

Contents

Structure

Regarding the structure of this thesis, as shown in the table of contents, this paper is divided into six main sections. The following section serves as the introduction and includes a brief instigation into this topic highlighting the contemporary relevance of this discourse. Subsequently this thesis's specific contribution to the discourse and its relevance will be presented, including different hypothetical expectations of this study. Next, I present existing research on this topic and a theoretical framework for the paper's theory considered the foundation to this paper's theory, these include Structural Realism, and The Copenhagen School. The subsequent segment is composed of describing the data used in the empirical research, this is in regard to the dataset and explaining of the variables. The following section elucidates how it will test this papers theory by clarifying and justifying the research design, and conclusively discussing the validity of the chosen analytical method. The following section will provide the results of this thesis's findings and an analysis of the discoveries. Subsequently this will be pursued by a conclusion, summarizing the results and implications of the research, highlighting strengths and weaknesses in the assignment outlining how others may improve or build upon this research.

Introduction

The military alliance known as NATO was first established with the purpose of ensuring the protection of three specific contemporary problems, preventing Soviet expansion, prohibit a potential rise of nationalist militarism in Europe and preserving democracy (NATO, 2022). NATO has thus effectively executed these challenges successfully and expanded its alliance which currently contains 32 members. Despite the alliances overall prosperity, its integrity has been questioned, most notably by former US president Donald Trump. Within his campaign, he firmly believes in the NATO guideline established in 2006 regarding that the member states should aim towards spending two percent of their national GDP towards the collective military alliance (Burns, 2006). This guideline was again reaffirmed during the 2014 NATO summit in Wales, where member states consensually agreed to work towards attaining this goal within the following decade (NATO, 2014). Despite a recent rise in NATO states military expenditure in recent years, the aforementioned requirement is still to be met by the majority of countries in the alliance. Figure 1 from NATO (2023, p. 3) shows that as of 2023, eleven out of thirty-one members have reached this goal, which is a large increase in comparison to 2014, where only three out of thirty-one members complied with this guideline.
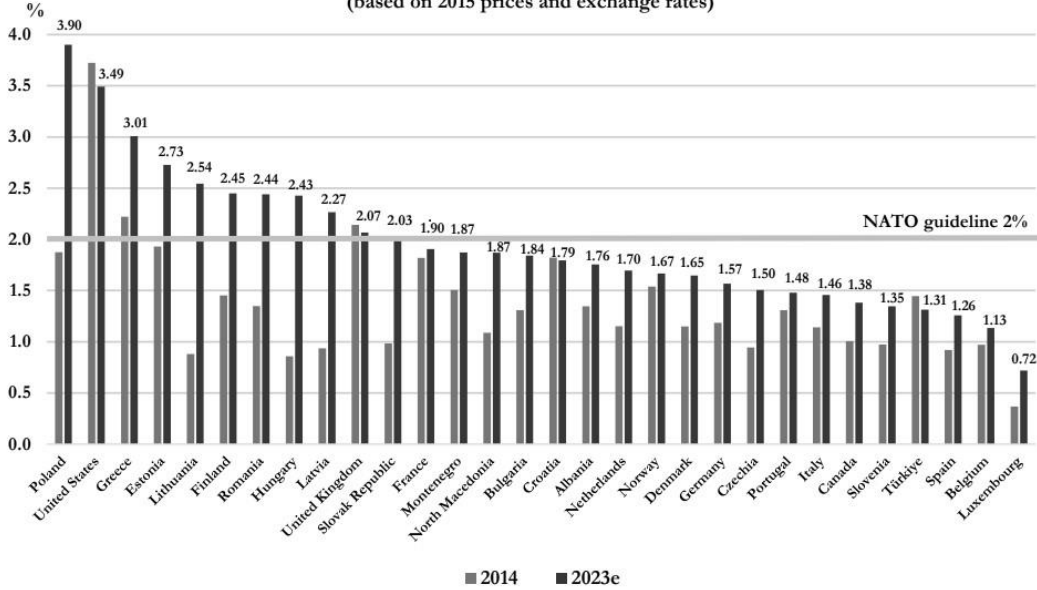
Figure 1 (NATO 2023, p.3)

The contemporary significance of this lack of coordination cannot be overstated, especially in light of Donald Trump's re-election bid and the impending elections. Trumps clear stance on NATO underscored by statements such as his contention regarding that the US would not protect non-compliant members, highlights the severity of the situation (Davis, 2024). The significance of this assertion is further reflected by figure 2 from NATO (2023, p. 7) which illustrates the disproportionate

contribution of the United States concerning NATO's military expenditure, that substantially exceeds all other member states combined in 2023.

Country	2014	2015	2016	2017	2018	2019	2020	2021	2022e	2023e
Albania	178	132	131	145	176	197	197	224	231	371
Belgium	5,200	4,204	4,258	4,441	4,845	4,761	5,324	6,245	6,880	7,076
Bulgaria	747	633	671	724	962	2,159	1,121	1,276	1,440	1,855
Canada	18,172	18,689	17,708	23,700	22,399	22,572	23,330	25,502	26,046	28,950
Croatia	1,064	883	837	926	966	1,001	983	1,361	1,285	1,394
Czechia	1,975	1,921	1,866	2,259	2,750	2,982	3,199	3,915	3,896	5,033
Denmark	4,057	3,364	3,593	3,780	4,559	4,487	4,886	5,274	5,420	6,775
Estonia	514	463	497	541	615	637	719	749	821	1,170
Finland	3,991	3,401	3,418	3,536	3,825	3,900	4,156	4,145	4,726	7,325
France	52,022	43,496	44,209	46,133	50,507	49,493	52,519	56,561	52,289	56,649
Germany	46,176	39,833	41,606	45,470	49,772	52,549	58,652	62,054	60,788	68,080
Greece	5,234	4,520	4,637	4,752	5,388	5,019	5,492	8,006	8,488	7,125
Hungary	1,210	1,132	1,289	1,708	1,615	2,190	2,767	3,061	3,278	5,036
Italy	24,487	19,576	22,382	23,902	25,641	23,559	30,084	33,157	30,307	31,585
Latvia	294	282	403	485	710	692	743	824	857	1,028
Lithuania	428	471	636	817	1,057	1,094	1,176	1,308	1,738	1,990
Luxembourg	253	250	236	326	356	381	426	403	511	609
Montenegro	69	57	62	65	75	74	83	91	86	131
Netherlands	10,349	8,673	9,112	9,643	11,172	12,067	12,838	13,953	15,606	16,741
North Macedonia	124	105	104	101	120	146	154	204	221	294
Norway	7,722	6,142	6,431	6,850	7,544	7,536	7,228	8,438	8,723	8,814
Poland	10,107	10,588	9,397	9,940	11,857	11,824	13,363	15,099	16,580	29,105
Portugal	3,007	2,645	2,616	2,738	3,249	3,299	3,273	3,886	3,574	4,167
Romania	2,691	2,581	2,645	3,643	4,359	4,608	5,056	5,298	5,195	8,481
Slovak Republic	999	987	1,004	1,056	1,298	1,802	2,049	2,066	2,090	2,620
Slovenia	487	401	449	477	547	572	568	763	777	928
Spain	12,634	11,096	9,975	11,889	13,200	12,630	12,828	14,849	14,897	19,179
Türkiye	13,577	11,953	12,644	12,971	14,168	14,089	13,396	13,137	12,286	15,842
United Kingdom	65,692	59,505	56,362	55,719	60,380	59,399	63,500	71,938	66,651	65,763
United States	653,942	641,253	656,059	642,933	672,255	750,886	770,650	793,990	821,830	860,000
NATO Europe and Canada	289,276	254,422	255,595	275,102	300,167	301,674	325,953	359,641	350,961	404,115
NATO Total	943,218	895,675	911,654	918,035	972,422	1,052,560	1,096,603	1,153,631	1,172,791	1,264,115

Figure 2 (NATO 2023, p.7).

The inconsistent compliance of certain NATO states to the two percent expenditure guideline prompts inquiries regarding the seriousness of their commitments. This thesis aims to prove that geopolitics is a vital determinant in understanding the phenomenon. These assumptions derive from the ongoing conflict between Russia and Ukraine which is perceived to have taken Europe by surprise. The reaction of bordering country Finland and subsequently neighbouring country Sweden illuminate this, as the conflict resulted in the states desperately applying to join NATO. Furthermore, the previously soviet owned state Poland has recently surged to the top of NATO's defence expenditure chart (Strzelecki & Pawlak, 2023). This could possibly be deemed as an indication towards post-Soviet states experiencing concern if they comprehend events in Ukraine as the start of a broader campaign by Russia.

Research contribution.

This thesis aims to discover which determinants influence NATO members military expenditure, specifically taking into considering their commitment towards the two percent guideline. By focusing on the interplay between factors such as geopolitics, economics and political factors, this study's purpose is to identify the motivations that lead to security spending within the alliance over time.

To be more precise I have developed a few hypothesises that entail specifically what is expected to find, each representing different aspects of my study. These research questions and hypothesises are not necessarily mutually exclusive and have been developed through the next segments previously existing research and the following sections theoretical foundation.

(H0): Geopolitics both past and present is an insignificant determinant in regard to impacting NATO members military expenditure.

How do geopolitical factors influence NATO countries military expenditure, specifically referring to proximity to Russia and the historic effect of previously being a part of the Soviet Union? (H1): NATO states defence expenditure is significantly influenced by geographic location, and historical ties to the Soviet Union. Countries sharing a land border with Russia and were once part of the Soviet Union, will have a higher incentive to increase their security spending.

To what magnitude does economic prosperity influence NATO states military expenditure and how does it interact with geopolitical considerations? (H2): Since funding a military is expensive, the economic state of a country will play a vital part towards its defence expenditure. A country that is more economically capable, particularly if more exposed to geopolitical tensions, will have a higher compliance with the two percent guideline.

To what extent is political stability and population density applicable in regard to how NATO states allocate their national GDP towards military expenditure? (H3): NATO members exhibiting a higher score of political instability will have a higher military expenditure, and countries with higher population densities will follow suit.

How are the chosen variables effecting NATO military expenditure over time? (H4): There will be significant shifts in spending patterns over time and recent years will display an increase in defence spending.

Theory

While prior research has established correlations between geopolitics and military expenditure, agreement regarding the matter remains non-existent. Notably, Kofroň & Stauber (2023, p.11) have researched the correlation between military spending and geographic proximity to Russia, emphasizing their study revolving around European states before and after the annexation of Crimea. While in this particular study, there were no significant correlations concerning these variables, however the assumption that there should be does exist. Existing literature suggests there is an expectation of significance in this relationship (Collier & Hoeffler, 2002; George & Sandler, 2018; Kofroň & Stauber, 2023).

Moreover, George and Sandler's (2018, p. 10) research also incorporates a bordering Russia variable. Despite finding lesser correlations between NATO military expenditure and this variable, the fact that their study consisted of data up to 2015 might be the reason for this. Referring of course to the inability to encapsulate the long-term effects of post Crimea annexation. However, the use of these variables furthers the assumption of importance in regard to geography and its role in shaping defence spending patterns.

Furthermore, the study highlights defence spending ripples across NATO countries which spotlights how some members are benefiting from the goods of the alliance without necessarily contributing accordingly. The research simultaneously discovers use of the term "spillover effect" which in this sense essentially refers to neighbouring countries being able to influence military expenditure by increasing theirs. This is supported by the findings of Collier & Hoeffler (2002, p.7) which in their study found that the level of military expenditure is strongly influenced by neighbouring states.

Existing literature regarding this topic also underscores the importance of military expenditure and its appliance towards evolving security threats such as terrorism (George & Sandler, 2018; Odehnal, Neubauer, 2020). This variable has found heterogenic results in terms of significance, however, does seem relevant to this discourse. Moreover, another variable that is similar to terrorism that has also been researched within this topic is threats such as external and internal. Despite Collier & Hoeffler (2002, p.7) not finding a correlation between risk of internal conflict and military expenditure, Aizenman & Glick (2003, p.26) do find a correlation in regard to external conflict. Contractively Odehnal & Neubauer's (2020, p.11) heterogenic findings indicate either no correlation or a negative significance of the external conflict within the military expenditure discourse. Highlighting the need for broadening the conflict variable and its influence on this topic.

Further research within the determinants for military expenditure discourse show that there are inconsistencies in factors influencing military expenditures when comparing newly admitted and veteran member states (Odehnal, Neubauer, 2020). The determinants encompassed in Odehnal's

(2020, p.11) study include economic, security and political factors whilst utilizing panel models. This empirical contribution further adds to the understanding of what determines a countries military expenditure. It additionally broadens the discourse by dividing and thereafter researching groups of NATO members identifying how these countries contribute differently to the collective alliance.

George & Sandler (2018, p.10) suggests a positive relationship between a country's GDP and population with military spending using a post-cold war timeframe. Larger economies and populations possess more resources to respond to securitized threats. Solarin (2017, p.11) uses data consisting of a variety of countries from the years 1989-2012 and in regard to military expenditure and population finds a negative relationship.

Moreover, the interplay between economics and military expenditure is a heavily researched area, with significant relationships between the pair found in variables such as GDP, government budget allocation, and national wealth influencing a nation's defence investment capacity (Aizenman & Glick, 2003; George & Sandler, 2018; Kofroň & Stauber, 2023; Odehnal, Neubauer, 2020; Solarin, 2017). However, the existence of studies that challenge the notion of a positive relationship between defence spending and economics are present in this discourse as well (Azam, 2020; Dunne & Nikolaidou, 2012; Gillani et al., 2022; Hou & Chen, 2013), highlighting the need for a broader geopolitical perspective.

Structural realism

Structural realism builds upon the premise of this thesis's independent variables by explaining NATO members increased military spending as a rational response to the contemporary challenges occurring at an international level. The theory heavily emphasizes the importance of anarchy in international systems and the balance of power (Waltz, 1979). The security dilemma concept entails that anarchic systems like NATO lacks the authority to guarantee safety and therefore states will prioritize their own security to guarantee safety (Williams & Mcdonald, 2023). Especially if there is a perceived security threat in close proximity as this thesis aims to identify the existence of.

Additionally, structural realism would argue that historical ties to a perceived security threat further leads to an increased incentive to exacerbate military expenditure (Waltz, 1979). This is in essence relevant in regard to NATO's primary purpose which to ensure collective security against Soviet expansion and to deter potential threats to democracy and stability in Europe. The Soviet predicament has been resolved. However, Russia remains and if perceived as a security threat, structural realists would justify previous members of the Soviet Union increasing their military expenditure as rational response to this potential threat (Baylis et al., 2020).

Moreover, in this case it is arguably rational to intertwine an increase in military expenditure due to historical roots with geographic proximity. Arguably as countries bordering Russia are also connected in the sense that a potential security threat is in close vicinity, therefore possibly causing an arms race (Rider, 2009). The significance of actions in neighbouring states influencing ones military expenditure is a justifiable point (Collier & Hoeffler, 2002; George & Sandler, 2018). This would clarify an increased defence expenditure in Baltic and Nordic states as a result of Russia's presence in Eastern Europe (Muradov, 2022).

Furthermore, structural realism emphasizes the importance of the distribution of power in shaping states' behaviours (Keohane, 1989). In regard to NATO, the most powerful member would be the United States, both from economic and military perspectives (NATO, 2023). This power asymmetry can influence other NATO members' decisions regarding military spending. As highlighted in the introduction, Trump's rhetoric to increase military expenditure can be seen as a manifestation of this power asymmetry (Davis, 2024). Underlining the possible effect that political pressure can accommodate.

Moreover, structural realism additionally acknowledges the role of relative gains in interstate relations (Thies, 2010). This could in essence explain the motive behind Trump and the emphasis he places on NATO members meeting the two percent GDP guideline. As it would theoretically explain how he perceives the distribution of burdens within the alliance unfair. From a realist perspective his concerns would be justified, as states are motivated by the desire to maximize their relative gains and minimize their weaknesses (Carvalho & Leira, 2020). Therefore, Trump's realist approach to the situation stems from an economic background, as he calls for a more even spread of expenditure as the alliances purpose is to ensure absolute gains for all rather than permitting benefits to certain members disproportionately.

Furthermore, structural realism highlights the possibility of national constrictions effecting states policies and in turn behaviours towards different parts of international politics (Thies, 2010). Most importantly the economic aspects of states in the form of national GDP and GDP per capita which has the power to influence domestic defence spending (Thies, 2010). Thus, emphasizing the structural realist point on systematic constraints deriving from the international system (Waltz, 1979). In order to ensure competitiveness in regard to their counterparts, states might delve into competitive policies, prioritizing self-help strategies to ensure national security and survival, resulting in taking precedence over their collective contributions (Baylis et al., 2020). Could explain why the majority of NATO members do not theoretically comply with the fundamental economic guideline in regard to spending two percent of their national GDP on NATO, as they rather spend it on bolstering their own security.

The Copenhagen School of security studies

The Copenhagen School of security studies provides a theoretical framework that aligns with the main premise of this paper, distinctively through the concept of securitization. This term refers to the process by which certain issues are framed as existential security threats that become part of the security agenda (Williams & Mcdonald, 2023). Securitization can explain why certain countries fund their military more than others by contemplating perceived security threats.

The Copenhagen School would argue that states in close proximity to Russia could increase their military expenditure as defensive mechanism due to a perceived security threat stemming from both historical and contemporary geopolitical tensions. Recently highlighting the current war in Ukraine and the Soviet Union's cold war as a foundation for these assumptions. The nature of Russia's unpredictable behaviour, by referring to the annexation of Crimea in 2014 further justifies the establishment of the securitization process.

The concept of referent objects provides a framework for explaining the variation in military expenditure in regard to NATO members. A referent object is what is deemed to be in need of protection and the cause of a securitization process (Williams & Mcdonald, 2023). In accordance with this thesis's theory, NATO members residing in Western Europe will have a lesser incentive to develop their military expenditure due to a lack of close threat. These defence resources may be applied to places such as cyber security, terrorism, or peacebuilding efforts.

The concept of desecuritization which refers to issues being removed from the security agenda sheds light on the choice of a time-series aspect used to conduct this research (Williams & Mcdonald, 2023). This term explains how a perceived security threat can cause a shift in military expenditure over time, illuminating potential turbulence in geopolitics.

Critique of chosen theories

A liberal approach would criticise the incorporation of structural realism in this study. The perspective entails an optimistic view on international cooperation in comparison to structural realism (Carvalho & Leira, 2020). It would disagree with the security dilemma and argue that international institutions are crucial for the global community's harmonic existence (Baylis et al., 2020). Effectively rejecting the view of states being entirely self-centred and being more inclined to believe in the possibility of collaboration resulting in relative gains. This approach would also advocate for a more diplomatic solution in regard to the possible geographic and historical threats, emphasizing that resorting to increased military spending is not the most effective.

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Utilizing a constructivist approach could criticise the Copenhagen School's significance on securitization and its interpretation of security threats. The constructivist view consists of an emphasis in culture and identity in shaping states behaviours (Baylis et al., 2020). Suggesting that the Copenhagen School dependency on heavily elite influenced referent objects overshadows the comprehensiveness located in civil society (Williams & Mcdonald, 2023). Moreover, constructivists would critique the Copenhagen Schools emphasis on perceiving security threats based on subjective perceptions instead of objective evaluations as potentially biased.

Data

The data used in this thesis consists of multiple sources, firstly, the data used in the introduction stems from NATO (NATO, 2023). The data from this database contains only countries from NATO members during the time period of 2014-2023. The two elements of data extracted from this database, were percentage of national GDP spent on defence and amount of expenditure towards the collective military alliance NATO in US dollars (NATO, 2023). For the time-series cross-sectional analysis, this thesis utilizes databases from The World Bank and Stockholm international peace research institute (SIPRI). The data used in the regression analysis will be split into two groups, one including all data from 1991-2022, the other encapsulates data from the years 2010-2022.

Dependent variable

The dependent variable for this study is the percentage of national GDP allocated to military expenditure is extracted from the SIPRI military expenditure database (*SIPRI Military Expenditure Database | SIPRI*, 2024). It is critical to understand that this variable does not refer to expenditure towards the collective military alliance NATO, but rather a countries military expenditure as a whole. NATO defence expenditure is defined as "payments made by a national government specifically to meet the needs of its armed forces, those of Allies or of the Alliance" (NATO, 2023). The decision to choose military expenditure as a whole instead of investments specifically dedicated to NATO stems from seeking a more comprehensive understanding of the members states defence spending. It allows for the addition of national security trends that would not be present in solely looking into NATO expenditure making this study highlight geopolitics more effectively. Figure 3 shows the average national GDP allocation towards military expenditure of all NATO countries combined between the time period of 1991-2022 (*SIPRI Military Expenditure Database | SIPRI*, 2024). The graph highlights how expenditure has slightly fluctuated but ultimately decreased since 1991, also shows a trend of increased expenditure starting in 2015.
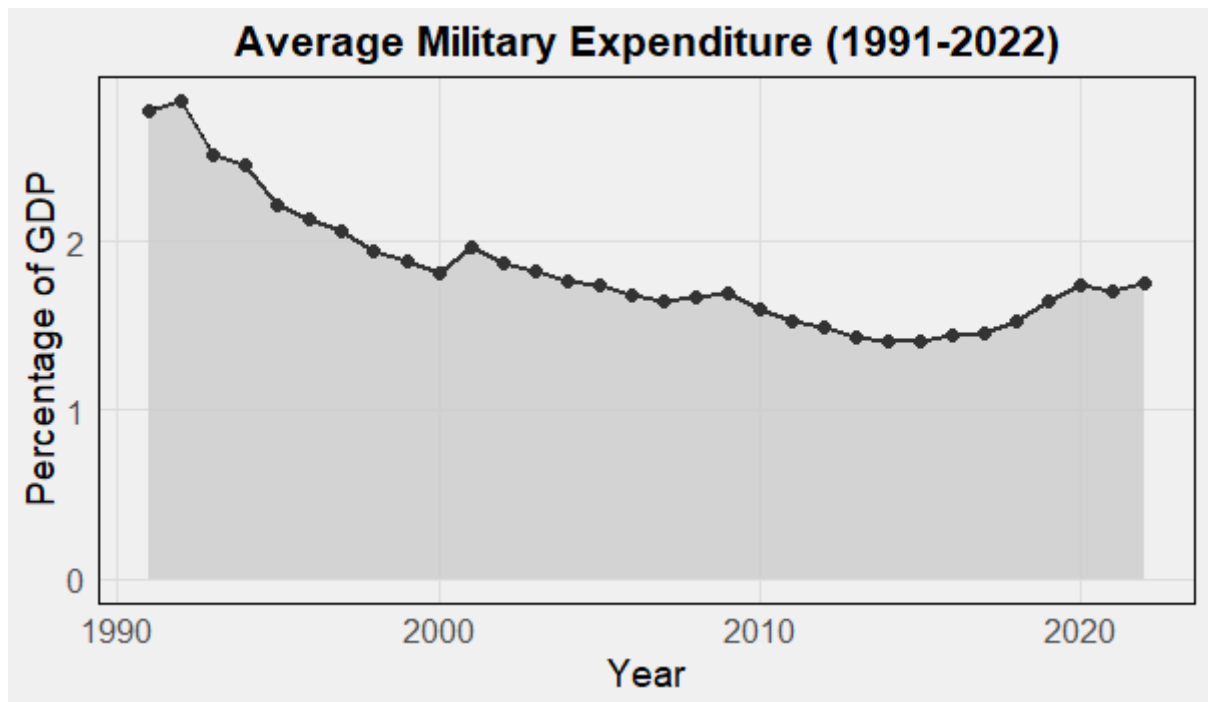
Figure 3 (*SIPRI Military Expenditure Database | SIPRI*, 2024)

Independent variable

The independent variables used in this study have been created using a simple dummy code, where countries that border Russia are marked with a 1, countries that do not fit this category are given a 0. The same system applies to countries that were previously influenced by the Soviet Union. Countries within NATO that border Russia include Norway, Estonia, Lativa, Lithuania, Poland, and Finland. The countries that were influenced by the Soviet Union is defined by members of the Warsaw pact from 1955. The NATO members that were previously a part of this pact include Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia. I also add Estonia, Lativa, and Lithuania to this list as they were officially part of the Soviet Union and therefore also members of the Warsaw pact. Figure 4 shows the average allocation of national GDP within NATO states distinguishing between three groups, the bordering Russia countries, the Soviet influenced countries, and other representing NATO countries as a whole. It highlights the differences in average expenditure between the groups and shows that countries bordering Russia have a slightly higher expenditure towards the military in comparison to the other groups, followed by the NATO countries as a whole and lastly, the Soviet influenced countries.
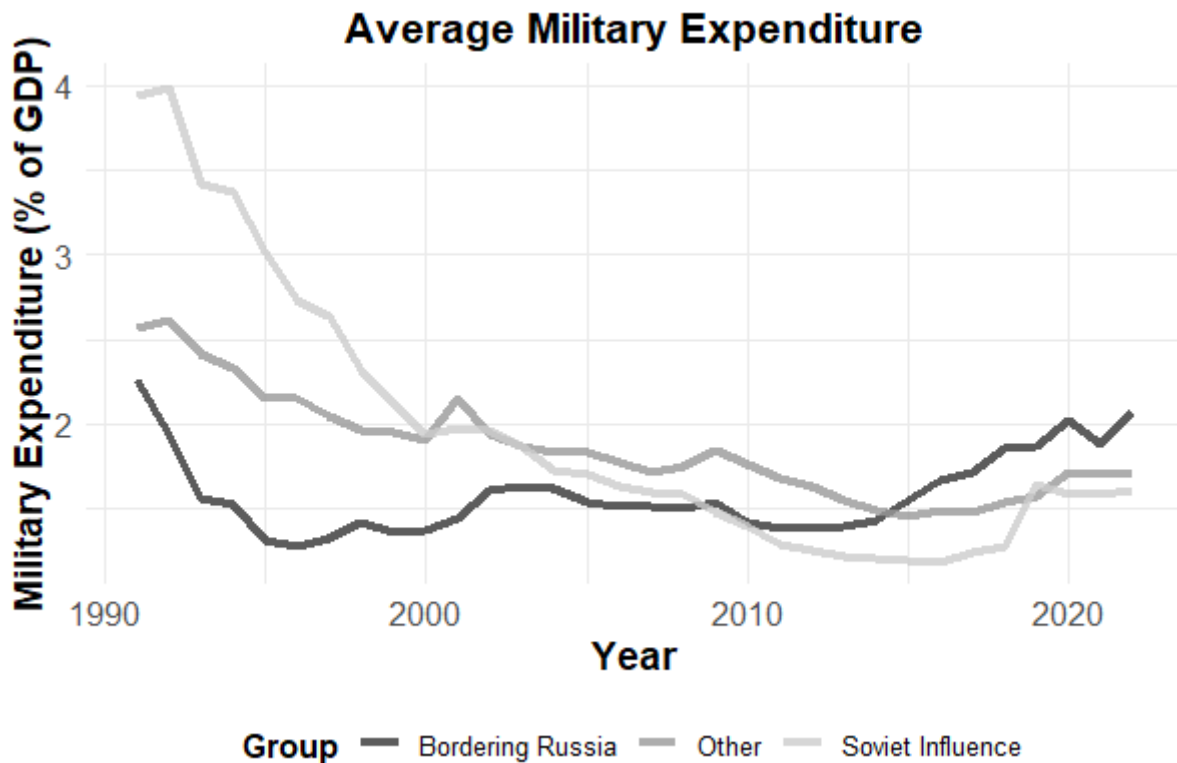
Average Military Expenditure

Figure 4 (*SIPRI Military Expenditure Database | SIPRI*, 2024)

Control variables.

The control variables that consists of national GDP in US dollars, GDP per capita in US dollars, population density per square kilometre of land area derive from The World Bank database (*GDP (Current US$)*, 2024; *GDP per Capita (Current US$)*, 2024; *Population Density (People per Sq. Km of Land Area)*, 2024). The last control variable used in this study is political stability, which refers to specifically likelihood of the government being destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism (Kaufmann et al., 2010). This variable consists of an estimate given to each individual country based on governance data sources ranging from -2.5 – 2.5. A higher score corresponds to better political stability, whilst a lower score indicates less political stability (*Political Stability and Absence of Violence/Terrorism: Estimate*, 2024).

The economic factors such as national GDP and GDP per capita have been proven to be relevant in existing literature (Aizenman & Glick, 2003; Kofroň & Stauber, 2023; Odehnal, Neubauer, 2020). It additionally includes relevant contextual information about each of the member states and is therefore, deemed applicable for this research as well.

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The political stability ratings are not a very common control variable in regard to geopolitics and its effect on military expenditure, however, similar variables which specifically focus on terrorism, internal, and external threats have previously been used as mentioned in the existing research part (Aizenman & Glick, 2003; Collier & Hoeffler, 2002; George & Sandler, 2018; Kofroň & Stauber, 2023; Odehnal, Neubauer, 2020). The use of this variable will provide the discourse with a nuanced understanding of political instability and its effect on the expenditure towards the military. Possibly by assuming that politically instable prone countries are expected to inhabit a higher existence of an increased political pressure to spend more on defence. This political pressure could stem from other NATO members, neighbouring countries, and general domestic politics.

Furthermore, this study will control for a national characteristics variable which encompasses geographical area and population (Pearson, 1989). Countries with a low population and large geographical territories will have an extra incentive to fund their military as they possess larger requirements regarding border control and general defence coverage. States such as Norway and Canada are both considerably large countries relative to their population size.

Summary statistics table

Variables	NATO military expenditure national GDP	National GDP $	National GDP per capita $	Political stability	Population per square kilometre
Observations	931.00	963.00	963.00	737.00	918.00
Average	1.82	971.7 billion	25727.08	0.62	114.70
25th percentile	1.28	34.3 billion	8911.88	0.36	46.19
Median	1.59	170.0 billion	20679.63	0.69	97.95
75th percentile	2.03	656.7 billion	37180.19	1.00	126.21
Standard. Dev.	1.01	2.71 trillion	22420.37	0.58	101.74
Minimum	0.36	652.2 million	200.85	-2.01	2.57
Maximum	11.15	25.44 trillion	133711.79	1.76	520.73
Missing	61.00	29.00	29.00	255.00	74.00

Figure 5 (*GDP (Current US$)*, 2024; *GDP per Capita (Current US$)*, 2024; *Political Stability and Absence of Violence/Terrorism: Estimate*, 2024; *Population Density (People per Sq. Km of Land Area)*, 2024; *SIPRI Military Expenditure Database | SIPRI*, 2024)

Figure 5 represents a statistical summary of the dependent and control variables used in this study. The first and last rows indicate a low amount of data missing in all variables excluding the political stability variable.

The military expenditure variable provides some interesting results in this summary statistics table. The average is quite misleading as it indicates that most member countries are spending enough to fulfil the allocation of two percent of national GDP guideline. However, taking into consideration the minimum and maximum values, reflects the member nations differences in defence policies as these

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differ greatly from 0.36 percent to 11.15 percent. The high dispersion from the standard deviation row shows how spread the values are around the mean (Kellstedt, Whitten, 2019).

Moreover, it comes as no surprise that the national GDP variable also varies greatly, ranging from a few hundred million dollars to several trillion dollars. The national GDP column substantially highlights the economic diversity of NATO members. The standard deviation row encapsulates this effectively, as does the aforementioned maximum and minimum rows. Additionally, the 25th and 75th percentiles supplement this as they indicate that most countries are within the spectrum of $34.3 billion and $656.7 billion. This dispersion can be seen as a contributing factor to two percent guideline as some wealthier nations will provide more economic support to the alliance despite spending a smaller percent of national GDP.

Furthermore, unsurprisingly the national GDP per capita variable imitates the national GDP variable. It again illustrates the economic diversity of the member states, but also the differences in population sizes, the minimum, maximum and average especially highlights this. This in regard to the vast spectrum between the minimum being just $200.85, whilst the maximum being $133711.79, despite the average being $25727.08. Which further shows how the economic inequality factor could be a root issue in the compliance of the two percent national guideline allocation to NATO predicament.

The political stability variable shows the average value of 0.62, which corresponds to NATO members tending to be relatively stable. The minimum value of -2.01 indicates that some countries face a significant amount of political turmoil, which possibly influences security expenditure. It is important to bear in mind the number of missing results when interpreting this variable.

Lastly, the population per square kilometre variable follows the normative trend of this summary statistics table, as it provides another variation factor within NATO states. The variable specifically underscores the differing geographical areas of the NATO members, exemplified by the high dispersion rate of the standard deviation. The minimum and maximum range indicates how some member states contain sparse populations, whilst others have high amounts of urbanization.

Figure 5 provides an overview of statistical factors in regard to this study; it also effectively reveals how diverse NATO members are. This study focuses on the geopolitical effect on military expenditure within the NATO states, however, this summary statistics table shows just how many elements that could also contribute to this. It also highlights the need for controlling these variables.

Methodology

This thesis will be utilizing a time-series cross sectional analysis (TSCS) for observing countries over time in order to test the hypothesises. The research method facilitates the usage of large amounts of countries across a specific time-period which tailors it to be optimal for finding correlations between

the chosen variables over time. Moreover, a TSCS model is in this context effective as it encompasses the possibility of measuring causal effects over time, in contrast to implementing a lone time-series or cross-sectional model.

The incorporation of multiple credible datasets provides the TSCS method with an enhanced chance of producing robustness and reliable results (Hsiao, 2007). This in addition to the implementation of the time-period encapsulates the possibility of finding causal relationships. As the NATO countries consist of ambiguous geographical characteristics, a TSCS analysis is capable of adjust to these attributes thus leading to a reduced risk of omitted variables, and in turn improving the validity of the estimates (Hsiao, 2007).

A TSCS research module effectively restricts the possibility of endogeneity which could arise if there are omitted variables affecting both NATO military expenditure and one of the dependent variables (Frees, 2004). Using random effect models will substantially mitigate the chances of inconsistent estimates. When analysing the TSCS, p-values will be able to determine if the variables are statistically significant, as the p-values serve as indicators of observing statistical significance between two variables (Kellstedt, Whitten, 2019). The panel model analysis will be utilizing a 95 percent confidence interval which would make a 0.05 p-value indicate a statistically significant relationship. The latter implies there is a 5 percent chance of the data being able to disregard the null hypothesis.

Random effect model

My regression will be fit using an array of random effect models. The choice of random effects model was partly decided based on the independent variables used in this study and their incompatibility with the usage of fixed effects. The independent variables refer to both bordering Russia and Soviet influence. The incompatibility can be explained by the possibility of fixed effects absorbing cross-sectional variance thereby suppressing level effects and causing biased estimations (Plümper et al., 2005). This may result in a model with little explanatory power. Therefore, the usage of these independent variables makes it unnecessary to conduct the more conventional Hausman test for determining which model to use, as the random effect model seems most optimal for these variables (Hausman & Taylor, 1981). The choice was also based on a number of strong points that the random effects model is capable of executing. One of these is being an efficient balance between the time series, and cross sectional variation creating an optimal environment for both specific individual effects and displaying an overall correspondence between variables (Bell & Jones, 2015). The estimations from random effect models are also perceived as being more efficient when compared to fixed effect models especially when there is no correlation between the individual effects and independent variables (Frees, 2004).

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Limitations of the research model

Despite being many advantages to choosing a TSCS research design, it is important to acknowledge the limitations that comes with it. The random effect model, although effective, does not properly solve the endogeneity issue. Despite controlling for a few omitted variables, the fact that geopolitics is a broad topic makes it difficult to control for all of these variables. Consequently there is a risk of biased estimates and inaccurate conclusions occurring, particularly if assumptions regarding exogeneity are not being sustained (Bell & Jones, 2015). There are also some disadvantages for not utilizing a fixed effect model in this research. To list a few, a fixed effect model would control for time-variant heterogeneity making the estimates overall more valid, also the within-unit aspect of the fixed effect provides a more detailed understanding of the military expenditure changes regarding each country (Wilson & Butler, 2007).

Multicollinearity

Controlling for the absence of multicollinearity when using a multivariate model for conducting research ensures that none of the predictors used in the regression model are highly correlative (Kellstedt, Whitten, 2019). Highly correlative variables can lead to inaccurate results, which is why I have decided to use a variance inflation factor (VIF) for all variables excluding the dependent variable to control for this. A value indicating a 5 or above is considered concerning in regard to multicollinearity, whilst values greater than 10 signifies a problematic amount of collinearity (Duxbury, 2021). Figure 6 represents the variables used in my study and shows no sign of problems concerning multicollinearity, meaning that they are compatible and do not necessarily require modification or removal.

Variables	Soviet influence	Bordering Russia	National GDP$	National GDP per capita	Political Stability	Population density
VIF result	1.784369	1.357859	1.224421	3.024300	2.132936	1.179994

Figure 6 (*GDP (Current US$)*, 2024; *GDP per Capita (Current US$)*, 2024; *Political Stability and Absence of Violence/Terrorism: Estimate*, 2024; *Population Density (People per Sq. Km of Land Area)*, 2024)

Robustness

I shall now argue for this study's robustness. As it incorporates data from NATO, The World Bank and SIPRI, these derivations are quite reputable. The employment of both the time-series and cross-sectional aspects of the research design results in a comprehensive observation of countries over time. This would increase the credibility of possible correlations and would also strengthen the validity and reliability of significant relationships. The control variables are relevant to this discourse as shown by existing research, in addition to this it has been established that the researched method is optimal in accordance with the chosen variables in this study. The aforementioned multicollinearity being controlled for using the variance inflation factor ensures that the predictors in the regression model are not highly correlated. These factors contribute to the robustness and overall validity of this study, allowing for a notable foundation in regard to interpreting the implications discovered in the empirical results section. Arguments against the robustness of this study has been reserved for the conclusion.

Empirical results

Figure 7 illustrates my empirical results; my TSCS analysis contains eight random fit regression models. It is important to note that the data used in the models is divided into two groups where the first four encompasses data of the chosen variables from 1991-2022, whilst the other four include data from the years 2010-2022.

Dependent variable: Military expenditure as a share of national GDP

	1991-2022			2010-2022				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Russia border	-0.156			0.243	0.245			0.596***
	(0.379)			(0.315)	(0.318)			(0.201)
Soviet influence	-0.134			-0.319	-0.112			-0.199
	(0.311)			(0.297)	(0.261)			(0.184)
GDP		4.893***		4.318***		3.624***		3.486***
		(1.169)		(1.212)		(0.605)		(0.560)
GDP per capita		-1.901**		-1.299		-1.237***		-0.883
		(0.773)		(1.258)		(0.413)		(0.573)
Political stabilty			-0.951***	-0.645			-0.581***	-0.400**
			(0.308)	(0.388)			(0.204)	(0.185)
Population density			0.0001	0.001			-0.001	0.0003
			(0.001)	(0.001)			(0.001)	(0.001)
Constant	1.780***	1.890***	2.149***	2.103***	1.780***	1.610***	1.926***	1.691***
	(0.176)	(0.180)	(0.231)	(0.263)	(0.176)	(0.121)	(0.192)	(0.158)
Observations	32	32	32	32	32	32	32	32
R^2	0.018	0.403	0.248	0.516	0.021	0.571	0.233	0.722
Adjusted R^2	-0.050	0.362	0.196	0.400	-0.046	0.542	0.180	0.656
F Statistic	0.264 (df = 2; 29)	9.789*** (df = 2; 29)	4.774** (df = 2; 29)	4.447*** (df = 6; 25)	0.315 (df = 2; 29)	19.324*** (df = 2; 29)	4.393** (df = 2; 29)	10.847*** (df = 6; 25)

Note: $^{*}p^{**}p^{***}p<0.01$

Interpretation of empirical results

Models 1, 2, 3 and 4 which encompasses the variables between the years of 1991-2022. The first model shows that bordering Russia is not statistically significant. This indicates that sharing a land border with Russia does not have a correlative impact on military expenditure across this thirty-one-year period. The same applies for countries that have previously been influenced by the Soviet Union, as the coefficients fail to signify any correlation. The following models 2 and 3 include national GDP, GDP per capita, political stability and population density. Population density is not statistically significant; however, the three other variables exhibit a significant impact on military expenditure. However, it is important to distinguish between the negative significance found in GDP per capita and political stability in comparison to the positive national GPD relationship. As a positive relationship indicates that when in this case national GPD increases, so does military expenditure, whilst negative relationships would suggest the opposite. Model 4 which includes all variables identically indicates that the independent variables are insignificant in regard to military expenditure. Excluding national GDP as it signifies being an influential variable when determining a countries military expenditure. However, national GDP per capita, political stability and population density do not indicate a significant impact.

The four next models incorporate data from 2010-2022. The independent variables in model 5 suggest the same as model 1 and 4, indicating that these variables are insignificant. The national GDP variable is again positively significant whilst the GDP per capita variable whilst also significant, is such in a negative manner. The same negative significance is once more found in the political stability variable and the population density remains insignificant. Model 8 indicates a positive statistical significance with bordering Russia and military expenditure. The same relationship is found with the national GDP variable, whilst a negative significance is discovered in the political stability variable. The rest of the variables are insignificant.

The regression results show noteworthy explanatory values as seen through the lines R^2 (Multiple R-squared analysis) and Adj. R^2 (adjusted R-squared analysis) at the bottom of the regression analysis. The coefficients are generated by the calculation 1 minus RSS (Residual sum of squares) divided by TSS (Total sum of squares) is equal to R^2 (Kellstedt, Whitten, 2019). Adjusted R^2 also considers the number of predictors by subsequently highlighting whether the explanatory value in R^2 artificially increases with the number of variables included in the calculation. This gives an explanatory value between 0 (no explanatory value) to 1 (fully explanatory), considering how much

the variables can be said to account for the change that occurs in the dependent variable in the regression analysis (Kellstedt, Whitten, 2019).

The R^2 lines are relevant factors to mention as they differ greatly when comparing the independent variables with the control variables. Models 1 and 5 show the substantially low values of 0.018 and 0.021 distinguishing them greatly from the third lowest value which is 0.233. This essentially means that they do not account for much of the change that occurs in the dependent variable in this regression analysis. However, the control variables do exhibit high explanatory coefficients, and nevertheless the most outstanding model is number 8 which shows 0.722.

Regression implications

The regression has several implications towards this study, firstly it does not allow for the rejection of the null hypothesis. Furthermore, hypothesis 1 seems to be mostly incorrect as NATO members military expenditure does not necessarily increase if it borders Russia or was influenced by the Soviet Union in the past. This finding goes against the structural realist perspective and partly the assumptions deriving from Collier & Hoeffler (2002, p.7) highlighting the influence of neighbouring states impacting military expenditure, and the findings of George & Sandler (2018, p.10) (Waltz, 1979). However, aligns with previous research on specifically the Russia border and Soviet influence variables (Kofroň & Stauber, 2023). The findings do however differ when the bordering Russia variable is examined with this studies control variables from the time-period of 2010-2022. Indicating that the chosen control variables are relevant when researching this discourse, and especially within this time-period. This discovery additionally highlights the importance of considering the securitization process (Williams & Mcdonald, 2023). In this context the lack of a significant relationship between bordering Russia and military expenditure may indicate an absence of perceiving Russia as a security threat. The time-period showing significance could suggest that there was a desecuritization of the Russia border in the past, and that this is shifting in the opposite direction, as highlighted in figure 3.

Hypothesis 2 which refers to the economic influence towards military expenditure supports the assumption that parts of existing literature has previously shown in regard to its significance when applied to military spending (George & Sandler, 2018; Kofroň & Stauber, 2023; Solarin, 2017). The findings in figure 5 further supplements the economic aspects of this discourse by finding high correlations between military expenditure and national GDP. Highlighting the importance of an economically prosperous nation in regard to military expenditure. The insignificance of the GDP per capita variable is also noteworthy as this research supports the findings of Aizenman & Glick (2003, p.26) and Gilliani et.al (2022, p.8-15), and further underscores the inconsistencies of the economic factors influence on military expenditure. The Copenhagen School lens could supplement the findings

of Aizenman & Glick (2003, p.26) and Gilliani et.al (2022, p.8-15) supporting the negative relationship between GDP per capita and military expenditure possibly deriving from broader socio-economic factors or income inequality (Williams & Mcdonald, 2023). From a structural realist perspective, the positive relationship found between a country's GDP and military spending aligns with the theory's emphasis on economic capacity as a determinant of defence investment (Waltz, 1979). Highlighting the importance of a states economic capabilities when shaping security policies.

The third hypothesis encompasses the population density and political stability variables. Purely population and urbanisation has been previously found to have a negative and positive relationship with military expenditure, however, this is not identical with the findings of George & Sandler (2018, p.10). The insignificant population findings do nevertheless align with Solarin (2017, p.11). The political stability variable is not a heavily researched variable within this discourse, however relatively relevant variables that measure external conflicts and terrorism has been studied (Aizenman & Glick, 2003; George & Sandler, 2018; Odehnal, Neubauer, 2020). These variables have overall heterogeneous findings with security spending. However, this regressions finding is supported by the structural realist framework highlighting the imperative for states to prioritize their own security for survival purposes whilst in a competitive anarchic international environment (Waltz, 1979). The finding additionally contradicts Collier & Hoeffler (2002, p.7) who did not find a correlation between the internal conflict and military expenditure.

Hypothesis 4 emphasizes the impact of the effect of time on the chosen variables in this research and is shown to be partly correct. Both theoretical frameworks supported this hypothesis as they heavily highlight the importance of international relations in regard to security spending, which is relevant in these arguably turbulent times (Waltz, 1979; Williams & Mcdonald, 2023). This also further supplements the findings of existing literature especially in regard to the economic aspects (George & Sandler, 2018; Kofroň & Stauber, 2023; Solarin, 2017). In addition to this, the geopolitical findings of George & Sandler (2018, p.10) and the political aspect of Odehnal & Neubauer (2020, p10).

Conclusion

This research on determinants of NATO members military expenditure emphasizes multiple different aspects of international security dynamics and security policy coordination within the alliance. This refers to despite expanding to as of this date 32 members, but subsequently still not achieving the consensually agreed upon two percent of national GDP towards NATO guideline which was agreed to be achieved by 2024. The persistent substantial gaps between the members and the apparent "free

riding" from above half of the alliance's states underscore the significance of this predicament (Odehnal, 2015). The geopolitical issue particularly referring to the non-compliance of possibly the future president of NATO's most powerful member Donald Trump again reaffirms the need for a deeper understanding of this discourse (Davis, 2024).

This study's contribution to the NATO members military expenditure discourse has been through investigating the latter by utilizing the effect of determinants such as geopolitics, economics, and political factors. The regression analysis conducted in this research resulted in heterogenic findings in accordance with the hypothesises. As they were partially supported by the findings, such as the influence of economic prosperity on defence spending, however others, like the impact of geopolitical factors, produced unexpected results. The lack of influence regarding GDP per capita found in this regression and in previous research calls for a broader socio-economic investigation of this determinant. In addition to this, implementing a more contemporary approach in regard to a research design that encapsulates geopolitics could also be interesting to investigate, as I would suspect it to result in significant findings. This is based upon the significance regarding the bordering Russia variable in figure 7 model 8, also figure 4 and due to factors stated in the introduction. Additionally, as the Ukraine/Russia war is ongoing and showing no particular signs of slowing down as of this date, underscores how relevant this discourse might become in the future.

This study could ultimately be improved by implementing the time aspect more efficiently, possibly with the addition of a decade variable looking at each decade individually, or even a variable looking at the chosen variables effect every five years. Considering altering the time split used in this study by adding a more contemporary approach could also have resulted in more significant findings. The independent variables used in this study could also be tweaked in order to encapsulate the geopolitics more comprehensively. Using only the bordering Russia and Soviet influence variables is possibly oversimplifying the relationship and not optimal for capturing the geopolitical dynamics in its entirety. The usage of Kofron & Stauber (2023, p.14) proximity to Russia variable measuring actual distance would be better for future research and could have possibly resulted in different outcomes for this research as well. I also considered but ruled out a geographic variable in this study incorporating a north, east, south, west split within the NATO countries. I could not find any research upon this, however, I was unsure of the results that these variables might pertain. This variable might also be relevant for future studies. As for the control variables, they displayed heterogenic results in my findings, however future researchers could consider adding more control variables. The political stability variable produced interesting discoveries, and implementing the variables that were similar to it would possibly contribute to the comprehensiveness of this study, referring to specifically purely terrorism, or external conflicts used in past literature. It might also be relevant to include a similar variable calculating the number of international disputes a country has participated in varying from minor to major, as this would also be considered a conflict variable. In addition to this, as previously

mentioned in the methodology segment regarding controlling for all relevant omitted variables is difficult, and therefore would arguably be good in the context of geopolitical studies.

Furthermore, it is important to reflect on the four hurdles of causality when interpreting the outcomes of this study. This refers to ensuring that there is a plausible mechanism connecting the variables to the dependent variable for establishing a causal relationship, additionally ruling out reverse causality, contemplating covariation between all variables and controlling for all relevant variables (Kellstedt, Whitten, 2019). Despite being difficult to control for all relevant variables, the national GDP variable when also considering existing literature would be the variable closest to assume having a causal effect on military expenditure.

In conclusion this research failed to provide a causal linkage between bordering Russia and being previously influenced by the Soviet Union as factors contributing to NATO members military expenditure. It is important to acknowledge the possible improvements that could be utilized to this study, and that despite not finding any causal linkage, it does however broaden the military expenditure discourse within NATO by researching the chosen variables. As the lack of compliance towards the 2 percent guideline is still existent by the majority of NATO members, further researching this topic is still relevant. This could be done by possibly implementing my suggestions above or investigating an assumption declaring the relationship between geopolitics and military expenditure as spurious requiring new variables.

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