National Security or Personal Security? – What is the effect of winning coalition size on arms import?

Bachelor thesis in political science

University of Stavanger

Petter Knardahl
Student number: 267835

Supervisor: Tevfik Murat Yildirim

Submitted date: 15.05.2024.
Word count: 8011

Abstract

What determines a states' decision to import weapons? Is it to ensure national security or is it to secure the leader and his winning coalition against whoever might try to challenge their leadership? This study investigates the effect of winning coalition size on arms importation, addressing a notable gap in the existing literature on arms trade and institutional structures. Utilizing a time-series cross-sectional dataset of up to 171 countries from 1950 to 2022, the analysis employs ordinary least squares regression with fixed effects to explore this relationship. The initial findings suggest a significant negative relationship between winning coalition size and arms imports. However, this relationship does not hold up when additional control variables are introduced. The study further examines the impact of winning coalition size on arms imports within authoritarian regimes, finding no statistically significant relationships. A notable finding is the significant negative effect of the number of alliances on arms imports, indicating that countries with more alliances tend to import fewer arms, likely due to domestic production capabilities.

Acknowledgements

The process of completing my bachelor thesis taught me a great deal. I would first like to thank my supervisor Tevfik Murat Yildirim. Thanks for inspiring me with your methodological insights and for lecturing the comparative politics course, where I first discovered selectorate theory. I would also like to thank the other lecturers at the bachelor´s program in political science for sharing their knowledge throughout my studies. Additionally, I extend my gratitude to my fellow students for their insightful discussions and encouragement. Finally, I would like to thank my family for their support and motivation throughout this journey.

Table of Contents

1. Introduction

In 2022 the world spent an average of 2.2% of GDP on military expenditures and the total global military expenditures were estimated to be over $2 trillion dollars (The World Factbook, 2024).The costs to humanity of this arming are immense. These funds could alternatively be directed towards eradicating global poverty, boosting global research and development expenditure by half, or guarantee treatment for every individual affected by HIV, as suggested by Coe and Vaynman (2020). This thesis will focus on a crucial segment of these expenditures – the international arms trade, particularly the importation of conventional arms. The increasingly flourishing international trade of arms holds significant implications for both human and state security. Arms transactions can escalate ongoing territorial or ethno-nationalist disputes, initiate arms races and increase tensions, ultimately culminating in armed conflict. Furthermore, arms transactions can empower authoritarian regimes, subvert democratic processes, and perpetrate human rights violations (Stohl & Grillot, 2009; Tan, 2023).

Various Influences on Arms Imports

In light of the multitude of negative implications of arms transfers, one may inquire: why do states persist in their procurement of weapons? Through a realist lens, these arms transfers are closely related to the most basic goal of the recipient states, namely national security. This entails sovereignty, political independence, and territorial integrity, serving as the precondition for any subsequent political objectives. Consequently, ensuring the availability of means to protect national security is a very important political matter (Catrina, 1988). However, not every instance of arms importation is purely motivated by concerns for national security, and it turns out that there are a lot of diverse motivations and perspectives for the importation of weapons.

Arms are commonly being perceived as a means to fend of external dangers, yet in the developing world, internal threats and corruption is more concerning. Blanton´s (1999) findings show a correlation between arms imports in developing countries and deteriorating human rights conditions. Implying that acquiring arms fuels repression by facilitating violent political maneuvers. The arms trade is also riddled with corruption, illegal transfers and "gray-sone" transfers that are identified as factors contributing to instability, violent conflict and undermining of democratic practice. This has a significant impact on both buying and selling countries, but most impacted are developing countries (Feinstein et al., 2011; Perlo-Freeman, 2018; Stohl & Grillot, 2009). Even though the international arms trade market makes up a relatively small part in the overall global trade market, some claim it accounts for as much as half of all total corruption in the global trade (Roeber, 2005). The problem of corruption in the arms trade is not due to isolated incidents or solely a result of individual greed. It is deeply integrated in to the political and economic structures of the involved countries. Making it extremely hard to solve (Perlo-Freeman, 2018).

Other notable explanations for why states import arms, highlights the role of wealth, technological development, and domestic defense production capabilities. The presumption is that wealthier states have increased capacity and demand to import weapons, meanwhile technological development and domestic production will reduce the dependence on such imports (Pearson, 1989). The evidence so far is inconclusive. Pearson (1989) finds that factors of economic wealth has little overall impact on arms purchases, and states that are able to produce weapons domestically, does not necessarily reduce imports. This is supported by Smith and Tasiran (2005) who observed no relationship between per capita income and importation of arms, instead finding significant military expenditure effects on arms importation. However, Comola (2012) Finds the opposite; per capita GDP and population are factors that increase importing of arms. While the specific relationship between wealth and arms importation remains under-studied, there is a large literature on wealth and military expenditures (for instance: Blum, 2019; Collier & Hoeffler, 2007; Dunne & Perlo-Freeman, 2003; Seiglie, 2016; Yakovlev, 2007).

Prestige and symbolism are also factors that can increase military spending and thereby increase arms importation. Weapons and more advanced weapon systems hold significant importance in global politics, functioning both as practical instruments of power projection and as symbols of national power. Aircraft carriers, long-range missile systems, submarines and bombers are examples of some of the prestigious weapons that can give countries a diplomatic leverage in interactions on the global stage. These symbols of a state's prestige are important assets for countries of all sizes (Tan, 2023). In a study by Johnson & Shreve (2023), they find that some countries import weapons because they desire them, and it is not necessarily because they need them. By importing these status symbol weapons, regimes aim to reduce the discrepancy between their actual accomplishments and how they are perceived internationally, elevating their status within the global hierarchy.

Institutional influences

Some studies indicate that similar political systems often engage in arms trade exclusively with each other due to security concerns (Baliga & Sjöström, 2004; Levine & Smith, 1995). This phenomenon can be attributed to the democratic peace theory, which assumes that democracies are less likely to enter into conflict with each another because of norms of cooperation and compromise (Maoz & Russett, 1993). Further studies demonstrate that during the cold war, the need for security led to arms exchanges between similar political entities. However, this ceased to matter after cold war, suggesting that the ethical claims of democracies to not trade with autocracies in recent years may be overstated (Akerman & Seim, 2014; Perkins & Neumayer, 2010).

While explicit research on the effect of regime type on number of arms imported is hard to find, there is one study suggesting that democracies in southern Africa have edged out hybrid regimes and authoritarian regimes in total arm imports from Russia, however hybrid regimes had the highest frequency of imports (Ndzendze & Manyana, 2022). The wider research field of regime type and military expenditures has more research. With findings that indicate that government form influence military expenditures (Hewitt, 1992) and findings that suggest democracy have a negative effect on military expenditures compared to other regime types (Dunne & Perlo-Freeman, 2003; Fordham & Walker, 2005; Goldsmith, 2003). But the link between number of arms imported and regime type is not clear.

Research Gap and Research Question

I took notice of, in line with Bove and Brauner (2016), that the vast majority of studies on military expenditures and arms importation that involve regime type use categorical measures that range from full democracy to full autocracy, such as polity IV and Freedom House (see Bueno de Mesquita and Smith (2022) for more standard regime-type indicators). As Bove and Brauner (2016) point out, these measures disregard the considerable variety among different kinds of democracies and autocracies. They use the example of communist China, Burmese military regime, and the UAE monarchy all having the same Polity IV score, yet their institutional environments are extremely different. It appears that the institutional concepts of the selectorate and winning coalition from selectorate theory offer a more nuanced perspective on political dynamics than what is provided by broad categorical labels such as democracy, junta, autocracy, or monarchy (Bueno de Mesquita et al., 2003). This measure is also continous, and is shown to outperform the alternatives in policy and welfare outcomes (Bueno de Mesquita & Smith, 2022).

Existing research on regime type and arms imports also seem under-researched, with the wider link to military expenditures as a whole, being more popular. More research is needed on the indicators of arms import and the motivations behind the arms trade, as the flow of these arms, as mentioned above, have the potential to end up in corrupt dealings, illegal trades and be a threat to human security. Also, with all the potential influential variables, it is important to sort out the most influential ones (Pearson, 1989). Therefore, I wish to contribute to filling this research gap, and as far as I know the selectorate theory and winning coalition has not yet been linked to weapon importation. With winning coalition being a good explainer for various phenomena such as: respect for human rights, leader survival time, promotion of public goods (Bueno de Mesquita et al., 2003). It is only natural to see how it also can be used to explain the motivations of arms importation (more on this in section 2). What is clear from previous literature is that there are a lot of reasons beyond just national security for the importation of arms. This leads me to present the research question for this study:

What is the effect of winning coalition size on arms import?

Contribution

The study of arms trade and military expenditures is a prominent area of interest in political science and international politics due to the significant consequences assosciated with these arms. Despite this, research has yet to fully explore how institutional structures, particularly those described in selectorate theory, influence arms importation.This study seeks to determine whether variations in the size of the winning coalition affect arms imports in countries over time. Using ordinary least squares regression with fixed effects, I will analyze a time-series cross-sectional dataset covering up to 171 countries from 1950 to 2022.

Structure

The structure of this paper is as follows: After the introduction, the second section will provide the theoretical framework, including a discussion of selectorate theory, its criticisms, and my hypotheses. The third section will describe the research design, discussing data, variables, and methods. The fourth section will present the results. In the fifth section, I will discuss the results and their implications for the hypotheses. The paper will conclude in the sixth section.

2. Theoretical framework

This chapter presents the theoretical framework, grounded in the seminal work of Bueno de Mesquita et al. (2003) on selectorate theory, which offers a straightforward and practical institutional explanation for the decisions of political leaders. Although this work on selectorate theory is a lot more complete than what I present here, I will only stick to the main elements that I deem to be most relevant to give a theoretical answer to the research question. Building on this framework I will present the hypothesis, outlining the expected observations that emerge from the core principles of selectorate theory. Lastly, I will discuss potential criticisms of the theory, introducing a second hypothesis to strengthen the theoretical and practical contributions of this study.

2.1 Selectorate theory

Residents, Selectorate and Winning Coalition

According to selectorate theory, all polities consist of three nested groups. The residents (N), the selectorate (S) and the winning coalition (W). The largest of this group is the residents, which encompasses every resident living in that polity. The residents can be divided into those that are in the selectorate and those that are not in the selectorate. The latter being disenfranchised. Throughout history the disenfranchised have comprised the great majority of people but political developments are showing a tendency to increase the size of the selectorate. Slowly integrating more and more residents into the selectorate, diminishing the disenfranchised population. The characteristics that determine who is included or excluded from the selectorate can be deliberately influenced by political actions and the greater the scarcity of a required characteristic, the smaller the selectorate will be. ¨These defining characteristics include (1) personal origin: birthplace and lineage; (2) special proficiency: skills, beliefs and/or knowledge; (3) wealth; and (4) gender and/or age" (Bueno de Mesquita et al., 2003, p. 43). In contemporary democracies, the disenfranchised group is usually mostly consisting of only those that are under eighteen (Bueno de Mesquita et al., 2003).

The selectorate is a smaller subset group of all the residents. The members of the selectorate have ¨a formal role in expressing a preference over the selection of the leadership that rules them, though their expression of preference may or may not directly influence the outcome¨ (Bueno de Mesquita et al., 2003, p. 38). These individuals can select their leaders, but most importantly, by being a member of the selectorate you get the opportunity to join the winning coalition. The selectorate membership is a necessary condition to be eligible for the winning coalition, but it is not sufficient. The prospects of joining can still be extremely low, but it is at least above zero and in some contemporary democracies it can be as high as a 50 percent chance (Bueno de Mesquita et al., 2003).

The winning coalition can be defined "as a subset of the selectorate of sufficient size such that the subset´s support endows the leadership with political power over the remainder of the selectorate as well as over the disenfranchised members of the society" (Bueno de Mesquita et al., 2003, p. 51). Support from a winning coalition is essential for any leader to gain and

maintain power. The number of supporters needed to establish a winning coalition is determined by what characteristics are necessary but also on how these characteristics are distributed among the selectorate. If the required characteristics are concentrated in a few, the leader seeking to form a winning coalition will have to specifically target those few individuals who possess them. Alternatively, if the necessary characteristics are broadly spread among many individuals, more options might be available to build a coalition, potentially requiring different strategies or a larger group of supporters (Bueno de Mesquita et al., 2003).

For example, in systems that depends in part on control over weapons, like military juntas. It is possible that the winning coalition might only comprise of a few senior officers who together command a majority or more of the nation's military personnel and arms, with the selectorate being a very small minority of the entire citizenry. Other non-democratic regimes such as single-party dictatorships might have a bit larger selectorate than the military juntas, (around 10 % of the total population was common in the former soviet states), but the winning coalition is still very small. On the other side, universal suffrage democracies are characterized by their large selectorates and their large winning coalitions and any citizen can potentially be a part of the winning coalition (Bueno de Mesquita et al., 2003).

The Loyalty Norm (W/S)

Another central principle in selectorate theory, is the loyalty norm, which is the probability of being in the leader's winning coalition. This is generated by W/S, the ratio of the winning coalition size (W) to the selectorate size (S). There is a risk associated with defecting from the current leader's coalition and there is also no guarantee that you will be in the next leader's coalition. "The risk of exclusion from a challengers long-term winning coalition drives loyalty to the current leader. Not surprisingly, leaders have tried to choose followers with the greatest risk of exclusion because they are the most loyal" (Bueno de Mesquita et al., 2003, p. 66). A lower W/S ratio reduces the likelihood that coalition members will risk their private benefits by backing a political opponent of the incumbent. In systems characterized by a low W/S ratio, such as dominant-party and personalistic dictatorships, the incumbent leader enjoys high loyalty from coalition members. Conversely, in systems with a high W/S ratio, like democracies, monarchies, and military juntas, coalition members tend to be less loyal (Bueno de Mesquita et al., 2003).

Public Goods and Private Goods

How does a leader gain the necessary support to maintain themselves in office? In selectorate theory, leaders do this by increasing taxes and allocating a portion of government revenue to use on public goods and private goods. Public goods benefit all members of society, including the disenfranchised. They are indivisible and nonexcludable. In contrast, not everyone benefits from private goods. Private goods only benefit the members of the winning coalition. The motivation behind distributing revenue towards the combination of public goods and private goods is to try to prevent any member of the winning coalition from switching allegiance to a competitor. Simply put, to hold the loyalty of W (Bueno de Mesquita et al., 2003).

The distribution and the effectiveness of private goods and public goods depend on the size of the winning coalition and the loyalty norm. Leaders in small-winning coalitions typically depend on distributing private goods to ensure that their supporters are loyal. These private goods can come in various forms such as: government contracts, access to resources, bribes, or industry subsidies. They are directly given to coalition members to give them immediate benefits that are inaccessible to non-members. Providing private goods is expensive, making them less appealing as the size of the winning coalition increases. Conversely, in systems where the winning coalition is large, the leader must satisfy a wider range of interests and therefore public goods are more appealing. Public goods are provided in a variety of forms, for example: public healthcare, road infrastructure and public education (Bueno de Mesquita et al., 2003).

This distribution also depends on the loyalty norm within the system. In systems where W/S is low, loyalty is high, and coalition defections are rare. Leaders can then afford to reduce their distribution of goods, particularly private goods. However, in systems with high W/S, where coalition members are less loyal, the continuous provision of private goods is more is crucial to deter defections (Bueno de Mesquita et al., 2003).

Military prowess

As mentioned earlier there are characteristics that determine who is included or excluded from the selectorate and “not surprisingly, military prowess is among the most common special skills used to determine selectorate membership” (Bueno de Mesquita et al., 2003, p. 46). Control or ownership of arms represents a distinct kind of expertise that continues to be essential in the governance of numerous societies. Military prowess not only enables its possessors to influence civilian leadership on military issues but also to coerce political leaders into recognizing the authority of the military. The leader values these special skills as they play an important role in deterring threats from the disenfranchised. Because of the threat of revolution, leaders have an incentive to increase the collective military prowess of the selectorate. The way they can increase this military prowess is by including those with such skills in the selectorate or by motivating existing members to increase their skills (Bueno de Mesquita et al., 2003).

2.2 Expected observations.

I bring up the research question again: ´What is the effect of winning coalition size on arms import? ´, With the theoretical framework in mind, I present the following hypothesis:

H1: As winning coalition size increase (W), the importation of arms to countries will decrease.

I expect that as countries increase their winning coalition size, they will decrease their arms imports. In contrast, when winning coalition size decreases, countries will import more arms. This hypothesized relationship is illustrated by Figure 1.

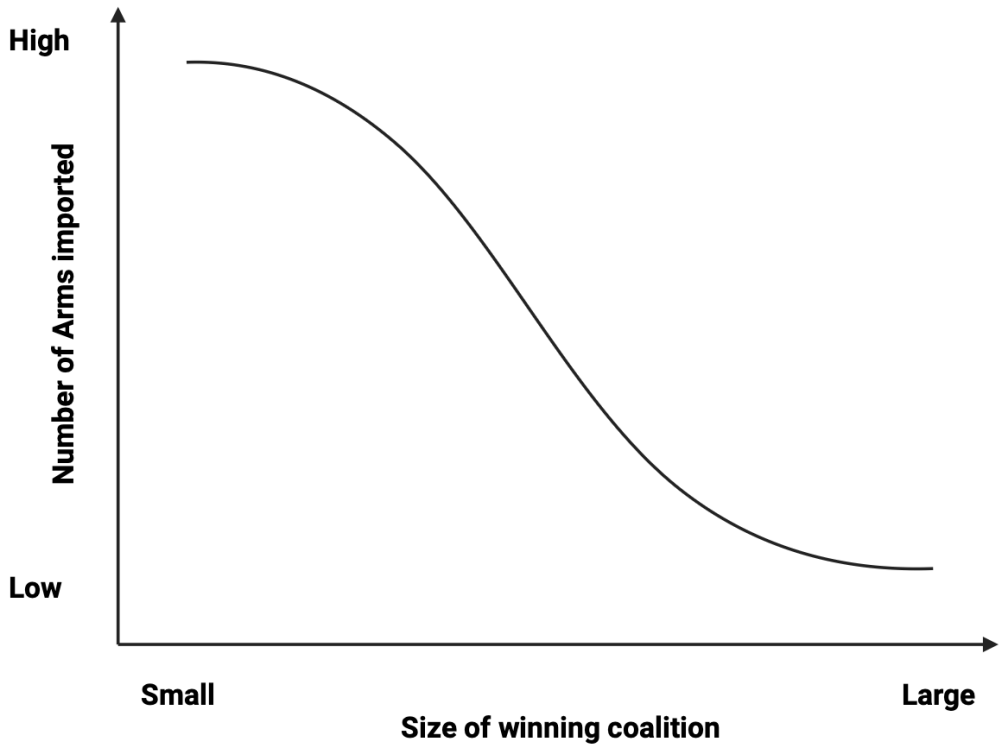

Figure 1: An illustration of the hypothesized relationship between W and arms importation

The rationale behind the formulation of this hypothesis is varied, with several considerations. First, I consider arms to be particularly well-suited to the category of private goods, which according to selectorate theory, tend to become more expensive and less valuable as the size of the winning coalition increases. The effectiveness of arms as private goods is evident in how weapon systems are viewed as status symbols, especially in what selectorate theory would classify as systems with low winning coalition sizes (Johnson & Shreve, 2023; Tan, 2023). Both leader and Coalition members would appreciate these symbols of prestige and strength. Beyond their status and prestige, weapons categorized as private goods also serve as economically valuable assets. Given how extensive the corruption in the international arms trade is (Roeber, 2005) and the numerous opportunities for corrupt officials to engage in illicit arms transfers for personal gain (Stohl & Grillot, 2009), it is quite reasonable to consider weapons as private goods that can be used to satisfy coalition members economically.

One could also argue the opposite, that arms can be a public good in the sense that it helps strengthen national security, benefitting all residents in the nation regardless of their position. This is supported by a realist view of the world. Realists contend that the primary objective of a state is to ensure its own survival. In an international system that is absent of a supranational authority to ensure that all states comply with international rules and where states pursue their territorial ambitions, national security is extremely important (Jensen, 2023).However, this perspective of national security holds true for all states, regardless of their size of winning coalition. This suggests that the argument to label arms as public goods is irrelevant to the hypothesis. Meanwhile, labelling arms as private goods is in line with selectorate theory, which suggests that small winning coalition leaders are more inclined to allocate resources into private goods that directly benefit their essential backers.

Second, I argue that the importation of weapons increases military prowess, which is highly valued in small winning coalition systems. As mentioned earlier, military prowess is one of the most influential factors in determining selectorate membership and can be used to strengthen the leader militarily to protect against the disenfranchised and challengers to the throne. The leader motivates existing members to increase their military prowess and in this context that means importing weapons to strengthen them. This is important in smaller winning coalition systems, which are more autocratic. Larger winning coalitions systems are typically democracies and therefore will value other characteristics higher than military prowess (Bueno de Mesquita et al., 2003). Along with studies that back up the claim that autocracies proportionally spend more than democracies on the military purposes (Dunne & Perlo-Freeman, 2003; Fordham & Walker, 2005; Goldsmith, 2003), it seems fair to claim that leaders of smaller coalitions value military prowess higher than larger coalitions, and that importation of arms is one way to increase military prowess.

Finally, I assume that the loyalty norm will increase arms imports to low W/S systems and high W/S systems, with democracies being the exception. The reasoning is that in low W/S systems like dominant-party dictatorships and personalistic dictatorships, the loyalty is high, and the leader will import arms knowing that their coalition will be very loyal and not use those arms against the leadership.
Meanwhile in high W/S systems like monarchies and military juntas, they have a weak loyalty norm, low W, and coup d'états are a lot more common (see Bueno de Mesquita (2003), p. 399). A coup can be used by coalition members to put action to their discontent. When the

disturbing potential for coups to occur is very high, I assume that the leadership must keep importing arms in order to defend against them. This increased importing of arms can also be a ¨double-edged sword for the elite¨ (Acemoglu et al., 2010, p. 2) though, as it could backfire resulting in a military takeover.

When looking at democracies which are also high W/S systems, the W is high, and they are less prone to coup d'états. Bueno de Mesquita et al. (2003) find no evidence of coups in the largest-coalition systems like universal suffrage democracies. The democratic traditions also mean that the challengers will use peaceful means, like elections, to grab power.
This means that despite the high W/S and low loyalty norm in democracies, they will not need to import weapons to defend against coups. But the other high W/S regimes don't have the luxury to stop import weapons.

2.3 Criticism of Selectorate theory

Important initial objections to selectorate theory pointed out the challenges associated with measuring the concept of coalition size. The early coalition size measures classified political regimes in categories or vectors. This prompted some theoretical questions since the authors had specifically highlighted the theory's ability to forecast outcomes within nominal regime categories (Kennedy, 2009). This was addressed by Bueno de Mesquita and Smith (2022), with the new continuous measure of winning coalition. Other notable criticism highlights how selectorate theory successfully separates policy choices between democratic and non-democratic systems, yet it seems inadequate in differentiating within non-democratic regimes (Bueno de Mesquita & Smith, 2022; Gallagher & Hanson, 2015; Kennedy, 2009).The authors conducted subset tests on autocracies and found that the new winning coalition measure outperforms other regime type measures both within and across these categories (Bueno de Mesquita & Smith, 2022).

Considering the performance of the measure within regime categories and to prevent this study from solely distinguishing between democracies and non-democracies, as well as to enhance the theoretical and practical contributions of this study, I will introduce a second hypothesis:

H2: As winning coalition size increase (W), the importation of arms to authoritarian regimes will decrease.

Focusing exclusively on a subset of autocracies could also yield interesting results due to the potential variability in governance practices among these regimes. The same theoretical expectations and reasoning supporting H1 remains applicable to this second hypothesis as well, although 'High W', previously assosciated to 'full suffrage democracy', is now associated to 'electoral autocracy´.

3. Research Design, Data & Methods

In this section, I will first present the research design, discussing why a time-series cross-sectional design is the logical choice. Thereafter, I will present the data and the variables, including discussing any issues related to the data. Finally, I will present the method of choice and discuss factors that contribute to the model´s robustness.

3.1 Research Design

Before I present the data and methods I employ in this study, it is necessary to outline the research design. Remember the research question, “What is the effect of winning coalition size on arms import?”. The primary objective of this research is to explore whether changes in the size of the winning coalition affect weapons imports in countries over time. To effectively analyze this relationship, the research necessitates the inclusion of both time and spatial dimensions. A time dimension will capture the comparisons over time, to see what effect increasing W, has on weapon imports. Additionally, to see how this relationship varies between the individual countries, a spatial dimension is necessary. Therefore, a time-series cross-sectional (TSCS) research design is the logical choice (Kellstedt & Whitten, 2018). Consequently the dataset chosen for this study has ´country-year´ as the unit of analysis.

3.2 Data

To effectively address the research question and test the hypotheses, I will utilize a time series cross-sectional (TSCS) dataset comprising of up to 171 countries spanning from 1950 to 2022. The data is gathered from various reputable sources, and the large sample size of countries and years, contributes to smaller standard errors. This enhances the reliability of the findings and improves their generalizability (Kellstedt & Whitten, 2018). This dataset is a TSCS rather than a panel dataset as the units are fixed, specifically countries, and are not sampled from a population. Consequently all inferences of interest are conditional on these countries, In contrast, in panel data analysis, the inferences of interest concern the underlying population from which these units are sampled (Urdinez, 2021).

Majority of the measures, including the main independent variable (W) are retrieved from the Varities of Democracy (V-Dem) Project (Coppedge et al., 2024). The V-Dem dataset encompasses nearly all of the countries in the world since 1789. The data is processed and coded by applying item response theory to surveys completed by experts (Pemstein et al., 2024). Data on arms imports, the dependent variable, is from Stockholm International Peace Research Institute´s (SIPRI) arms transfer database (2024a). It covers major weapon types such as artillery, armoured vehicles, missiles, ships, aircraft and more. The data covers the period of 1950 to 2022. The other measures are retrieved from data of the World Bank (2024), the state-year version of the Alliance Treaty Obligations and Provisions Project (ATOP) datasets (Leeds et al., 2002), and from the country-year violence dataset from Uppsala Conflict Data Program (Sundberg & Melander, 2013).

Data Issues

The dataset is unbalanced due to the presence of missing values, with some variables being very well covered, however, others have many missing values due to data availability. There are a total of 11488 country-year unit observations but not all variable values are present on every unit. For instance, the SIPRI arms transfers database illustrates this issue well. Although data from 1950 and onwards is available for most countries, this varies significantly across different countries. This variability in data availability is a substantial challenge in the field of arms transfer research. Furthermore, many governments publish arms transfer data, but the

reliability and completeness of this information vary. Some countries report voluntarily, while others do not, leading to inconsistencies. For example Russia has been reporting numbers that are too low to be credible. Additionally, these reports typically only include weapons that pass through customs, which might ignore military aid. To mitigate these issues and enhance the dataset's reliability, SIPRI supplements its records with information from press reports and non-governmental organizations (Wezeman, 2003). Despite these challenges the SIPRI arms transfer database still “continues to provide the most comprehensive and reliable public information about the conventional arms trade” (Stohl & Grillot, 2009, p. 179).

Autocracies

To test **H2**, which emphasizes authoritarian regimes, I will extract a subset of the main dataset, including only units that are classified as either closed autocracy or electoral autocracy. This classification is based on the political regime's performance in terms of power competitiveness and adherence to liberal principles from the V-Dem dataset (Coppedge et al.,2024). The classification scale ranges from 0 to 3, with 0 representing a closed autocracy and 3 representing a liberal democracy. Figure 2 shows the distribution of these regime classifications in the dataset. The total unit observations are 11488, with about 7000 of these being autocracies.

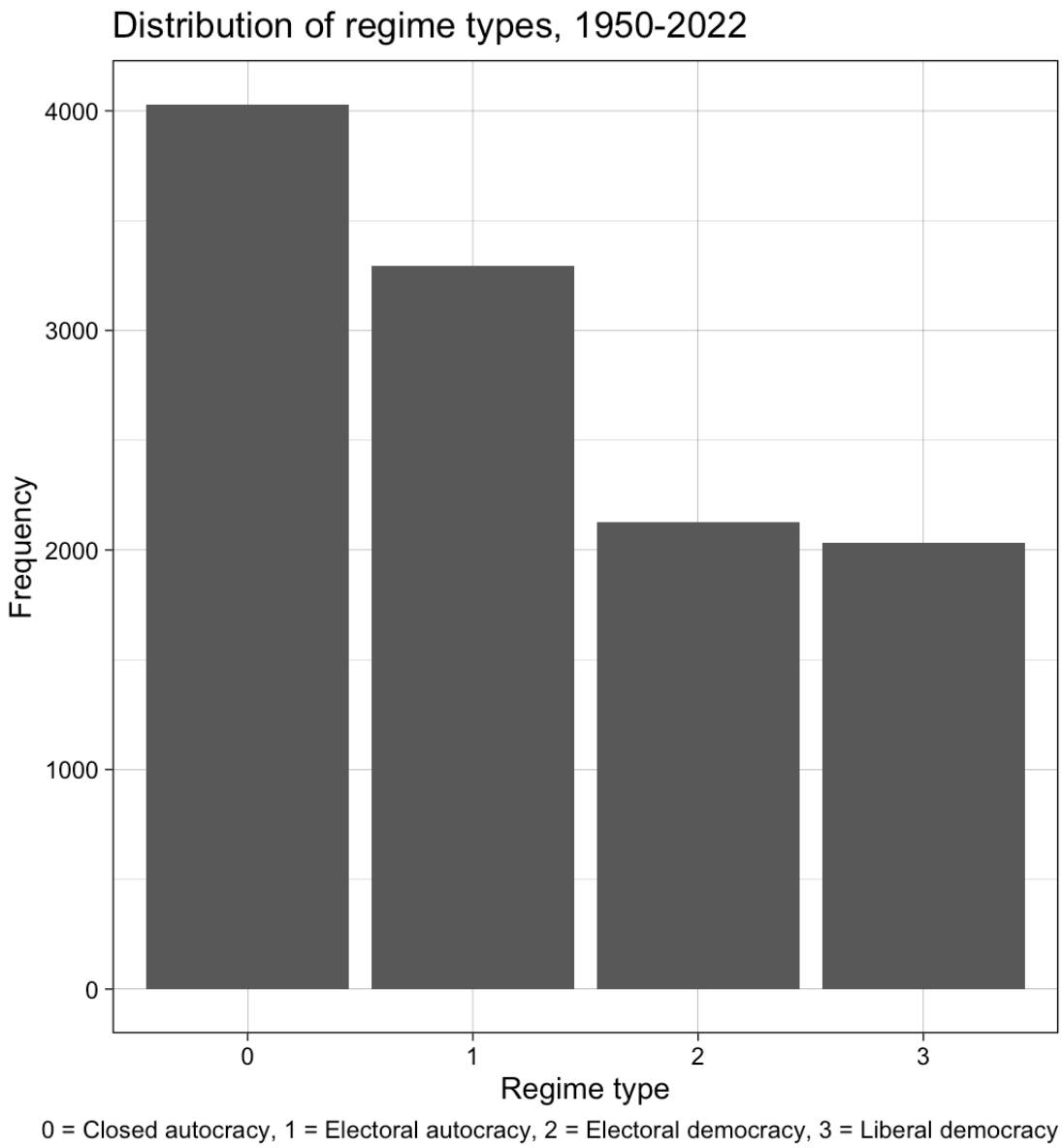

Figure 2: Distribution of regime types, 1950-2022. Total observations: 1148

Dependent variable: Arms importation

I operationalize the dependent variable of arms importation with trend indicator values (TIV) from the SIPRI arms transfer database (2024a). TIV is a measure developed by SIPRI and it measures the deliveries of major conventional weapons. TIV is calculated using the known unit production costs of a core selection of weapons, aiming to represent the transfer of military resources rather than the monetary value of the transfer. If a weapon's production cost is unknown, it is compared to core weapons by analyzing aspects like size and performance capabilities. These values account for all weapon deliveries over the course of a year (SIPRI, 2024b). Figure 3 shows total weapon imports of all countries from the time period of 1950 to

2022. Since this variable is the dependent variable and its data starts from 1950 onwards, this will serve as the cutoff point for all other variables with values from years prior to 1950. During the wold war, the reported values reached their peak before it decreased after the cold war period ended. Now, in the 2000s period, global arms imports are increasing again.

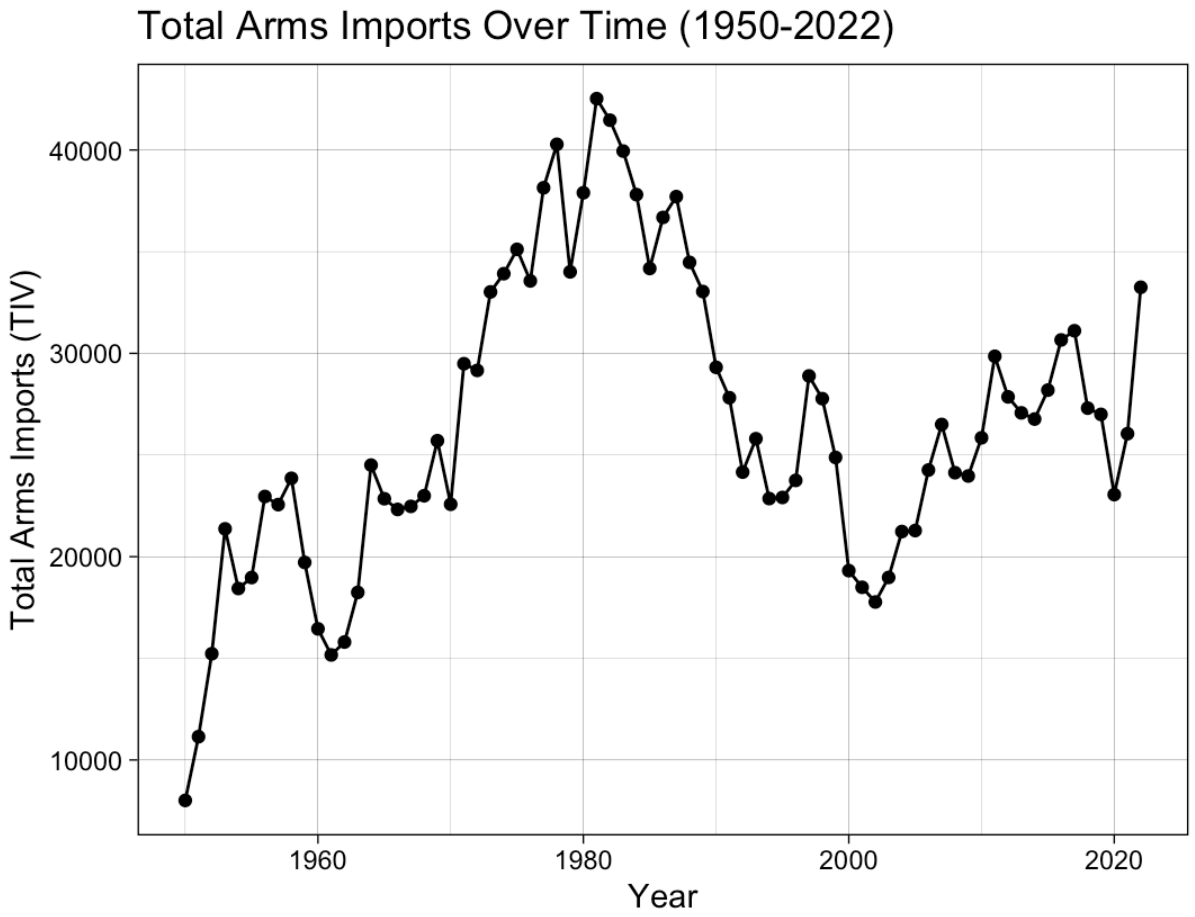

Figure 3: Total arms imports over time 1950-2022. All countries.

Independent variable: Winning coalition size (W)

In response to criticisms of their previous measure, Bueno de Mesquita and Smith (2022) developed a new measure of winning coalition size. This updated measure highlights institutional mechanisms, moving away from behavioral considerations and offering convincing answers to issues raised by critics. The data covers the years from 150 onwards (Li & Zha, 2024). The measure is constructed from the V-dem dataset (Coppedge et al., 2024) and is utilizing institutional indicators such as: election monitoring body autonomy, opposition parties' autonomy, barriers to political party participation and closed succession. It

is scaled to range from 0 to 1, where a higher value suggests a larger winning coalition. This new measure is also continuous which sets it apart from the earlier categorical measure of winning coalition (Bueno de Mesquita & Smith, 2022). Figure 4 displays the distribution of W in the dataset from the years 1950 to 2022 in units of 0.01 width. The winning coalition sizes shows large variation across this time period.

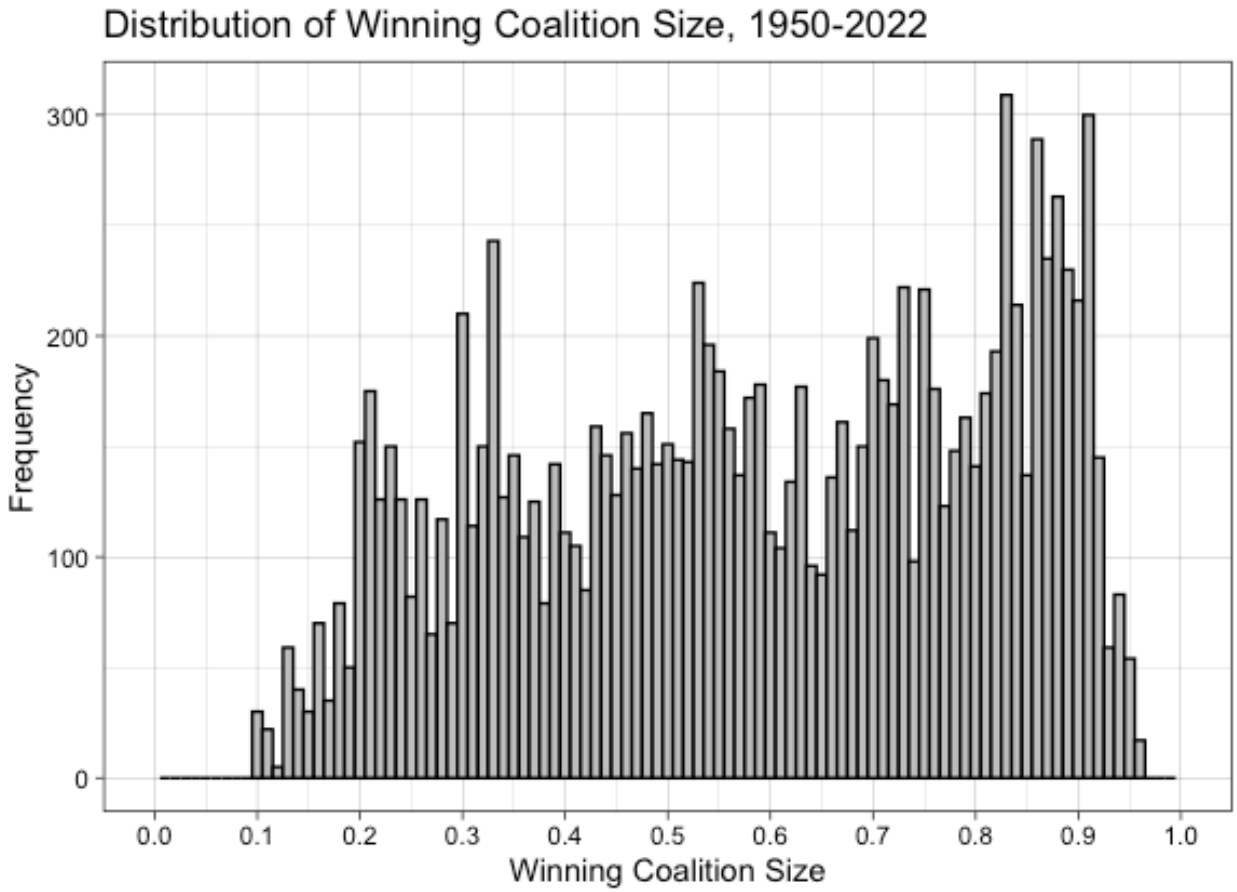

Figure 4: Frequency of W 1950-2022. Based on Bueno de Mesquita and Smith (2022)

Control Variables

The selection of control variables for this study is grounded in previous literature and research that identifies and theorizes the factors influencing the importation of weapons. This approach is important because "if sufficient attention is paid to accounting for all of the other possible causes of the dependent variable that are suggested by current understanding, then we can make informed evaluations of our confidence that the independent variable does cause the dependent variable" (Kellstedt & Whitten, 2018, p. 93). Following this approach, I control for

level of wealth, population density, alliance treaties and organized violence within country borders.

Level of wealth

As previously mentioned, the specific research on the relationship between wealth and arms imports is inconclusive. However, there is more substantial research on the connection between wealth and overall military spending. Goldsmith´s (2003) findings suggest that economic growth and wealth positively influences defense spending and when levels of wealth are high, resources tend to be disproportionately allocated to military spending. Treating arms imports as a part of military spending it becomes evident how they also would be influenced. Based on Comola´s (2012) findings that GDP per capita increase arms imports, I will control for wealth levels using both GDP and GDPpc. With GDP controlling for the absolute size of the economy and GDPpc adjusting for population size. The data comes from the V-dem dataset (Coppedge et al., 2024), and the timeframe for the data ranges from 1950 to 2022.

Population density

Dunne and Perlo-Freeman (2003) finds that an increase in population has a significant negative effect on military expenditures. It has also been theorized that geographical area and population are associated with weapon imports. Larger countries presumably need more weapons to defend their extensive territories, particularly when they have lower populations. This argument has been made for states such as Norway and Australia (Pearson, 1989). I use the population density data from World Bank (2024) here, which accounts for both population and land territory. Specifically, people per square kilometer of land area. The data period is from 1961 to 2022.

Alliances

Previously I mentioned that some studies indicate that similar political systems often engage in arms exclusively with each other due to security concerns (Baliga & Sjöström, 2004; Levine & Smith, 1995). Additionally, Pearson (1989) theorizes that alignment patterns and alliance orientation can increase the pressure to procure arms in cooperation with alliance members. Therefore, I will control for this in the analysis. I have decided to operationalize alignment patterns by counting the number of alliances a country has. The data on alliances is sourced from the ATOP dataset (Leeds et al., 2002), which includes offense pacts, defense pacts, neutrality pacts, non-aggression pacts, and consultation pacts as alliance types. For an agreement to qualify as an alliance, it must be a formal written agreement between countries. Each alliance adds a value of 1. I have chosen to include only offense pacts and defense pacts from 1950 to 2018, as these are the strongest forms of alliances and are likely to have the most significant impact.

Violence

Where there is internal conflict, there will be a need for weapons. With research indicating that arms imports are fueling internal conflict (Blanton, 1999), I will need to control for internal conflict. I have decided to operationalize internal conflict and unrest with violence data from UCDP (Sundberg & Melander, 2013). It is a global dataset that measures organized violence within country borders between 1989 and 2002. The variable is categorical with two values. It measures the existence of state-based violence within the borders of a country in a given year. It is 1 if state-based violence occurs. State-based violence refers to the instances where the government of a state is one of the warring parties. The variable is categorical with two values, indicating the presence of state-based violence within a country in a given year. A value of 1 indicates the occurrence of state-based violence, which refers to instances where the government is one of the warring parties. 0 indicates no such occurrences. Table 1 includes descriptive statistics on all the continuous variables except the violence variable as it is categorical. Here, it is evident that the dataset is unbalanced, with some variables either not extending back to 1950 or containing missing data due to limited data availability.

Table 1: Descriptive table

Variable	W	Arms Imported	GDP	GDP per capita	Population density	Alliances
Observations	11488	7197	10817	10817	9356	7248
Average	0.59	268.42	31832.45	10.44	142.56	3.56
Median	0.60	65.00	3314.73	4.91	50.85	2.00
Stand. Dev.	0.23	501.68	127788.96	14.14	460.78	4.59
Minimum	0.10	0.00	13.37	0.29	0.65	1.00
Maximum	0.96	5710.00	2279809.27	156.63	7965.88	41.00
Missing	0.00	4291.00	671.00	671	2132.00	4240.00

3.3 Methods

Let's address the research question: ´What is the effect of winning coalition size on arms import? ´ In order to test the hypotheses and identify if there is a relationship between W and arms importation, I will use Ordinary Least Squares (OLS) regression with fixed effects to model this relationship. OLS can illustrate how the relationship between two variables changes at different levels of another variable. Since the dependent variable is continuous this model is suitable (Fynn & Nocetto, 2021b; Urdinez, 2021).

Fixed effect or random effect

Individual effects are not inherently fixed or random. They can be treated as either fixed (constant parameters) or random (random deviations). For micro data, the random effects approach is appealing since the sample comprises of numerous individuals randomly drawn from a large population, making individual effects less relevant. However, since we are dealing with macro data, which includes almost all countries in the world, capturing the individual effects becomes interesting, making the fixed effects approach more suitable (Crossaint & Millo, 2019).

Given the research question and hypotheses, My primary interest lies in understanding how W affects arms importation across all countries (H1) and specifically within autocracies (H2). I am particularly interested in the individual effects of the winning coalition within each country. To capture these effects, I have chosen to use a fixed effects approach.

Multicollinearity

When the independent variables are highly correlated, multicollinearity occurs, making it difficult to isolate the individual effect on the dependent variable. To detect multicollinearity, I perform a variance inflation factors (VIF) test. A score less than 2 is acceptable; scores above 2 indicate high variance and issues with multicollinearity (Fynn & Nocetto, 2021b). Table 2 presents the VIF scores from the test, showing that all variables meet the criteria.

Table 2: VIF scores of independent variables

Variables	W	GDP	GDP per capita	Violence	Population density	Alliances
VIF score	1.054245	1.118799	1.201700	1.120796	1.026405	1.097430

Panel corrected standard errors

The standard errors produced by OLS could be inaccurate. They might exhibit panel heteroskedasticity, which indicates that the error variance varies across countries. Errors might also be contemporaneously correlated, where an error in one country is associated with errors in other countries during the same year. Additionally, errors could be serially correlated, where a country´s errors are related to its past errors. To address these issues, I will implement panel-corrected standard errors, which correct for these deviations and improve the reliability of inferences from linear models using TSCS data (Beck, 2001).

F test

I deemed it necessary to do an F-test. The purpose of this test is to evaluate whether the regression model with predictors fits the data significantly better than a model without any predictors (Sureiman & Mangera, 2020). In the context of TSCS data, this means evaluating whether the inclusion of individual effects significantly improves the models explanatory power (Crossaint & Millo, 2019). The small p-value (< 2.2e-16) indicates that the fixed effects model provides a significantly better fit than a pooled model.

Robustness

The use of TSCS data enables more sophisticated specifications than simple cross-sectional or time series approaches. While this brings considerable benefits, it also introduces challenges (Crossaint & Millo, 2019). Here, I will outline the several steps I have taken to improve the robustness of the model. To begin with, I am working with an extensive sample size, covering as many as 171 countries and spanning the period from 1950 to 2022. A large temporal dimension is essential for the effectiveness of TSCS methods (Beck, 2001). Second, I have included several control variables that have been theorized to affect the dependent variable to isolate the effect of interest. Third, I have included on a subset of the data concerning only autocracies to gain insights into how these variables behave within this specific group. Fourth, I have tested for multicollinearity to ensure that the effects of each variable on the dependent variable can be accurately isolated. Fifth, I have applied panel corrected standard errors to reduce heteroskedasticity. Finally, the F-test indicated that individual country effects are significant and should be included in the model.

4. Results

This section presents the findings from the OLS regression model, specifically I test the two hypotheses:

H1: As winning coalition size increase (W), the importation of arms to countries will decrease.
H2: As winning coalition size increase (W), the importation of arms to authoritarian regimes will decrease.

Table 3: Fixed effect regression model with panel corrected standard errors.

	Dependent variable:			
	Arms imported			
	(1)	(2)	(3)	(4)
W	-164.641*	-0.811	28.582	100.991
	(93.579)	(108.864)	(104.899)	(183.955)
Violence		52.464	46.361	57.381
		(32.090)	(33.576)	(51.163)
Alliances		-9.013	-13.783*	15.319
		(6.655)	(7.626)	(21.605)
Popdensity		0.231	0.220	0.079
		(0.298)	(0.260)	(0.195)
GDP			0.0004	0.0002
			(0.0003)	(0.0001)
GDPpc			-1.866	0.454
			(2.948)	(4.011)
Group	All Regimes	All Regimes	All Regimes	Autocracies
Observations	7,197	2,623	2,623	1,172
R^2	0.003	0.005	0.015	0.013
Adjusted R^2	-0.021	-0.056	-0.046	-0.085
F Statistic	22.197*** (df = 1; 7025)	2.980** (df = 4; 2472)	6.111*** (df = 6; 2470)	2.368** (df = 6; 1065)
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 3 illustrates the impact of the winning coalition size (W) on the number of arms imported across four models. Model 1 includes only the main independent variable (W) and the dependent variable (arms imported). Model 2 adds controls for violence within country borders, alliances, and population density. Model 3 incorporates all previous control variables along with GDP and GPD per capita. Model 4 is similar to Model 3 but is restricted to a subset of autocracies from the main dataset.

Main findings

In Model 1, the effect of our primary independent variable (W) on arms importation is significant at the 0.1 level ($p < 0.1$), with a coefficient value of -164.641 and standard error of 93.579. This suggest than an increase in the winning coalition size is associated with a decrease in arms imports, giving support to hypothesis 1. However, this does not hold up in the more complex models. As we add more control variables, the coefficient for W, displays a reversal, changing from negative in Model 1 to positive in Model 4. Additionally, while W is statistically significant in Model 1, it loses significance in Models 2 through to 4. This gives support to the null hypothesis of H1.

In Model 2, the effect of our primary independent variable (W) on arms importation has a coefficient of 100.991 and a standard error of 183.955. This is not statistically significant effect, providing evidence for the null hypothesis of H2.
The goodness of fit of the models are indicated by the R^2. It explains the explanatory capacity of the models (Fynn & Nocetto, 2021b). What is evident is that these models only explain a small percentage of the variability of arms importation. With Model 1 explaining a mere 3 %. The addition of the GDP variables in Model 3 raised the percentage by 10 % from Model 2, suggesting that these two variables explain more of the arms importation variability than the other variables combined.

Other findings

In Model 3, the coefficient for alliances is -13.783 with a standard error of 7.626. This is statistically significant at the 0.1 level ($p < 0.1$), indicating that a one unit increase in the number of alliances decreases arms importation by 13.783 units. The significant F-statistics suggest that the models as a whole are useful, However since few of the predictor variables are significant, the overall F statistics are not statistically significant (Sureiman & Mangera, 2020).

5. Discussion

While Model 1 indicated a statistically significant relationship between winning coalition size and arms importation, this relationship did not hold up when controlling for other variables. This significantly weakens Hypothesis 1 in favor of the null hypothesis. In Model 4, there is also evidence that strengthens the null hypothesis, casting doubt on hypothesis 2. This highlights the importance of controlling for other significant predictors of arms importation. The findings and the goodness of fit imply that the model, under the current specifications, fails to accurately predict the relationship between winning coalition size and arms importation.

Given the findings in Model 3, which suggest that an increased number of alliances decreases arms importation, it appears now that a confounding variable might be influencing this relationship. I now realize that the variable should have been operationalized differently. My reasoning is as follows: Countries with the highest number of alliances in the Alliance dataset also possess the strongest military industries (e.g., the USA with a value of 16 in 2018 and Russia with 41 in 2018). Their extensive military industries and substantial domestic weapon production likely reduce their need for importing weapons. These countries are instead large exporters (Wezeman et al., 2023).

Suggestions for future research

This study set out to find answers to the research question: ´What is the effect of winning coalition size on arms import? ´. Although sufficient evidence was not found to support the proposed hypotheses, I have several suggestions for future research.

Conducting research on arms importation is challenging due to limited data availability. Future research could do analysis on countries that are more credible in their arms reporting to mitigate some of these issues. “In recent years, however, governments have recognized that public discussions are needed to help assess the potential consequences of arms exports and to prevent irresponsible or unethical exports. As a result, virtually all Western European governments and the American, Canadian and South African governments have released to the public more information on arms exports”. Future research should consider including a subset of democracies with more credible reporting in their models to improve accuracy.

The combination of different methods is key to answering a research question. The explanation of a phenomenon necessitates identifying the relationships between variables and offering detailed insights into how and why these relationships exist (Fynn & Nocetto, 2021a) Perhaps conducting a series of qualitative case studies could help identify specific situations where the relationship between winning coalition size and arms imports might be more plausible. This could later be tested quantitatively.

6. Conclusion

This objective of this study was to investigate how the size of a winning coalition affects arms imports, thereby addressing a gap in the literature. The analysis employed a time-series cross-sectional dataset covering up to 171 countries from 1950 to 2022, utilizing ordinary least squares regression with fixed effects.

The initial model showed a statistically significant relationship where an increase in winning coalition size was associated with a decrease in arms importation. However, this relationship ceased to exist when other variables were controlled for. Thus, the support for Hypothesis 1, which suggested that a larger winning coalition would lead to fewer arms imports, did not hold up. The model used to evaluate Hypothesis 2 within authoritarian regimes also failed to yield significant results, suggesting that in authoritarian settings, the size of the winning coalition does not influence arms importation.
One notable finding from the analysis was the significant negative effect of the number of alliances on arms importation. This suggests that countries with more alliances tend to import fewer arms, although this relationship may be influenced by confounding variables related to domestic arms production capabilities.

This study faced issues with data availability and future research should consider focusing on countries with more reliable arms reporting and potentially employing a mixed-methods approach, incorporating qualitative case studies to provide deeper insights into specific contexts where the studied relationship may be true.

In conclusion, while this study did not find strong evidence to support the hypothesized relationship between winning coalition size and arms importation, it highlights the importance of considering a broader range of factors in understanding arms trade dynamics. The findings underscore the need for further research that includes more detailed and context-specific variables to better capture the motivations for arms importation.

7. Bibliography

Acemoglu, D., Ticchi, D., & Vindigni, A. (2010). A Theory of Military Dictatorships. *American Economic Journal: Macroeconomics*, *2*(1), 1–42. https://doi.org/10.1257/mac.2.1.1

Akerman, A., & Seim, A. L. (2014). The global arms trade network 1950–2007. *Journal of Comparative Economics*, *42*(3), 535–551. https://doi.org/10.1016/j.jce.2014.03.001

Baliga, S., & Sjöström, T. (2004). Arms Races and Negotiations. *The Review of Economic Studies*, *71*(2), 351–369. https://doi.org/10.1111/0034-6527.00287

Beck, N. (2001). Time-Series-Cross-Section Data: What Have We Learned in the Past Few Years? *Annual Review of Political Science*, *4*, 271–293. https://doi.org/10.1146/annurev.polisci.4.1.271

Blanton, S. L. (1999). Instruments of Security or Tools of Repression? Arms Imports and Human Rights Conditions in Developing Countries. *Journal of Peace Research*, *36*(2), 233–244. https://doi.org/10.1177/0022343399036002006

Blum, J. (2019). Arms production, national defense spending and arms trade: Examining supply and demand. *European Journal of Political Economy*, *60*, 101814. https://doi.org/10.1016/j.ejpoleco.2019.101814

Bove, V., & Brauner, J. (2016). The demand for military expenditure in authoritarian regimes. *Defence and Peace Economics*, *27*(5), 609–625. https://doi.org/10.1080/10242694.2014.925325

Bueno de Mesquita, B., & Smith, A. (2022). A new indicator of coalition size: Tests against standard regime-type indicators. *Social Science Quarterly*, *103*(2), 365–379. https://doi.org/10.1111/ssqu.13123

Bueno de Mesquita, B., Smith, A., Siverson, R. M., & Morrow, J. D. (2003). *The Logic of Political Survival*. MIT Press.

Catrina, C. (1988). *Arms Transfers and Dependence*. UNIDIR.

Coe, A. J., & Vaynman, J. (2020). Why Arms Control Is So Rare. *American Political Science Review*, *114*(2), 342–355. https://doi.org/10.1017/S000305541900073X

Collier, P., & Hoeffler, A. (2007). Unintended Consequences: Does Aid Promote Arms Races?*. *Oxford Bulletin of Economics and Statistics*, *69*(1), 1–27. https://doi.org/10.1111/j.1468-0084.2006.00439.x

Comola, M. (2012). Democracies, Politics, and Arms Supply. *Review of International Economics*, *20*(1), 150–163. https://doi.org/10.1111/j.1467-9396.2011.01014.x

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Altman, D., Angiolilo, F., Bernhard, M., Borella, C., Cornell, A., Fish, M. S., Fox, L., Gastaldi, L., Gjerlow, H., Glynn, A., God, A. G., Grahn, S., Hicken, A., Kinzelbach, K., … Ziblatt, D. (2024). *V-Dem Codebook v14*. Varieties of Democracy (V-Dem) Project. http://dx.doi.org/10.2139/ssrn.4774440

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Altman, D., Angiolilo, F., Bernhard, M., Borella, C., Cornell, A., Fish, M. S., Fox, L., Gastaldi, L., Gjerlow, H., Glynn, A., God, A. G., Grahn, S., Hicken, A., Kinzelbach, K., … Ziblatt, D.

(2024). *V-Dem (Country-Year/Country-Date) Dataset v14* [dataset]. Varieties of Democracy (V-Dem) Project. https://doi.org/10.23696/mcwt-fr58.

Crossaint, Y., & Millo, G. (2019). *Panel data econometrics with R*. Wiley.

Dunne, P., & Perlo-Freeman, S. (2003). The Demand for Military Spending in Developing Countries. *Defence and Peace Economics*, *14*(6), 461–474. https://doi.org/10.1080/1024269032000085224

Feinstein, A., Holden, P., & Pace, B. (2011). Corruption and the arms trade: Sins of commission. In *SIPRI Yearbook 2011*. SIPRI. https://www.sipri.org/yearbook/2011/01

Fordham, B. O., & Walker, T. C. (2005). Kantian Liberalism, Regime Type, and Military Resource Allocation: Do Democracies Spend Less? *International Studies Quarterly*, *49*(1), 141–157. https://doi.org/10.1111/j.0020-8833.2005.00338.x

Fynn, I., & Nocetto, L. (2021a). Case Selection Based on Regressions. In F. Urdinez & A. Cruz (Eds.), *R for Political Data Science: A Practical Guide* (1st ed., pp. 131–145). Chapman and Hall/CRC.

Fynn, I., & Nocetto, L. (2021b). Linear Models. In A. Cruz & F. Urdinez (Eds.), *R for Political Data Science: A practical guide* (1st ed., pp. 89–130). Chapman and Hall/CRC.

Gallagher, M. E., & Hanson, J. K. (2015). Power Tool or Dull Blade? Selectorate Theory for Autocracies. *Annual Review of Political Science*, *18*(Volume 18, 2015), 367–385. https://doi.org/10.1146/annurev-polisci-071213-041224

Goldsmith, B. E. (2003). Bearing the Defense Burden, 1886-1989: Why Spend More? *Journal of Conflict Resolution*, *47*(5), 551–573. https://doi.org/10.1177/0022002703254297

Hewitt, D. (1992). Military Expenditures Worldwide: Determinants and Trends, 1972–1988. *Journal of Public Policy*, *12*(2), 105–152. https://doi.org/10.1017/S0143814X00005080

Jensen, M. A. (2023). Realisms. In P. D. Williams & M. McDonald (Eds.), *Security Studies: An introduction* (4th ed.). Routledge.

Johnson, R. A. I., & Shreve, A. P. (2023). Boys and Their Toys: Status Inconsistency in Non-democratic Regimes and the Import of Major Weapon Systems. *Journal of Conflict Resolution*, 00220027231220021. https://doi.org/10.1177/00220027231220021

Kellstedt, P. M., & Whitten, G. D. (2018). *The fundamentals of political science research* (Third edition.). University Press.

Kennedy, R. (2009). Survival and Accountability: An Analysis of the Empirical Support for "Selectorate Theory." *International Studies Quarterly*, *53*(3), 695–714. https://doi.org/10.1111/j.1468-2478.2009.00552.x

Leeds, B., Ritter, J., Mitchell, S., & Long, A. (2002). Alliance Treaty Obligations and Provisions, 1815-1944. *International Interactions*, *28*(3), 237–260. https://doi.org/10.1080/03050620213653

Levine, P., & Smith, R. (1995). The Arms Trade and Arms Control. *The Economic Journal*, *105*(429), 471–484. https://doi.org/10.2307/2235505

Li, A. X., & Zha, W. (2024). Leadership turnover, winning coalition size and foreign policy realignment. *Asian Review of Political Economy*, *3*(1), 2. https://doi.org/10.1007/s44216-024-00022-8

Maoz, Z., & Russett, B. (1993). Normative and Structural Causes of Democratic Peace, 1946–1986. *American Political Science Review*, *87*(3), 624–638. https://doi.org/10.2307/2938740

Ndzendze, B., & Manyana, Z. (2022). A differentiated courtship: A regime-type analysis of Russia's Southern African (arms) trade, 2012–2019. *South African Journal of International Affairs*, *29*(4), 483–507. https://doi.org/10.1080/10220461.2022.2144942

Pearson, F. S. (1989). The Correlates of Arms Importation. *Journal of Peace Research*, *26*(2), 153–163. https://doi.org/10.1177/0022343389026002004

Pemstein, D., Marquadt, K. L., Tzelgov, E., Yi-ting, W., Medzihorsky, J., Krusell, J., Miri, F., & von Romer, J. (2024). The V-Dem Measurement Model: Latent Variable Analysis for Cross-National and Cross-Temporal Expert-Coded Data. *University of Gothenburg: Varieties of Democracy Institute*, *9th edition*(No. 21).

Perkins, R., & Neumayer, E. (2010). The organized hypocrisy of ethical foreign policy: Human rights, democracy and Western arms sales. *Geoforum*, *41*(2), 247–256. https://doi.org/10.1016/j.geoforum.2009.09.011

Perlo-Freeman, S. (2018). Arms, corruption, and the state: Understanding the role of arms trade corruption in power politics. *The Economics of Peace and Security Journal*, *13*(2), Article 2. https://doi.org/10.15355/epsj.13.2.37

Roeber, J. (2005). *Parallel markets: Corruption in the international arms trade. London: Campaign Against Arms Trade.*

Seiglie, C. (2016). Openness of the economy, terms of trade, and arms. *Southern Economic Journal*, *82*(3), 748–759. https://doi.org/10.1002/soej.12033

SIPRI. (2024a). *SIPRI Arms Transfers Database* [dataset]. https://doi.org/10.55163/SAFC1241

SIPRI. (2024b, May 13). *Sources and methods | SIPRI*. https://www.sipri.org/databases/armstransfers/sources-and-methods

Smith, R. P., & Tasiran, A. (2005). The Demand for Arms Imports. *Journal of Peace Research*, *42*(2), 167–181. https://doi.org/10.1177/0022343305050689

Stohl, R., & Grillot, S. (2009). *The International Arms Trade* (1st ed.). Polity Press.

Sundberg, R., & Melander, E. (2013). Introducing the UCDP Georeferenced Event Dataset. *Journal of Peace Research*, *50*(4), 523–532. https://doi.org/10.1177/0022343313484347

Sureiman, O., & Mangera, C. (2020). F-test of overall significance in regression analysis simplified. *Journal of the Practice of Cardiovascular Sciences*, *6*, 116. https://doi.org/10.4103/jpcs.jpcs_18_20

Tan, A. T. H. (2023). Global Arms Trade. In P. D. Williams & M. McDonald (Eds.), *Security Studies: An Introduction* (4th ed.). Routledge.

The World Factbook. (2024, March 26). *Military expenditures*. CIA - The World Factbook. https://www.cia.gov/the-world-factbook/field/military-expenditures/

Urdinez, F. (2021). Panel data. In F. Urdinez & A. Cruz (Eds.), *R for Political Data Science: A Practical Guide* (1st., pp. 147–171). Chapman and Hall/CRC.

Wezeman, P. D. (2003). *Conflicts and Transfers of Small Arms. Sweden, Stockholm International Peace Research Institute*.

Wezeman, P. D., Gadon, J., & Wezeman, S. T. (2023). *Trends in International Arms Transfers, 2022*. SIPRI. https://www.sipri.org/publications/2023/sipri-fact-sheets/trends-international-arms-transfers-2022

World Bank. (2024). *Population Density ID: EN.POP.DNST* [dataset]. World Bank Group Archives. https://data.worldbank.org/indicator/EN.POP.DNST

Yakovlev, P. (2007). Arms trade, military spending, and economic growth. *Defence and Peace Economics*, *18*(4), 317–338. https://doi.org/10.1080/10242690601099679