The impact of US elections on US defense industry: Firm-level evidence from 1996 to 2022*

Anna Balestra[1] and Raul Caruso[2]

[1]Department of Economic Policy, Università Cattolica del Sacro Cuore
[2]Department of Economic Policy, Università Cattolica del Sacro Cuore

Abstract

This study examines the relationship between the US political cycle and the revenues of US military manufacturing companies from 1996 to 2022. The research introduces a novel approach by utilizing data on military manufacturing companies' revenues, diverging from the prevalent use of SIPRI data in the existing literature on military revenues. The primary challenge in collecting defense revenues is *dual engagement* namely the fact that most companies are engaged in both military and civilian production. This challenge is addressed through cross-referencing company data with patent information. Furthermore, to distinguish revenues stemming from military sales versus those from civilian and commercial sales, we exclusively select data from business lines directly involved in military production. Data has been collected for 103 US military manufacturing companies from 1996 to 2022. Consistent with existing literature, the empirical analysis demonstrates that in the year preceding executive election years, the growth rate of US defense revenues is lower compared to non-preceding executive election years. Conversely, in executive election years, the growth rate of defense revenues is higher compared to other years.

JEL classification: H56, D72, L25.

Keywords: Military Spending, Political Cycle, Military Companies

1 Introduction

This study investigates the influence of the political cycle on the growth rate of defense revenues in the United States from 1996 to 2022. The research aims to provide a comprehensive analysis of how political cycles in the United States affect the performance of US military companies, as measured by their revenue growth rates.

Since the seminal work by Nordhaus (1975), several studies have examined the relationship between electoral cycles and public expenditure [see among others Hammond and Rosenstiel (2020); Bove et al. (2017); Mintz and Ward (1989); Nincic and Cusack (1979)]. The Political Business Cycle (hereafter PBC) theory posits that incumbents may manipulate public spending to enhance their prospects of re-election. Given that defense spending constitutes a component of public

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expenditure, many scholars have sought to clarify how political elections influence fluctuations in defense spending. The majority of this research has focused on how elections influence defense budgets, which may be considered a proxy for the demand for military equipment, although military spending also encompasses other expenditure categories such as personnel, retirement plans, R&D projects, and related expenses. In essence, previous studies have primarily investigated how election timing affects defense budget allocations. A significant innovation of this study is its focus not on defense budgets but rather on the revenues that defense firms generate through the sale of military products. By shifting the focus from defense budgets to military revenues, this study aims to capture not only the potential manipulation of defense spending but also the actual impact of such manipulation on the revenues of defense companies. To the best of our knowledge, the only other study to examine this relationship is the one by Klomp (2023a), which investigates the effect of elections on military revenues. Utilizing a dataset of 269 firms across 25 countries from 2002 to 2016, the author finds that: (i) total revenues of defense companies in major arms-producing countries increase as domestic elections approach, potentially as a strategy to enhance economic performance; (ii) elections in democratic foreign countries are associated with a decrease in revenues for domestic defense firms; and (iii) elections in autocratic foreign countries result in a slight increase in defense sales for arms producers. In line with Klomp (2023a), previous research on defense firms has often relied on data from the Stockholm International Peace Research Institute (hereafter SIPRI).

The contribution of this paper lies in the development of a novel dataset specifically for defense companies in the United States, with a focus on their defense-related revenues. A significant challenge in the construction of the dataset is what we term *dual engagement*. The term *dual engagement* refers to the phenomenon wherein several companies engaged in military production simultaneously manufacture civilian goods. This creates two primary challenges: (i) accurately identifying defense companies and (ii) distinguishing revenues from military sales from those generated by civilian products. This study proposes a methodology to address both hurdles, resulting in a dataset that, while centered on the United States, could potentially be adapted for other countries.

Our focus on the United States is driven by two main reasons. First, the United States is the world's foremost manufacturer and exporter of defense products, as well as the leading global contributor to military expenditures. According to the PBC theory, manipulation of public spending can serve as an economic stimulus in the short run. However, such effects are likely to be more significant in countries with substantial military production capabilities, such as the United States. Furthermore, a common critique of the PBC theory is the potential for unanticipated elections or irregularities in political cycles that deviate from typical patterns. Unlike many other arms-producing countries, the United States has held scheduled and predictable elections over the past three decades, allowing for a more precise application of PBC theory to study the relationship between elections and the revenues of defense firms in the country.

The empirical analysis reveals that: (i) the growth rate of defense revenues in the United States tends to decrease in the year preceding executive elections, and (ii) the growth rate of defense revenues increases in the year of executive elections.

The structure of the paper is as follows: Section 2 presents a comprehensive review of the extant literature on the relationship between Political Business Cycles and military expenditures. Section 3 delineates the methodology employed to construct the dataset. Section 4 elucidates the empirical model utilized in the analysis. Section 5 expounds upon the results, comparing findings

across various models and discussing their implications. Section 6 provides robustness checks. Eventually, Section 7 provides concluding remarks.

2 Literature Review

While the extant literature has predominantly focused on the influence of electoral cycles on defense budget allocations, this study adopts an alternative approach by examining the military revenues of defense companies. Specifically, we aim to investigate the relationship between the revenues of US defense companies and the US political cycle. This shift in focus is significant as it enables us to explore not only the potential manipulation of defense spending but also the tangible effects of such manipulation on the domestic defense industry. To date, only one study has been identified that examines the impact of elections on the military revenues of defense companies. Klomp (2023a) analyzed data from 269 firms across 25 countries from 2002 to 2016. The study reveals several significant findings: (i) defense companies in major arms-producing countries experience revenue growth as elections approach; (ii) elections in democratic foreign countries reduce revenues for domestic defense firms, as foreign governments tend to decrease defense imports; (iii) conversely, elections in autocratic foreign countries may marginally increase defense sales, potentially signaling military strength; and (iv) countries facing security threats tend to increase purchases of strategic military items near election periods, driven by heightened security concerns.

However, existing literature focuses on the effect of political cycles on public spending in general and defense budgets if they focus on the military sector. A key theoretical framework in this stream of literature is the Political Business Cycle theory, first proposed by Nordhaus (1975). According to the PBC, incumbents manipulate public spending to enhance their re-election prospects. The theory is predicated on two key assumptions: (i) voters have short-term horizons, prioritizing recent economic outcomes; and (ii) voters tend to focus primarily on their economic well-being when casting ballots. Nonetheless, the manipulation of defense spending could potentially be a double-edged sword for an incumbent. On the one hand, defense spending, similar to other forms of public expenditure, can stimulate the economy in the short term, increasing employment and revenue in the defense sector. On the other hand, particularly during peacetime, voters may prioritize alternative areas of public spending over defense. The empirical literature presents mixed findings regarding the impact of political factors on military expenditures.

In arms-producing countries, the increase of defense expenditure preceding elections may serve as a short-term economic stimulus, supporting the domestic defense sector, generating increased profits for defense companies, and mitigating unemployment. Such improved economic conditions may enhance an incumbent's prospects for re-election. For instance, Nincic and Cusack (1979) examined US military spending from 1948 to 1976 and found that military outlays tended to rise in the two years leading up to elections, followed by a post-election decline. The study attributes this pattern to the economic stabilizing effects of military spending and political benefits tied to its economic impacts. Other studies, such as Cusack and Ward (1981), explored US military expenditure within the broader context of international relations, highlighting that internal political and economic factors, rather than just external threats, play a significant role in shaping defense spending. Griffin et al. (1982) also found evidence that US military expenditure increased prior to elections, indicating that defense budgets respond to both domestic political cycles and international events. Mintz and Ward (1989) provided further evidence by demonstrating how military spending in Israel serves as a political-economic instrument to manage the economy and create a

favorable environment for incumbents during elections.

In contrast, alternative scholarly perspectives argue that incumbents may prioritize (i) the reduction of public expenditure or (ii) non-defense public spending to secure electoral support. Both these hypotheses may result in a decrease in defense allocations. The cut of public spending as a strategy to enhance election prospects is demonstrated by studies such as Peltzman (1992), who provides evidence that voters generally favor fiscal conservatism, as increased federal spending, including defense expenditures, often leads to electoral losses for the incumbent party. This hypothesis is further supported by Brender and Drazen (2005), who indicated that voters in established democracies tend to exhibit fiscal conservatism, which can diminish the scope for opportunistic fiscal expansions in defense spending preceding elections. A decrease in the defense budget may also be attributed to the fact that, particularly during peacetime, voters may favor social spending over defense allocations. Klomp (2023b) conducted a meta-regression analysis, revealing that elections tend to have a weak negative effect on military expenditures, suggesting that governments adopt a fiscally conservative approach to defense spending as elections approach. Bove et al. (2017) examined the trade-off between military and social spending in 22 OECD countries from 1981 to 2009, concluding that incumbents often reduce defense spending during election periods to increase social spending. However, this trade-off is less prominent in countries involved in conflicts, where national security concerns may constrain the manipulation of defense budgets for electoral purposes. Barro and Rugy (2013) synthesized previous research on the fiscal multiplier and determined that defense spending typically exhibits a smaller impact on GDP compared to other forms of public spending, especially when financed through deficits.

Additionally, some studies, particularly those focusing on European countries, find no consistent evidence of PBC effects on defense spending. Zuk and Woodbury (1986) found no evidence that US defense spending systematically increased or decreased during election years, and instead emphasized international factors, such as US-Soviet relations, as primary determinants of defense spending patterns. Similarly, studies in Spain (Pérez-Forniés et al., 2014), Italy (Caruso and Francesco, 2012), and Greece (Kollias and Paleologou, 2003) found no significant effect of electoral cycles on defense expenditures.

From a theoretical perspective, the seminal work by Rogoff and Sibert (1988) explains the existence of political cycles as a complex budgetary process that can, at least temporarily, deceive voters. Their model is based on the concepts of competence and asymmetric information. The authors posit that politicians possess varying levels of competence, which are unknown to the electorate. Highly competent politicians are more adept at managing public resources and are consequently more likely to implement pre-election expansionary policies, such as increasing public expenditure, to signal their competence to voters. However, due to the electorate's inability to directly observe a politician's competence, they rely on visible fiscal outcomes, such as defense spending, to make inferences. This dynamic creates incentives for incumbents to strategically manipulate spending to influence voter perceptions prior to elections.

More recent Political Business Cycle models by Persson and Tabellini (2000), Shi and Svensson (2006), and Efthyvoulou (2012) expand upon the work of Rogoff and Sibert by incorporating additional complexities into (i) the temporal aspects and (ii) nature of fiscal policy adjustments. These models emphasize that both the timing of expenditure decisions and the unobservable nature of political effort play crucial roles.

Regarding the temporal aspect, incumbent politicians may endeavor to manipulate fiscal policy well in advance of elections to enhance economic conditions closer to the voting period, thereby

increasing their probability of re-election. Defense budgets are typically determined in advance, indicating that changes in spending may not immediately influence economic outcomes. For instance, if an incumbent seeks to inform voters about the economic advantages of an increased defense budget during an election year (time t), the decision to raise the defense budget would need to occur in the previous year (time t-1). This is due to a delay between the approval of budget increases and the realization of their economic effects. Consequently, revenues of defense firms may decrease in the year preceding an election (due to earlier fiscal restraint or budget reductions), but subsequently may increase in the election year as the economic outcomes from prior defense spending become evident. In simpler terms, if the incumbent seeks to utilize defense spending to stimulate the economy and garner voter support, the increase must be initiated in the year preceding the election. This timing ensures the benefits are observable in the election year. Additionally, the aforementioned models posit that incumbents can utilize subtle, less observable policy instruments to achieve their objectives. In the defense sector, this could encompass leveraging procurement contracts or reallocating existing funds, which may not immediately manifest in overall spending figures but still provide support to defense firms, particularly during electoral periods. For instance, DeRouen and Heo (2001) focus on Defense Prime Contract Awards, which presidents can time without congressional approval, as these funds are already appropriated. The study finds that election years positively influence efense Prime Contract Awards, suggesting that US presidents may manipulate defense contracts to enhance their re-election prospects. Furthermore, incumbents may employ non-budgetary measures, such as lifting arms trade embargoes, to support the defense industry. For example, during his 1992 re-election campaign, President Bush Sr. lifted arms embargoes on Taiwan to benefit the US defense industry (Mayer, 1992). Based on such theoretical considerations, this paper empirically tests the following hypotheses:

H1: The growth rate of defense revenues is higher in election years.

H2: The growth rate of defense revenues is lower in non-election years.

3 Defense Company Data

3.1 Methodology

To investigate the relationship between the US political cycle and the revenues of US defense companies, the initial step is to identify companies engaged in the production of defense products.

The SIPRI Arms Industry Database is widely regarded as the most reliable and comprehensive source for data on defense companies and their revenues. Annually, SIPRI publishes a ranking of the top 100 defense companies worldwide, including data on total revenues and military revenues, specifically those derived from the sale of military products. This database covers the period from 2002 to 2022. Nevertheless, the SIPRI data has several limitations for the purposes of this study. Firstly, it only reports figures for the top 100 largest companies globally, with approximately 40% being US-based. Secondly, companies may enter or exit the list, as a company ranked 99th one year could drop to 101st the next, resulting in unavailable data when a company is excluded. Thirdly, SIPRI began publishing this list in 2002.

To address these limitations, we propose a novel methodology for collecting defense revenue data. This approach yields a more comprehensive dataset, encompassing a larger number of companies across an extended time period, while mitigating issues associated with missing financial information. The main challenge in the identification of companies engaged in defense production is what we *dual engagement*. By *dual engagement* we refer to the situation wherein the majority of companies operating within the defense industry concurrently produce goods for civilian use. Boeing exemplifies this situation, being a significant manufacturer of both commercial and military aircraft. This issue becomes increasingly pertinent for companies that do not produce final products but rather manufacture critical weapon components. Current industrial classification systems lack specific codes for defense companies, and there exists no comprehensive directory of companies involved in defense manufacturing. Furthermore, subsequent to the identification of these companies, differentiating between revenues derived from military and civilian product sales presents an additional challenge. Unfortunately, there are no standardized requirements for companies to disclose the proportion of their financial performance attributed to military production.

To address these complexities, our methodology comprises three stages: (i) initially, we conduct a keyword-based search in Orbis - a database containing comprehensive business information on private companies worldwide - to identify potential defense-related entities; (ii) subsequently, we cross-reference company information with patent data to verify the involvement of identified companies in military production; and (iii) finally, for the identified companies, we isolate business line revenues within each company to extract military-specific financial information. The first two stages aim to overcome the issue of defense company identification, while the third stage addresses the task of distinguishing military-related revenues from non-military revenues.

The first stage consists in a keyword-based query in the Orbis database. We extracted information on all companies whose activity descriptions included the terms *defense*, *defence*, *weapon*, *security*, or *military*. This preliminary search yielded a total of 2,849,262 companies globally [1].

The utilization of specific keywords in stage one may yield potentially misleading results, as identified companies might not be associated with non-military activities. For example, the term *security* might identify private security firms unrelated to military production. To identify companies directly involved in the military industry, we incorporated an additional search criterion: patent information. The defense sector holds strategic significance for countries, spurring technological investments from both government and private entities due to its strategic imperatives. Governments frequently promote defense-related R&D to gain technological advantages in potential conflicts, aiming to create more effective and sophisticated weapons. Concurrently, companies invest in R&D to enhance their competitiveness, improve their prospects of securing government contracts, and increase profitability. Given the strong motivations for technological innovation on both sides, the defense industry is highly advanced and technologically sophisticated. Consequently, we use patent data to identify companies engaged in military production. The validity of utilizing patent data as a research approach is further supported by the expansion of patenting activities in the defense industry. Although defense-related innovations have traditionally been characterized by secrecy (Gross, 2023; Rassenfosse et al., 2020), a shift occurred after World War II. During World War II, substantial government investments in defense R&D were focused on achieving victory in the war (Gross et al., 2023). Subsequently, during the Cold War, intense competition between Western and Soviet blocs, along with the global expansion and strengthening of intellectual property (IP) systems Epstein (2014), led to a consistent increase in the number

[1] Last accessed January 2024

of military patent applications. Figure 1 shows the growth in military patent family applications from 1837 to 2023, highlighting a steady upward trend since the end of World War II.

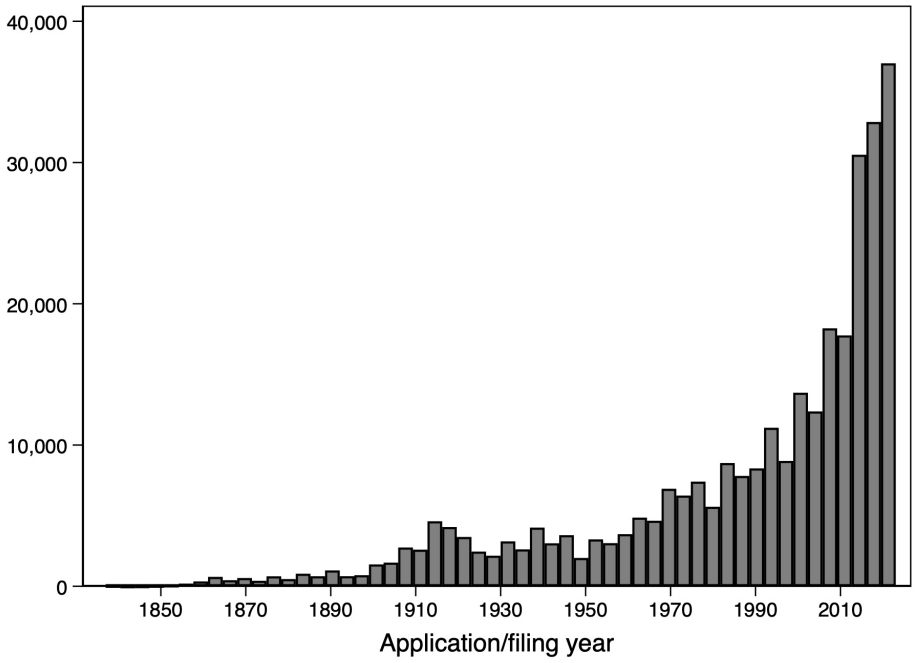

Figure 1: Number of application of patent families F41 and F42 1837-2023

The second stage of our strategy involves examining whether any of the 2,849,262 companies identified in the first stage are listed as patent applicants or patent owners or both of at least one patent in the International Patent Classification (IPC) classes F41 (Weapons) or F42 (Ammunition and Blasting) or both, which are directly associated with military production.[2] For this purpose, we utilized the Orbis IP database, a comprehensive resource that links global patent information to the companies and groups owning them. A significant advantage of employing both Orbis and Orbis IP is their shared unique identifier for each company, which mitigates potential errors arising from inconsistencies in company names across various sources or translations from different languages. This process identified 3,384 entities worldwide. We subsequently eliminated 317 inactive entities from the sample, resulting in 3,067 active ones. As our research focused on defense manufacturers, we further excluded 337 entities classified in other sectors, such as banking and insurance. This resulted in a final sample of 2,730 defense-related companies worldwide. Of the 2,730 defense manufacturers identified globally, 831 are located in the United States. Therefore, this study focuses exclusively on these companies, as the objective of this research is to construct a dataset for US defense companies and their revenues. Among these 831 US manufacturers, 174 were categorized as having *No Financial Information* and 384 as having *Limited Financial Information*. Due to the absence of sufficient financial data for these companies, rendering it unfeasible to obtain reliable revenue information, they have been excluded from the dataset.

Upon completion of the identification of defense companies, the third stage entails the collection of annual data on defense-related revenues of these firms. As previously noted, the issue of *dual*

[2]IPC classes F41 and F42 are also utilized in research on dual-use technologies due to their direct connection to the military sector. [see among others Caviggioli et al. (2023); Acosta et al. (2018); Lee and Sohn (2017)]

engagement renders total sales figures unsuitable for our analysis. When examining the financial data of such companies, overall sales figures encompass revenues from both military and civilian sectors, making it challenging to distinguish between the two. Furthermore, the involvement in military production can vary significantly not only among different companies but also within the same company over time. For instance, according to SIPRI data, in 2021, Lockheed Martin's arms sales constituted 90% of its total sales, while Boeing's arms sales represented only 54%. This variation complicates the process of drawing meaningful conclusions about defense-related financial performance of a company by examining aggregate sales data alone, either across different firms or across different years. To address this issue, data were collected at the business line level for each of the 274 companies. Specifically, both the Orbis and Refinitive databases were utilized to obtain annual financial data on external revenues by business line. Two key points warrant clarification. First, only publicly listed companies are required to disclose financial information, indicating that such data may not be available for non-listed entities. Second, detailed, disaggregated financial information is typically found in the explanatory notes to financial statements. However, there is no standardized requirement for companies to disclose or publish segmented revenue data, and such information may be available in some years but not in others. Furthermore, the manner in which a company chooses to report its business lines data can change from year to year due to factors such as mergers, acquisitions, or corporate restructuring, which can affect data categorization.

Given these challenges, a comprehensive, year-by-year evaluation for each company is necessary to differentiate military revenues from civilian ones. For each of the 273 companies, segmented revenue data from 1996 to 2022 was collected, focusing on business lines directly related to defense activities. In some instances, this process was straightforward, as companies explicitly distinguished between commercial and military revenues, such as Boeing's *Defense, Space, and Security* business line. However, in other cases, a deeper analysis was required. For example, Textron, which produces both aircraft and helicopters, reported its defense-related revenues under the label *Aircraft* from 1994 to 1998, but subsequently used the label *Bell* from 1999 onward. In such cases, revenue trajectories were manually reconstructed by combining the relevant data from both labels to exclude unrelated divisions. For each of the 273 US defense companies, this analysis was conducted at the business line level for every year from 1996 to 2022. In some instances, it was not possible to disentangle military and civilian revenues due to the way the data was reported, leading to the exclusion of these companies. Additionally, some companies only provided detailed information for one or two years, and they were also excluded from the dataset. After completing this process, defense-related revenue data was successfully gathered for 103 companies over the period from 1996 to 2022.

3.2 Description of military firms data

In this section, we provide a comprehensive analysis of the data collected through the methodology delineated in the previous section. Prior to focusing on US data, Figure 2 illustrates the global distribution of defense manufacturers. Of the 58 countries represented, 48% have 10 or fewer defense manufacturers. In contrast, only seven countries exhibit a substantially higher number of defense-related manufacturers: the United States, China, Germany, the United Kingdom, Russia, Japan, and France. It is noteworthy that four of these seven countries are members of NATO.

Our data collection process yielded information on 103 defense companies spanning from 1996 to 2022. We selected 1996 as our starting point due to the substantial changes in defense spending

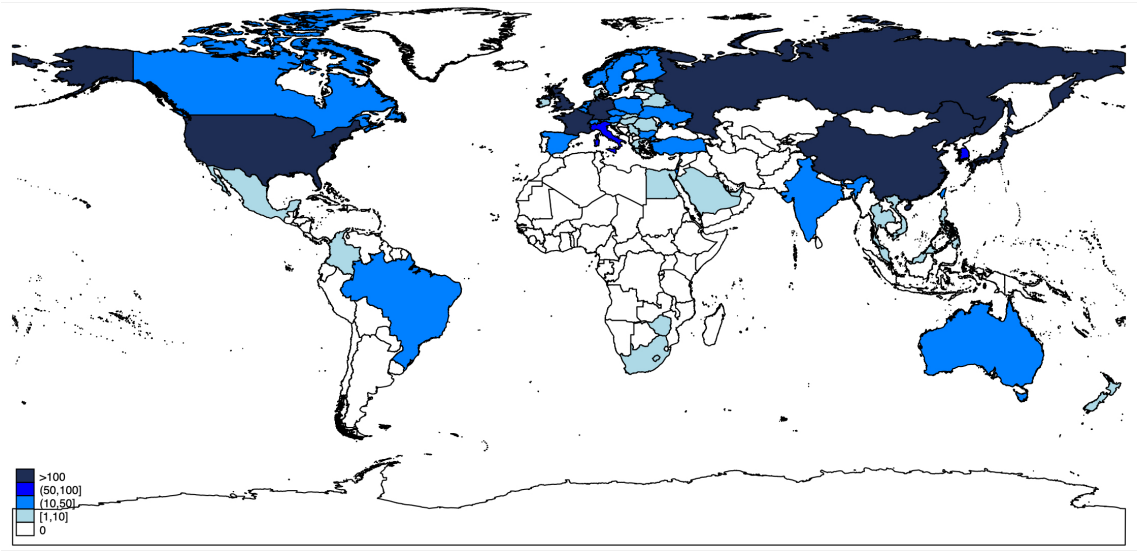

Figure 2: Defense manufactures locations

strategies following the end of the Cold War, which triggered a major consolidation in the defense sector (Caruso and Locatelli, 2013). A significant event, known in the industry as "the Last Supper," exemplifies the extent of this transformation. This designation originated from a Pentagon dinner in 1993, organized by then-Secretary of Defense Les Aspin and his deputy, William J. Perry, who subsequently assumed the role of Secretary of Defense. At this gathering, Aspin and Perry conveyed an unambiguous message: given that defense spending, which had already been declining for five years, would continue to decrease rapidly and significantly, they promoted the acceleration of the consolidation process in the US defense market. The consolidation process culminated in the establishment of Lockheed Martin Corporation, formed through the merger of Lockheed and Martin Marietta in 1995. With the decline of the Soviet threat, the United States deemed it necessary to reduce military expenditure and restructure its defense industry through consolidation. While this process remains ongoing (DoD, 2022), the late 1990s witnessed the emergence of major defense corporations that continue to maintain prominence in the US and international military sectors. These entities currently rank among the foremost defense contractors both domestically and globally.

Upon examination of our dataset, Figure 3 presents a comprehensive analysis of the trends in aggregate revenues of US defense companies (left axis), US Equipment Expenditure (left axis) and total US military expenditure (right axis) from 1996 to 2022, all expressed in constant 2022 US dollars. Data for US Equipment Expenditure are sourced from NATO, while military spending data are derived from SIPRI. The defense revenues were aggregated from all 103 companies in our dataset. Notably, while US military expenditure exhibits an inverted U-shaped pattern, reaching its peak in 2010, total defense company revenues demonstrate a consistent upward trajectory throughout the entire period. Specifically, between 1996 and 2022, total defense revenues experienced a substantial increase of 900%, in contrast to a more moderate 63% increase in military expenditure. [3] The average annual growth rate of aggregate defense revenues is 9.7%, whereas US military expenditure grows at an average annual rate of only 2%. This disparity suggests

[3]It is important to note that the dataset encompasses 88 companies in 1996, 92 in 1997, 95 in 1998, and 98 in 1999. From 2000 onward, data are available for more than 100 companies.

that despite fluctuations and even reductions in defense budgets, these fiscal adjustments have had minimal impact on the revenues of US defense manufacturers. This observation is further substantiated by the fact that US Equipment Expenditure closely aligns with the trends observed in defense revenues.

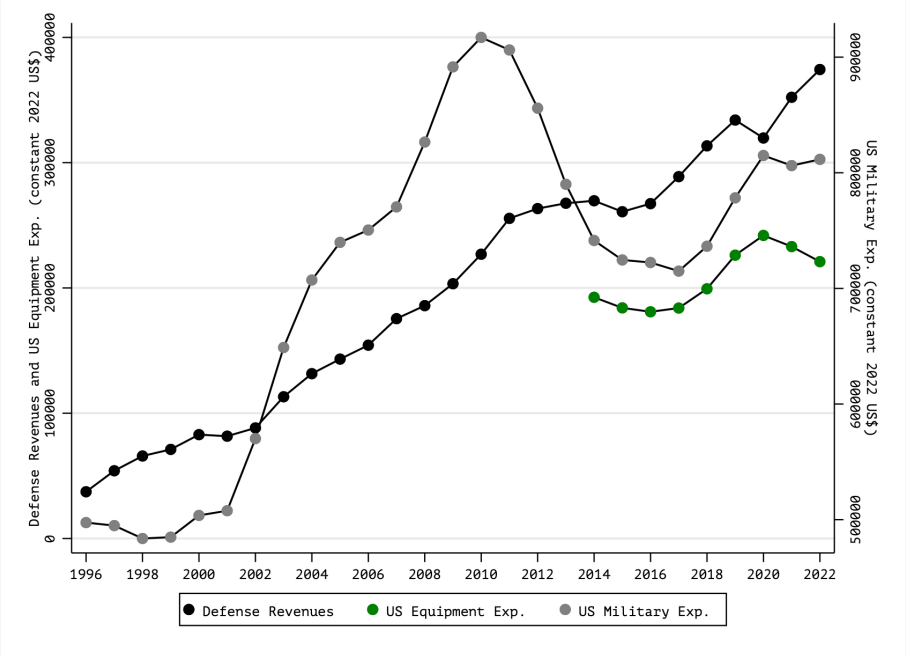

Figure 3: Military expenditure and military revenues

Figure 4 illustrates the kernel density distribution of the logarithm of military revenues for the 103 companies in our dataset. The distribution has a mean of 6.42 and a standard deviation of 1.91. The minimum value is -1.15, while the maximum value reaches 10.91, indicating that some companies report significantly higher military revenues, likely outliers influencing the upper end of the distribution. Overall, the distribution is positively skewed, as the mean exceeds the median, with a longer tail extending toward higher values. This skewness suggests that while most companies have moderate military revenues, a few large firms dominate the upper range.

As previously mentioned, identifying defense companies is the primary critical issue when examining this sector. A significant challenge in this process is the absence of a specific global classification system for defense companies, necessitating alternative methodologies to identify them effectively. Our proposed methodology addresses this gap. The companies we identified are classified under a broad array of industrial sectors. This is attributable to two primary factors. First, companies producing final products, such as aircraft or ships, often fall under general transportation-related classifications, which encompass both civilian and military products. Second, many companies in the defense sector primarily manufacture components or subcomponents of military equipment. Consequently, they are classified according to the specific components they produce rather than as defense manufacturers. Table 1 presents the most frequent classifications according to the North American Industry Classification System (NAICS).

According to the NAICS 2022 revision, out of the 103 companies analyzed, 15 (14%) are categorized under NAICS code 3345, which refers to Navigational, Measuring, Electromedical, and Control Instruments Manufacturing. An additional 13 (13%) fall under NAICS code 3364,

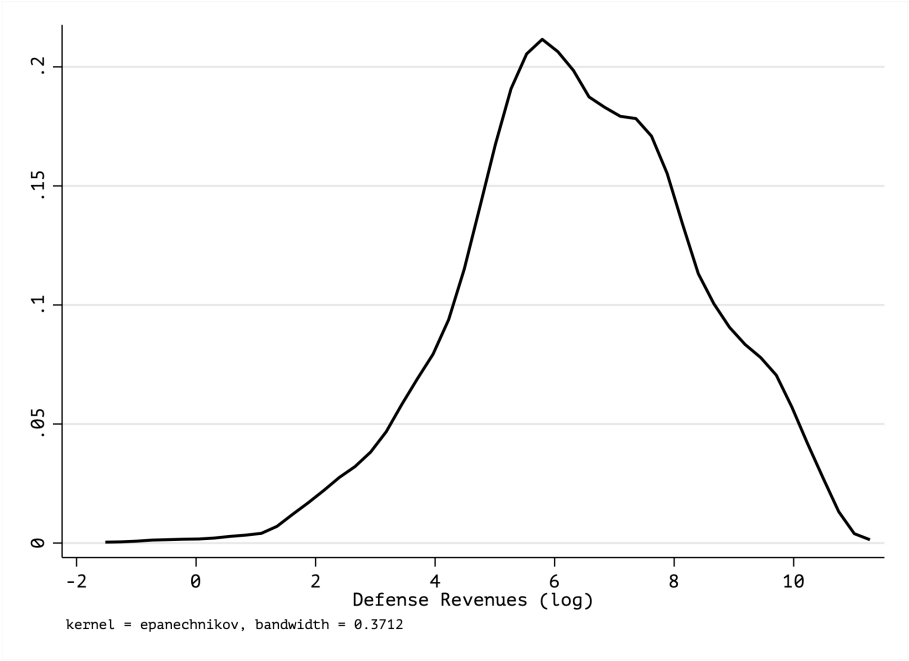

Figure 4: Density function of defense revenues (log)

NAICS Code	NAICS Description	Companies	Percentage of Total
3345	Navigational, Measuring, Electromedical, Control Instruments	15	14%
3364	Aerospace Product and Parts Manufacturing	13	13%
3344	Semiconductor and Other Electronic Component Manufacturing	11	11%
3329	Other Fabricated Metal Product Manufacturing	7	7%
3342	Communications Equipment Manufacturing	6	6%

Table 1: Main NAICS code

which pertains to Aerospace Product and Parts Manufacturing, while 11 (11%) are classified under NAICS code 3344, related to Semiconductor and Other Electronic Component Manufacturing. Furthermore, 7 (7%) are classified under NAICS code 3329, indicating Other Fabricated Metal Product Manufacturing, and 6 (6%) fall under NAICS code 3342, representing Communications Equipment Manufacturing. In contrast, some defense-related companies belong to less apparent industrial classifications. For instance, PPG Industries Inc. - which supplies advanced coatings for military ships, aircraft, and other defense equipment - falls under NAICS code 3255, which pertains to Paint, Coating, and Adhesive Manufacturing, while Hexcel Corporation - which is a leading supplier of carbon fiber, honeycomb structures, and other lightweight composite materials in military production - is classified under NAICS code 3252, related to Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing. These examples illustrate the complexity of identifying defense companies based solely on industrial classifications. As previously noted, once companies have been identified, a significant challenge in the collection of defense revenue data is that only publicly listed companies are required to disclose such information. At present, 66 out of the 103 companies in our sample (64%) are listed. It is also important to emphasize that alterations in listing status constitute an additional concern. Specifically, certain companies may cease to be individually listed due to mergers or acquisitions during the period under examination.In such instances, these companies are incorporated into a larger listed entity. For instance, Northrop Grumman Space & Mission Systems Corp. is an unlisted subsidiary of Northrop

Grumman, which is publicly listed. Similarly, Goodrich Corp. was initially listed but subsequently delisted following its acquisition by RTX. In such cases, the company is considered to exist until it was merged with or acquired by another company.It is noteworthy that all companies in our sample have, at some point, been publicly listed. This observation supports the proposition that companies subject to the obligation to publish financial data—whether in the past or present—are more likely to disclose financial information. However, it is also imperative to acknowledge that we are unable to capture data for non-listed companies.

The third step of our strategy centers on isolating financial figures specifically related to defense production. This step is crucial because the level of engagement of a company in the defense sector can vary significantly, both among different companies and within the same company over time. In our sample, the proportion of defense-related activities, measured by the ratio of defense revenues to total revenues, ranges from as low as 3% to as high as 100%, with an average of 48%. This variability demonstrates the diverse levels of participation in defense production among companies. For example, Lockheed Martin (78%) and Raytheon Company (85%) are primarily defense-oriented, often functioning as prime contractors specializing almost exclusively in defense production. These companies are heavily focused on defense contracts and related activities. In contrast, Boeing (40%) and Viasat (45%) maintain a substantial presence in both defense and civilian sectors, producing both military and non-military products. Their revenue streams are more diversified, characterizing them as *dual engaged* companies. Conversely, companies such as Ball Corp. (15%) have defense revenues comprising a relatively small proportion of their total revenues. These companies primarily engage in non-defense activities, with their involvement in the defense sector occupying a secondary role in their overall business operations. Figure 5 in the analysis illustrates trends in military sales based on the level of engagement in the defense sector, plotted alongside total military sales.

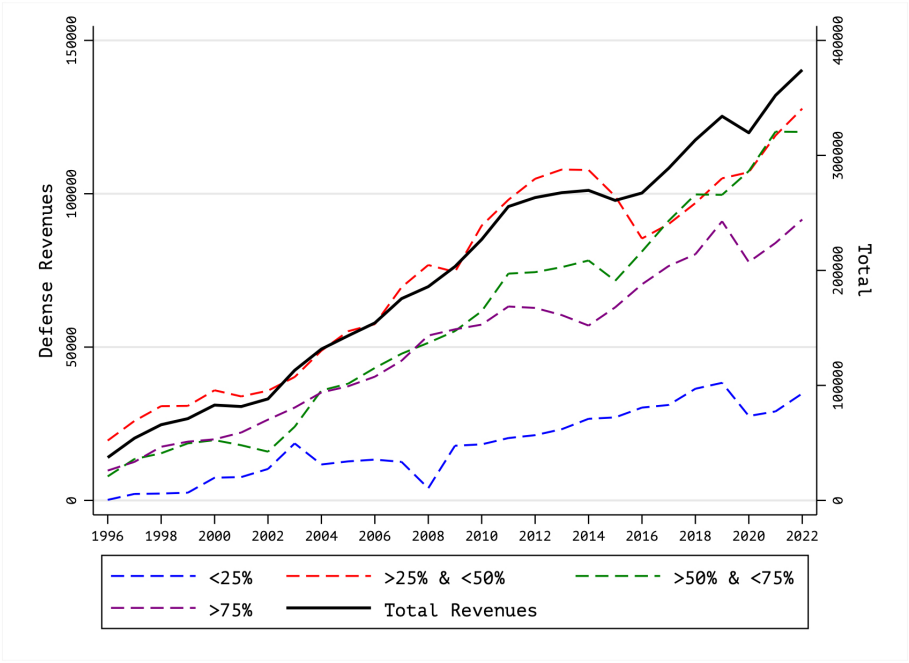

Figure 5: Defense revenues by military engagement (1996-2022)

The trends are categorized by the extent of the engagement in the defense market of each

company. The blue dashed line represents companies with an average defense engagement of 25% or less (11 companies), while the red dashed line shows those with engagement between 25% and 50% (37 companies). The green dashed line denotes companies with engagement levels between 50% and 75% (37 companies), and the purple dashed line tracks those with engagement exceeding 75% (18 companies). Although the overall trend is predominantly characterized by companies highly engaged in defense (represented by the purple line), companies with lower levels of involvement in the sector have also exhibited significant growth in defense sales. Highly engaged companies demonstrate an average growth rate of 9.4%, while those with engagement ratios between 50% and 75% (green line) exhibit a higher average growth rate of 12.4%. It is noteworthy that while companies with engagement between 25% and 50% (red line) and those between 50% and 75% (green line) are equally represented in the sample in terms of number of entities, the former group consistently reports higher revenues than the latter.

3.3 A comparison with SIPRI data

The primary data source for defense revenues is the SIPRI Arms Industry Database, which provides a comprehensive collection of information on arms revenues and total revenues for over 200 public and private arms-producing companies across more than 25 countries starting from 2022 onward. Each year, the SIPRI Arms Industry Database presents the top 100 arms-producing companies, approximately 40% of which are based in the United States. The composition of the list undergoes annual modifications as companies enter or exit the rankings, necessitating yearly adjustments. While numerous firms consistently appear in the rankings over multiple years, facilitating the longitudinal tracking of arms revenue data, discontinuities occur when companies exit and subsequently re-enter. This phenomenon creates gaps in the continuity of military revenue information, particularly for companies that have appeared intermittently in the database since 2002. According to the SIPRI definition, *arms revenue* denotes income generated from military products and services sales. The reported arms revenues may reflect either the portion of total revenue specifically attributed to defense activities or the total revenue from a company's defense division, which may encompass some unspecified civilian business activities. When companies do not disclose such data, SIPRI employs estimation techniques, including analysis of contract awards and general information on arms production and military services programs. SIPRI's utilization of the term *defense division* to identify military revenues aligns closely with our methodological approach. To compare our dataset with SIPRI data, we also collect arms revenues from companies in the SIPRI Arms Industry Database. Of the 103 companies we examined, 44 (43%) are also included in SIPRI's top 100. Table 2 presents the pairwise correlation between the two datasets. Henceforth, we refer to our dataset as MILFIRM. The correlation between SIPRI and MILFIRM is 0.91, with a significance level of 1%.

	MILFIRM (log)	SIPRI (log)
MILFIRM (log)	1.0000	
	(438)	
SIPRI (log)	0.9070*	1.0000
	(438)	(438)
* significance level of 1%; obs. in parenthesis		

Table 2: Correlation between MILFIRM and SIPRI

Figure 6 illustrates the kernel density distribution of density functions for MILFIRM (repre-

sented by the black line) and SIPRI (shown by the red line).

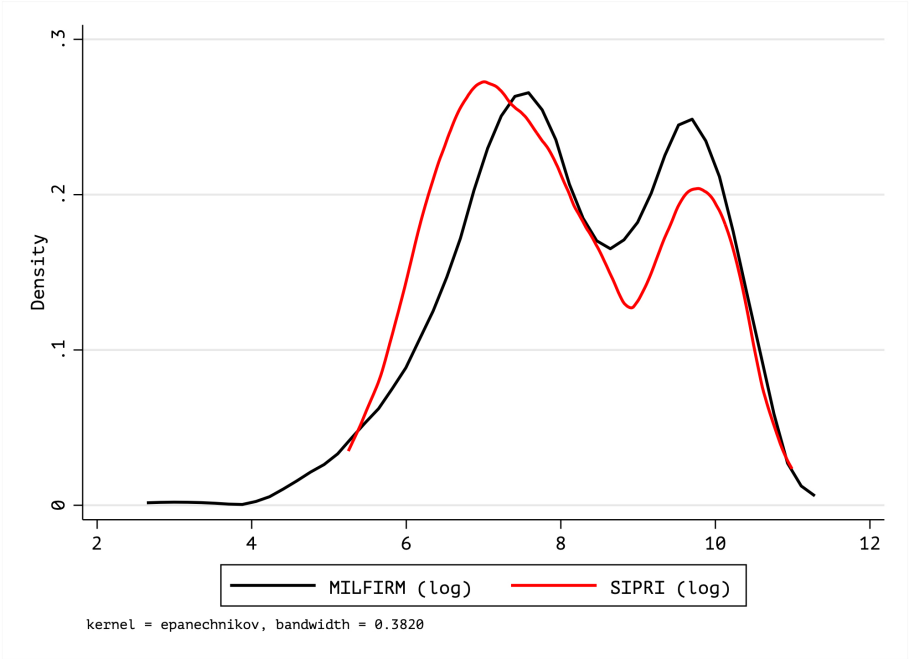

Figure 6: MILFIRM and SIPRI

This analysis focuses exclusively on companies and years for which data are available from both datasets, as MILFIRM encompasses a greater number of observations, even among companies common to both datasets, due to its longer timeframe (1996-2022) compared to SIPRI (2002-2022). As observed, the density functions of both datasets exhibit significant overlap. Specifically, for higher values (>10), the functions overlap. However, nuanced distinctions emerge for lower values (in <7) and moderate values between 8.5 and 10. Compared to SIPRI data, the MILFIRM dataset tends to underestimate revenues for smaller values (<7) while overestimating revenues for those ranging from 8.5 to 10.

This finding is further corroborated by Figure 7, where the black line represents the 45° line. For lower values of defense revenues, MILFIRM typically demonstrates lower values compared to SIPRI, while for moderate levels of defense revenues, MILFIRM data are slightly higher than those from SIPRI. Nonetheless, most data points align closely with the 45° line. For higher values of defense revenues, the two series overlap, indicating that larger companies, in terms of revenue, provide more detailed data. This suggests that both our data collection process and SIPRI methodology would yield similar results. To validate the methodology used in collecting military revenues, a simple panel linear regression was conducted. The regression yielded a coefficient of 0.98 with a p-value of 0.000, further confirming that the two series could be interchangeable.

The similarity between the two distributions is further supported by Table 3, which presents descriptive statistics for both dataset.

Variable	Obs	Mean	Std. dev.	Min	Max
MILFIRM (log) (total)	1,911	6.419253	1.912815	-1.147363	10.90508
MILFIRM (log)	438	8.190825	1.432707	3.025549	10.90508
SIPRI (log)	438	7.994773	1.407414	5.249979	10.99188

Table 3: MILFIRM and SIPRI Descriptive Statistics

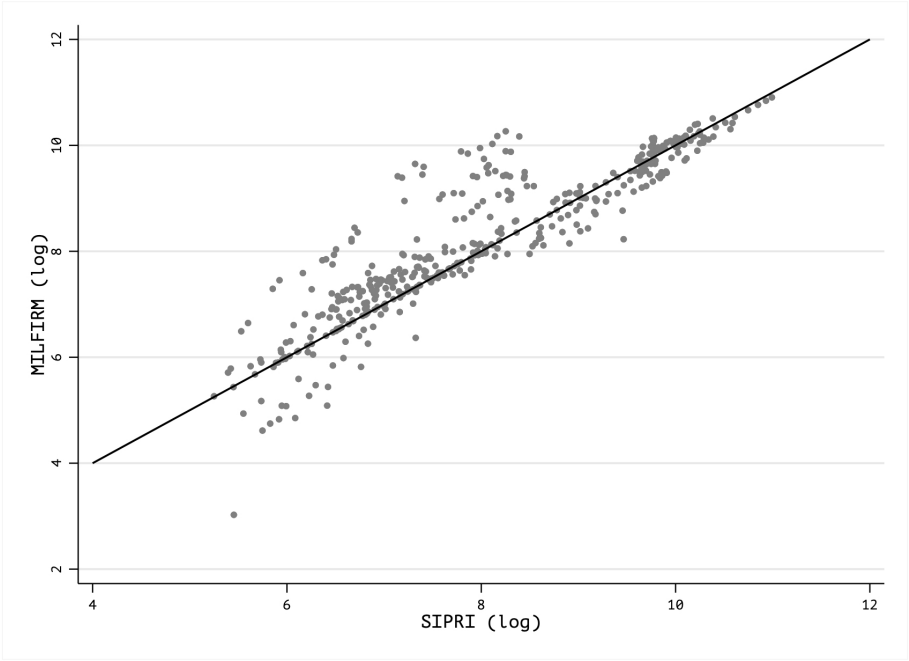

Figure 7: MILFIRM and SIPRI

Focusing exclusively on the observations shared between the two datasets, the mean of the MILFIRM distribution is 8.2, closely approximating the mean of 8 for SIPRI. Additionally, the maximum values are comparable, with MILFIRM registering 10.9 and SIPRI at 11. However, discrepancies exist in the minimum values, with MILFIRM recording 3, compared to a minimum of 5.2 for SIPRI. Consequently, MILFIRM exhibits a marginally higher standard deviation of 1.43, while SIPRI has a standard deviation of 1.40. When considering the entire MILFIRM dataset, a substantially lower mean of 6.4 is observed compared to the mean of 8 for SIPRI. There are no differences in maximum values, but the disparities in minimum values are more pronounced, with MILFIRM showing -1.1 compared to a minimum of 5.2 for SIPRI. Notably, the standard deviation is also higher in MILFIRM, at 1.9, compared to a standard deviation of 1.4 for SIPRI. This evidence further substantiates that the methodology captures the companies and revenues provided by SIPRI while encompassing a larger number of firms, particularly smaller companies, over a more extensive period. Specifically, while SIPRI yields only 438 observations, MILFIRM collects 1,911 observations.

The ability of our methodology to both (i) collect data comparable to SIPRI and (ii) broaden the dataset by including smaller firms is corroborated by Figure 8, which displays the kernel density distribution functions for both the overall MILFIRM dataset and the SIPRI data. As showed, the MILFIRM dataset captures companies with lower values of military revenues compared to the SIPRI dataset.

4 Empirical model

In this section, we outline the empirical method used to examine the impact of US elections on the military revenues of US defense companies. The model we estimate is as follows:

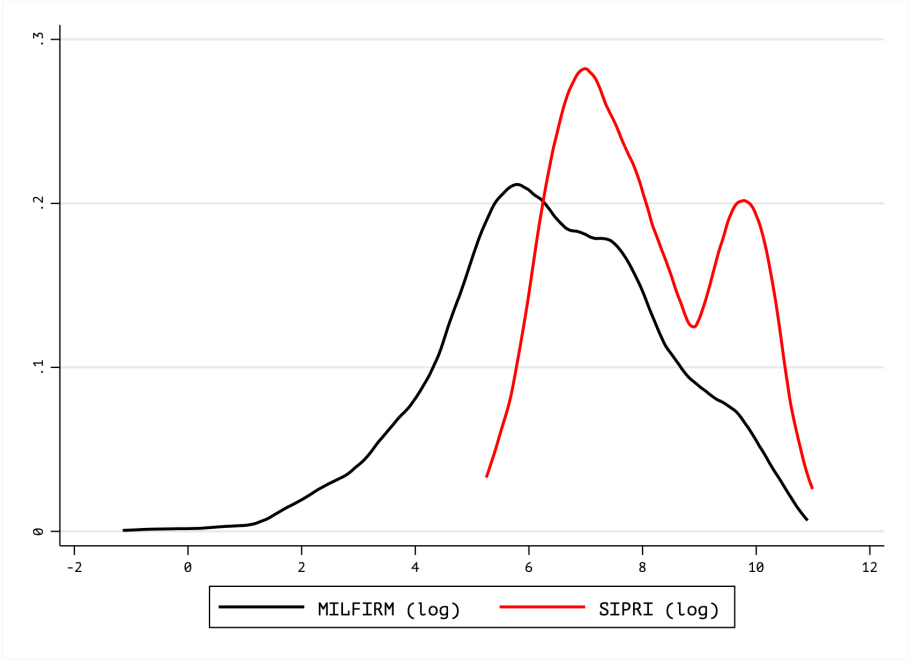

Figure 8: MILFIRM and SIPRI

$$\Delta ln(Military\,Revenues)_{it} = \alpha_{it} + \beta_1 Elections_t + \beta_2 \mathbf{X}_t + \beta_3 \mathbf{F}_{it} + \mu_i + \epsilon_{it}$$

The dependent variable is the growth rate of military revenues for company i at time t.

Figure 9 illustrates the trend of defense revenues from 1996 to 2022, with vertical lines marking presidential election years. Blue lines indicate years when a Democratic president was elected, while red lines represent elections won by a Republican candidate.

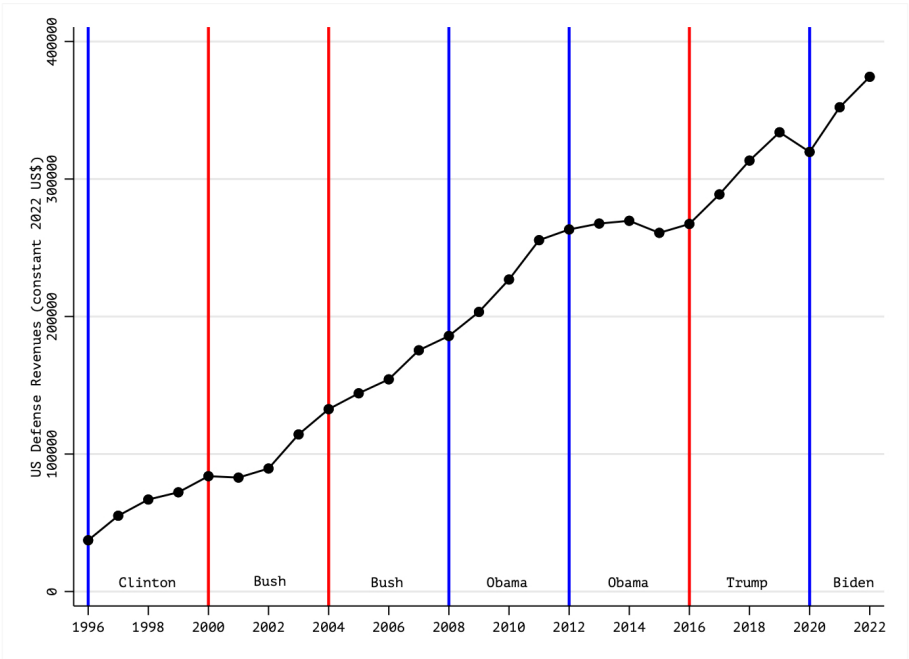

Figure 9: Defense revenues (1996-2022)

During this timeframe, the defense industry demonstrates consistent revenue performance, exhibiting positive growth in most years. However, there were a few exceptions, notably in 2001, 2015, and 2020, when growth rates did not show positive figures. Given this consistency, our empirical analysis will focus on revenue growth rates rather than absolute revenue levels.

The primary independent variable relates to US elections. To capture changes throughout the political cycle, we use alternatively four dummy variables, as described Table 4, with each dummy representing a specific year within the presidential term. Data are from the Database of Political Institutions (DPI).

Variable	Description	Source
Executive Election Year	Dummy taking the value 1 in presidential election year, and 0 otherwise.	DPI
Post-Executive Election Year	Dummy taking the value 1 in the year after presidential election, and 0 otherwise.	DPI
Midterm Election Year	Dummy taking the value 1 in midterm election year, and 0 otherwise.	DPI
Pre-Executive Election Year	Dummy taking the value 1 in the year before presidential election, and 0 otherwise.	DPI

Table 4: Elections Variables

A key consideration is that elections in the United States occur in November, towards the conclusion of the calendar year. Consequently, revenue fluctuations during election years partially reflect the final policy decisions implemented by the outgoing administration. This implies that the financial outcomes for defense firms in election years are influenced by the concluding actions of the incumbent president and legislators.

The vector $\mathbf{X}_t$ represents a set of political control variables, which encompass the following factors: (i) the incumbent ideology, (ii) legislative fractionalization, (iii) women participation, (iv) corruption, (v) military spending and (vi) military export.

The vector $\mathbf{F}_{it}$ represents company-specific control variables. Specifically, this vector accounts for (i) firm age, (ii) size and (ii) R&D expenditure.

Table 5 present the description of the variables utilized for the empirical analysis.

4.1 Controls

4.1.1 Firm Controls

The vector $\mathbf{F}_{it}$ represents a set of firm controls, which includes various firm-specific characteristics aimed at accounting for differences between companies. Specifically, this vector accounts for (i) firm age, (ii) size and (ii) R&D expenditure. The influence of age of companies on its financial performance has been widely acknowledged as a significant factor. Scholars have extensively investigated the relationship between a the longevity of a company and its financial outcomes, examining various aspects such as the impact of age on growth, profitability, and survival rates. However, the findings of these studies have been inconsistent. Some research has demonstrated positive correlations (Capasso et al., 2015; Coad et al., 2018; Rafiq et al., 2016), while other studies have revealed negative associations (Coad et al., 2013; Grazzi and Moschella, 2018). We use an inverse measure of age, employing the incorporation date as the basis for assessing the age of a company.

We also control for firm size. The relationship between firm size and financial performance has been extensively investigated. Numerous studies have examined the impact of firm size on financial outcomes, considering factors such as leverage, industry effects, green innovation strategies, relational capital, and financial and legal constraints. In general, larger firms tend to exhibit superior financial performance, benefiting from economies of scale and enhanced access to resources

Variable	Description	Source
Dependent Variable(s)		
$\Delta ln(MilitaryRevenues)$	Log change of firm military revenues in constant 2022 US$	MILFIRM
$\Delta ln(SIPRIMilitaryRevenues)$	Log change of firm military revenues in constant 2022 US$	SIPRI Arms Industry Database
Independent Variable(s)		
Elections	Set of 4 dummy variables each one capturing a year in presidential mandate	Database of Political Institutions
Firm Controls		
Age	Incorporation date	Orbis/Refinitive
Total asset (log)	Log of total asset in constant 2022 US$	Orbis/Refinitive
Employees (log)	Log of total number of employees	Orbis/ Refinitive
$R\&D_{t-1}(log)$	Log of total R&D expenditure	Orbis/ Refinitive
Country Controls		
Republican	Dummy variable taking a value of 1 if the executive is affiliated with the Republican Party, and 0 otherwise.	Database of Political Institutions
Alignment	Dummy variable taking a value of 1 if the executive party holds an absolute majority in the legislative houses with lawmaking powers, and 0 otherwise.	Database of Political Institutions
Legislative fractionalisation (log)	Continuous variable ranging from 0 to 1, indicating the probability that two randomly chosen deputies from the legislature belong to different parties (log).	Database of Political Institutions
Women Participation (log)	Continuous variable ranging from 0 to 1 representing the percentage of women in the House of Representatives. (log)	Comparative Political Dataset
Control of Corruption (log)	Continuous variable capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution.	World Governance Indicators
Military spending (log)	Log of US military spending in constant 2022 US$	SIPRI
Military $export_{t+1}(log)$	Log of US export of military product at time t+1 in constant 2022 US$	SIPRI

Table 5: Description of Variables

(Beck et al., 2006; de Guevara et al., 2021; Orlitzky and Benjamin, 2001). Furthermore, this study accounts for potential non-linear relationships between size and performance (Lee, 2009). Two distinct measures of size are employed: (i) the logarithm of the number of employees and (ii) the logarithm of total assets.

Eventually we consider the innovation investments of companies, which play a critical role in maintaining competitiveness, particularly in the defense industry where technological advancement is essential. We quantify innovation using the lagged logarithm of R&D spending, reflecting a firm's commitment to research and development activities. The impact of R&D investments on performance has been thoroughly examined in academic literature. Numerous empirical studies demonstrate that R&D expenditures typically result in enhanced performance, positively influencing market valuation and profitability, especially in manufacturing industries (Boiko, 2022; Ehie and Olibe, 2010; Jefferson et al., 2006).

By incorporating these factors, our analysis accounts for differences in capabilities, both in terms of operational scale and innovative capacity.

Table 6 presents estimation results based solely on firm controls. These findings align with existing literature and corroborate the validity of our data collection methodology.

Specifically, we observe that company size is positively correlated with the growth rate of defense revenues. When utilizing the number of employees as a measure of size, we observe an inverted U-shaped relationship between size and performance. Conversely, employing total assets as a size proxy reveals a positive linear relationship. In both specifications, more innovative firms tend to exhibit higher growth rates in military revenues. The effect of age on defense revenue growth is ambiguous; in column (1), age is positive and significant, while in column (2), it is insignificant. This suggests that younger firms may experience higher growth rates in defense revenues. However, this finding could also be influenced by mergers and acquisitions (M&A), as the incorporation dates for such firms are more recent and fail to account for their true age in terms of accumulated experience and established market positions. A more comprehensive analysis of this aspect lies beyond the scope of this study. Given the larger number of observations in employment data, we will utilize only the logarithm of the number of employees as a size proxy in subsequent

Dep Var :$\Delta ln(MilitaryRevenues)$	(1)	(2)
Incorporation date	**0.0145*** **	-0.0035
	[0.0044]	[0.0043]
Workers (log)	**1.1961*** **	
	[0.2141]	
Workers (log)_sq	**-0.0287** **	
	[0.0132]	
Total Asset (log)		**0.7854*** **
		[0.0934]
Total Asset (log)_sq		-0.0070
		[0.0061]
R&D expenditure$_{t-1}(log)$	**0.4096*** **	**0.1378*** **
	[0.0334]	[0.0296]
Constant	**-31.2399*** **	**6.3692***
	[8.8357]	[3.4602]
Firms FE	Y	Y
Observations	1,913	1,862
Firms	103	101
Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1		

Table 6: Growth of Military Revenues and Firms Controls

analyses.

4.1.2 Political Controls

The vector $\mathbf{X}_t$ represents a set of political controls encompassing the following factors: ideology of the incumbent, legislative fractionalization, women participation, corruption, military spending and military export.

Ideology of the incumbent is represented by a dummy variable taking a value of 1 if the executive is affiliated with the Republican Party, and 0 otherwise. Numerous studies have investigated the influence of partisan politics on military expenditure. Empirical evidence suggests that left-wing parties generally favor increased social spending, while right-wing parties advocate for higher military budgets. For instance, Seiglie and Xiang (2022) found that Republicans are more likely to support military expenditures based on roll-call data from the 112th U.S. House. Kuokštytė et al. (2021) demonstrated a significant influence of domestic politics in EU28 member states, indicating that right-wing governance increases defense spending, particularly in pre-election periods. Potrafke (2020) reported lower defense budgets under left-wing governments in OECD countries, especially in election years. Comola (2008) observed that right-wing governments in democracies tend to increase major conventional weapons exports, with significant fluctuations during electoral cycles, particularly in election years when incumbents often reduce exports.

We account for *Legislative fractionalization*, defined as a continuous variable ranging from 0 to 1, which reflects the probability that two randomly selected deputies from the legislature belong to different parties. Extant literature suggests that high legislative fractionalization impedes the executive's capacity to implement policies effectively, particularly in the allocation of public expenditure (Alesina and Drazen, 1991; Roubini and Sachs, 1989). Annual budget decisions necessitate extensive negotiation, and the political costs of such bargaining are exacerbated in a highly fractionalised legislative body (Weingast and Marshall, 1988).

We also control for alignment between the executive and the legislative power. Alignment takes a value of 1 when the party of the executive holds a clear majority in legislative chambers

with law-making authority, and 0 otherwise. Such coordination can influence policy directions through various mechanisms. For instance, a government with unified control may prioritize the expansion of social or economic initiatives rather than defense, potentially resulting in a decrease in defense revenue growth. Conversely, if the ruling party considers the defense sector a priority, this alignment could facilitate policies that increase defense spending, thus accelerating defense revenue growth rates. This measurement facilitates the understanding of how the strategic policy implications of executive-legislative coordination impact defense expenditures.

Women Participation is a continuous variable ranging from 0 to 1, representing the proportion of women in the House of Representatives. Recent empirical studies suggest that increased female representation has resulted in alterations to parliamentary discourse and specific policy outcomes, particularly regarding social expenditure in domains such as education, health, and social transfers (Hessami and da Fonseca, 2020).

Corruption is assessed utilizing the World Bank's Control of Corruption index, which quantifies perceptions of the extent to which public power is exercised for private gain, encompassing both petty and grand forms of corruption. The index is standardized on a scale ranging from approximately -2.5 (weak governance) to 2.5 (strong governance). Extant empirical research has demonstrated that elevated levels of corruption are associated with increased military expenditure (d'Agostino et al., 2016; Gupta et al., 2001).

Eventually, we also control for (i) the logarithm of US military spending and (ii) the logarithm of US military exports led by one year. We control for US military spending, given that the domestic government is the primary buyer for defense companies. Furthermore, exporting to other customers (foreign governments) also requires approval from the company's government. Given these regulations and strategic considerations, government decisions regarding equipment acquisition and export approval are presumed to significantly impact military revenues. Both variables are sourced from SIPRI. The decision to lead the value of arms exports is based on how the variable is calculated by SIPRI. Specifically, the SIPRI Arms Transfers Database provides trend indicator values (TIV) for a country's exports of major conventional weapons. These values describe actual deliveries of major conventional weapons per year; however, they do not necessarily reflect the actual payment flow. Therefore, leading the exports of major conventional weapons allows for a better alignment between sales by arms-producing companies and the actual delivery of arms, capturing the effects of advance payments.

Table 7 displays presents summary statistics for all the variable included in the analysis.

Variable	**Obs**	**Mean**	**Std. dev.**	**Min**	**Max**
Dep. var.					
$\Delta ln(MilitaryRevenues)$	1,913	0.103	0.293	-2.014	1.954
$\Delta ln(SIPRIMilitaryRevenues)$	415	0.079	0.168	-0.887	0.955
Indep. var(s)					
Executive Election Year	2,720	0.261	0.439	0	1
Post-Executive Election Year	2,720	0.259	0.438	0	1
Midterm Election Year	2,720	0.257	0.437	0	1
Pre-Executive Election Year	2,720	0.224	0.417	0	1
Political controls					
Republican	2,720	0.456	0.498	0	1
Alignment	2,720	0.717	0.450	0	1

Legislative fractionalisation (log)	2,720	-0.698	0.013	-0.740	-0.682
Women Participation (log)	2,720	-1.814	0.224	-2.207	-1.291
Control of Corruption (log)	2,261	0.338	0.136	0.038	0.628
Military spending (log)	2,720	13.435	0.209	13.089	13.729
Military export$_{t+1}(log)$	2,614	8.714	0.313	8.007	9.168
Firm controls					
Total asset (log)	2,130	7.193	2.217	-7.116	13.283
Employees (log)	2,291	8.937	1.823	1.609	12.737
R&D (log)	1,972	3.713	2.216	-4.167	9.772

Table 7: Summary Statistics

5 Findings

This section presents the results of the empirical analysis. Tables 8 and 9 display the primary findings, with a distinction: Table 8 incorporates *Legislative fractionalization* as a control variable, while Table 9 utilizes alignment. These variables are not included simultaneously to mitigate potential multicollinearity, as they exhibit a significant correlation of 37%.

Dep.Var. $\Delta ln(MilitaryRevenues)$	(1)	(2)	(3)	(4)
Executive Election Year	**0.062*** **			
	[0.019]			
Post-Executive Election Year		0.001		
		[0.018]		
Midterm Election Year			-0.003	
			[0.018]	
Pre-Executive Election Year				**-0.057*** **
				[0.016]
Republican	**0.070*** **	**0.045** **	**0.045** **	**0.058*** **
	[0.019]	[0.019]	[0.020]	[0.019]
Legislative fractionalisation (log)	**-4.552*** **	**-4.736*** **	**-4.741*** **	**-4.350*** **
	[1.084]	[1.116]	[1.105]	[1.081]
Women Participation (log)	**-0.531*** **	**-0.416*** **	**-0.420*** **	**-0.505*** **
	[0.114]	[0.102]	[0.101]	[0.113]
Control of Corruption (log)	**-0.572*** **	**-0.416*** **	**-0.420*** **	**-0.456*** **
	[0.162]	[0.157]	[0.152]	[0.153]
Military spending (log)	0.067	0.101	0.1	0.11
	[0.089]	[0.089]	[0.091]	[0.089]
Military export$_{t+1}(log)$	**0.906***	0.589	0.601	**0.858***
	[0.515]	[0.506]	[0.497]	[0.518]
cons	-0.19	0.315	0.321	-0.762
	[1.585]	[1.594]	[1.559]	[1.634]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	1,913	1,913	1,913	1,913
Firms	103	103	103	103
R_sq overall	0.049	0.042	0.042	0.048
R_sq within	0.051	0.042	0.042	0.05
R_sq between	0.048	0.055	0.059	0.056

Robust standard error in brackets. * p<0.1, ** p<0.05, *** p<0.01.

Table 8: US Elections and the growth rate of US military companies

The main insight from analyzing the full political cycle is that executive elections significantly influence the growth rate of defense revenues, whereas legislative elections show no significant effect. Notably, the coefficients associated with midterm elections and the year subsequent to an executive election (effectively

Dep.Var. $\Delta ln(MilitaryRevenues)$	(1)	(2)	(3)	(4)
Executive Election Year	**0.060*** **			
	[0.020]			
Post-Executive Election Year		0.006		
		[0.018]		
Midterm Election Year			-0.000	
			[0.017]	
Pre-Executive Election Year				**-0.061*** **
				[0.017]
Republican	**0.109*** **	**0.087** **	**0.087** **	**0.097*** **
	[0.016]	[0.016]	[0.016]	[0.016]
Alignment	-0.039	**-0.068***	**-0.070** **	-0.053
	[0.038]	[0.035]	[0.035]	[0.037]
Women Participation (log)	**-0.539*** **	**-0.441*** **	**-0.443*** **	**-0.530*** **
	[0.116]	[0.104]	[0.103]	[0.114]
Control of Corruption (log)	**-0.402***	-0.161	-0.168	**-0.258**
	[0.214]	[0.189]	[0.186]	[0.195]
Military spending (log)	-0.006	0.082	0.085	0.073
	[0.104]	[0.098]	[0.098]	[0.098]
Military export$_{t+1}(log)$	0.929	0.817	0.802	**1.010***
	[0.588]	[0.587]	[0.580]	[0.590]
cons	-2.491	-3.314	-3.305	**-3.716***
	[2.270]	[2.221]	[2.202]	[2.230]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	1,913	1,913	1,913	1,913
Firms	103	103	103	103
R_sq overall	0.039	0.033	0.033	0.04
R_sq within	0.04	0.032	0.033	0.041
R_sq between	0.036	0.057	0.057	0.051
Robust standard error in brackets. * p<0.1, ** p<0.05, *** p<0.01.				

Table 9: US Elections and the growth rate of US military companies

the year preceding midterms) are not statistically significant. Conversely, coefficients for years of executive elections and the years preceding them are significant. This finding suggests that despite the fact that defense budgets are approved by Congress, the concurrent change of executive branch and legislative body exerts a more substantial influence on the growth rate of defense revenues of military companies.

The coefficient for pre-executive election years is negative and statistically significant, indicating a reduced growth rate of defense revenues during these years—at -5.7% in Table 8 and -6.1% in Table 9. This could reflect either (i) incumbents' tendency to prioritize other public spending areas over defense as elections approach (Bove et al., 2017; Klomp, 2023b) or (ii) the time lag between budget increases and defense revenue growth.

Conversely, in executive election years, defense revenue growth is significantly positive, showing increases of +6.2% and +6.0% in Tables 8 and 9, respectively. This may result from (i) pre-election budgetary boosts in the prior year, impacting the current year; (ii) increased Defense Prime Contract Awards, not impacting immediate budgets as they draw from pre-appropriated funds; and (iii) strategic support for arms exports. Altogether, incumbents appear to bolster defense sector support more visibly in executive election years than in others.

Among the control variables, we confirm that the ideology of the incumbent plays a significant role. The results each specification demonstrate that Republican administrations consistently provide greater support to defense companies than Democratic administrations throughout the political cycle. Specifically, during executive election years, a Republican president is associated with a 7% higher growth rate in defense revenues compared to a Democratic president in Table8, and a 10.9% increase in Table 9. In simpler terms, Republican presidents typically extend stronger support to the defense industry than their Democratic counterparts, with this disparity becoming more pronounced in executive election years.

The coefficient of *Legislative fractionalization*, which measures the probability that two randomly chosen deputies belong to different parties, is negative and statistically significant in all specifications. the higher the index, the higher the fractionalization. Such results confirms theoretical models, such as those by

Alesina and Drazen (1991) and Roubini and Sachs (1989), indicate that higher fractionalization reduces the ability of incumbents to implement policies.

The alignment between the executive and legislative branches exhibits a negative correlation with the growth rate of defense revenues during midterm and pre-midterm election years, demonstrating declines of -6.8% and -7%, respectively. This result suggests that during midterms, when only the legislative body is involved, deputies may prioritize expenditure areas more proximal to their constituents over defense policies in the presence of alignment. Conversely, this alignment does not exert influence on defense revenue growth in executive election years.

The negative correlation between military revenue growth and *Women Participation* is consistent across all specifications in Table 8 and Table 9. This observation aligns with broader societal trends, indicating that women generally exhibit a greater propensity to advocate for social spending rather than defense expenditures. Their preferences may be attributed to divergent values and priorities regarding public expenditure, resulting in an emphasis on issues such as education, healthcare, and social welfare. This result underscores the influence of gender representation on fiscal policy decisions, particularly in the context of military funding allocation.

The coefficient of *Control of Corruption* is negative and statistically significant across all specifications in Table 8. In Table 9, this significant negative relationship is evident only during pre-executive election years and executive election years. Considering that a higher *Control of Corruption* score indicates a less corrupt country, these findings substantiate the notion that higher levels of corruption are associated with lower growth rates in defense revenues.

Military spending is consistently insignificant across all specifications. Although weapons are purchased through the defense budget, the broad definition of military spending, which encompasses various expenses such as personnel salaries, may dilute its relevance. This emphasizes that military spending is not necessarily a reliable indicator for assessing support for the defense industry. Instead, focusing on specific allocations or policies directly related to defense contracts may provide a clearer understanding of government support for the defense industry.

The coefficient for the lead military exports demonstrates statistical significance during executive and pre-executive election years in Table 8, while exhibiting significance exclusively in pre-executive elections in Table 9. This observed significance as the elections approach suggests that supporting exports might constitute a non-budgetary measure to support the defense industry. By facilitating exports, incumbent administrations can stimulate the national economy without increasing government expenditure, thereby potentially gaining a strategic advantage in the period preceding elections.

6 Robustness checks

6.1 Comparison with SIPRI

To evaluate the robustness of our findings, we estimate the same models using SIPRI data, with results presented in Table 10. Specifically, Panel A presents results from SIPRI data. We observe a reduction in the number of companies from 103 to 29. In Panel B, we replicate the estimation using MILFIRM data for firms included in the SIPRI lists, resulting in an increased number of observations and firms. This increase is attributable to the fact that some companies enter and exit the SIPRI list, precluding the construction of a consistent series with SIPRI data. However, upon identification, we are able to construct the growth rate series for defense revenues utilizing MILFIRM data.

Panel A partially corroborates the general findings. Specifically, the analysis confirms that only executive election and pre-executive election coefficients are statistically significant, whereas legislative coefficients are not significant. However, while the pre-executive election year coefficient is negative and significant, the executive election years exhibit only a positive but statistically insignificant coefficient. This lack of significance may be attributed to the reduced sample size: previous findings were based on

103 companies and 1,913 observations, whereas the SIPRI dataset comprises only 29 companies and 283 observations. Among the control variables, the results for *Republican*, *Legislative fractionalization*, and *Women Participation* maintain their anticipated signs and statistical significance.

Panel A: SIPRI data				
Dep.Var. $\Delta ln(MilitaryRevenues)$	(1)	(2)	(3)	(4)
Executive Election Year	0.024			
	[0.022]			
Post-Executive Election Year		0.017		
		[0.021]		
Midterm Election Year			-0.009	
			[0.015]	
Pre-Executive Election Year				**-0.023****
				[0.011]
Republican	**0.120*****	**0.128****	**0.122****	**0.128*****
	[0.021]	[0.026]	[0.022]	[0.023]
Legislative fractionalisation (log)	**-2.072***	-1.966	-1.924	**-2.134***
	[1.225]	[1.241]	[1.257]	[1.262]
Women Participation (log)	**-0.322***	**-0.320****	**-0.291***	**-0.355****
	[0.114]	[0.102]	[0.101]	[0.113]
Control of Corruption (log)	-0.213	0.012	-0.074	-0.079
	[0.177]	[0.141]	[0.111]	[0.113]
Military spending (log)	-0.115	0.041	-0.028	-0.025
	[0.108]	[0.109]	[0.105]	[0.106]
Military export$_{t+1}(log)$	0.388	1.001	0.619	0.864
	[0.886]	[1.091]	[0.902]	[0.950]
cons	-1.141	-4.581	-2.692	-3.524
	[3.365]	[4.026]	[3.306]	[3.529]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	283	283	283	283
Firms	29	29	29	29
R_sq overall	0.217	0.216	0.215	0.218
R_sq within	0.162	0.160	0.157	0.164
R_sq between	0.386	0.389	0.398	0.388
Panel B: MILFIRM data SIPRI firms				
Dep.Var. $\Delta ln(MilitaryRevenues)$	(1)	(2)	(3)	(4)
Executive Election Year	0.034			
	[0.027]			
Post-Executive Election Year		0.017		
		[0.022]		
Midterm Election Year			-0.014	
			[0.018]	

Pre-Executive Election Year				**-0.036****
				[0.017]
Republican	**0.074*****	**0.059*****	**0.062*****	**0.068*****
	[0.023]	[0.022]	[0.021]	[0.022]
Legislative fractionalisation (log)	-2.312	-2.312	-2.388	-2.169
	[1.684]	[1.618]	[1.669]	[1.634]
Women Participation (log)	**-0.413*****	**-0.361****	**-0.364****	**-0.406****
	[0.151]	[0.152]	[0.150]	[0.158]
Control of Corruption (log)	**-0.377*****	**-0.273***	**-0.302****	**-0.318****
	[0.136]	[0.154]	[0.150]	[0.154]
Military spending (log)	0.018	0.033	0.025	0.041
	[0.104]	[0.105]	[0.101]	[0.107]
Military export$_{t+1}(log)$	0.314	0.210	0.206	0.306
	[0.722]	[0.709]	[0.709]	[0.711]
cons	-1.141	-4.581	-2.692	-3.524
	[3.365]	[4.026]	[3.306]	[3.529]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	550	550	550	550
Firms	38	38	38	38
R_sq overall	0.059	0.057	0.056	0.059
R_sq within	0.053	0.051	0.050	0.054
R_sq between	0.053	0.059	0.066	0.035
Robust standard error in brackets. * p<0.1, ** p<0.05, *** p<0.01.				

Table 10: US Elections and the growth rate of US military companies - SIPRI firms

In Panel B, we apply the same model using MILFIRM data, focusing exclusively on companies listed in SIPRI. Consistent with Panel A, we observe that executive elections are statistically significant, while legislative elections are not. The coefficient for the pre-executive election year is negative and statistically significant at -0.036, which is higher than in Panel A and aligns more closely with the overall findings, suggesting that the smaller sample size in Panel A may be a limitation. The coefficient for executive election years remains positive but statistically insignificant. However, the p-value decreases from 0.27 in Panel A to 0.21 in Panel B, likely due to the increased sample size. Among the control variables, *Republican*, *Women Participation*, and the *Control of Corruption* consistently demonstrate strong statistical significance and align with the main findings.

6.2 High Defense Engagement vs. Low Defense Engagement

Table 11 presents the estimation results for the same model applied to two subsamples. Panel A focuses on firms that are heavily involved in the defense sector, defined as those whose average defense revenues exceed 50% of their total revenues over the specified period. Conversely, Panel B encompasses firms with defense revenues accounting for less than 50% of total revenues on average. This analysis aims to check whether the general findings are primarily driven by companies that specialize in defense production. Estimation results confirm general findings.

Consistent with the general findings, only executive elections exhibit a statistically significant effect

on the growth rate of defense revenues. The signs and magnitudes of the coefficients are consistent with previous results. Specifically, the growth rate of defense revenues is lower in the year preceding executive elections compared to other years, with values of -0.065 for companies heavily engaged in the defense industry and -0.053 for those less engaged. Conversely, in the year of executive elections, the growth rate of defense revenues is positive for both subsamples, at 0.064, indicating a robust pattern of support for the defense industry as elections approach.

Panel A: Defense Revenues >50% of Total Revenues				
Dep.Var.	(1)	(2)	(3)	(4)
$\Delta ln(MilitaryRevenues)$				
Executive Election Year	**0.064****			
	[0.027]			
Post-Executive Election Year		-0.007		
		[0.026]		
Midterm Election Year			0.009	
			[0.027]	
Pre-Executive Election Year				**-0.065****
				[0.030]
Republican	**0.061*****	0.034	**0.033**	**0.049***
	[0.025]	[0.024]	[0.025]	[0.025]
Legislative fractionalisation (log)	**-4.603****	-4.870***	-4.848***	**-4.347****
	[1.810]	[1.861]	[1.846]	[1.813]
Women Participation (log)	**-0.640*****	**-0.503****	**-0.498****	**-0.614*****
	[0.201]	[0.201]	[0.195]	[0.221]
Control of Corruption (log)	-0.360	-0.221	-0.209	-0.254
	[0.228]	[0.210]	[0.218]	[0.223]
Military spending (log)	0.028	0.069	0.075	0.069
	[0.147]	[0.146]	[0.147]	[0.144]
Military export$_{t+1}(log)$	**1.598***	1.129	1.110	1.503
	[0.896]	[0.898]	[0.869]	[0.942]
cons	-1.439	-0.568	-0.623	-1.925
	[2.240]	[2.293]	[2.259]	[2.372]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	750	750	750	750
Firms	43	43	43	43
R_sq overall	0.057	0.050	0.050	0.058
R_sq within	0.055	0.048	0.048	0.056
R_sq between	0.028	0.032	0.030	0.022
Panel B: Defense Revenues <50% of Total Revenues				
Dep.Var.	(1)	(2)	(3)	(4)
$\Delta ln(MilitaryRevenues)$				
Executive Election Year	**0.064****			
	[0.026]			
Post-Executive Election Year		0.007		
		[0.026]		
Midterm Election Year			-0.014	
			[0.024]	
Pre-Executive Election Year				**-0.053*****

				[0.018]
Republican	**0.081*** **	**0.055***	**0.057***	**0.067****
	[0.029]	[0.030]	[0.029]	[0.029]
Legislative fractionalisation (log)	**-4.499*** **	**-4.674*** **	**-4.688*** **	**-4.344*** **
	[1.296]	[1.327]	[1.315]	[1.287]
Women Participation (log)	**-0.517*** **	**-0.416*** **	**-0.419*** **	**-0.490*** **
	[0.137]	[0.109]	[0.111]	[0.121]
Control of Corruption (log)	**-0.761*** **	**-0.585****	**-0.601*** **	**-0.627*** **
	[0.232]	[0.232]	[0.212]	[0.214]
Military spending (log)	0.086	0.124	0.112	0.133
	[0.111]	[0.111]	[0.115]	[0.112]
Military export$_{t+1}(log)$	0.574	0.349	0.372	0.555
	[0.622]	[0.631]	[0.616]	[0.620]
cons	0.393	0.637	0.739	-0.280
	[2.222]	[2.286]	[2.185]	[2.302]
Firms Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Obs	793	793	793	793
Firms	49	49	49	49
R_sq overall	0.056	0.048	0.049	0.053
R_sq within	0.057	0.048	0.048	0.054
R_sq between	0.169	0.196	0.199	0.183
Robust standard error in brackets. * p<0.1, ** p<0.05, *** p<0.01.				

Table 11: US Elections and the growth rate of US military companies - High vs. Low Defense Engagement

Among the control variables, the ideology of the incumbent and *Women Participation* continue to exhibit a strong correlation with the growth rate of defense revenues. Specifically, as observed in previous findings, Republican incumbents demonstrate greater support for the defense industry compared to their Democratic counterparts throughout the political cycle. Furthermore, the presence of women in legislative bodies confirms its negative relationship with the growth rate of defense revenues. Notably, the *Control of Corruption* is significant only in Panel B, which includes companies less engaged in the defense sector. The negative coefficient across all specifications indicates that lower levels of corruption (higher values indicating less corruption) are associated with a reduced growth rate of defense revenues. This suggests that companies with lower defense engagement may be particularly sensitive to corruption, as negative publicity from scandals could adversely impact their non-defense performance, thus making them more vigilant about maintaining a positive reputation.

7 Conclusion

This study investigates the influence of the political cycle on the growth rate of defense revenues in the United States from 1996 to 2022. The research aims to provide a comprehensive analysis of how political cycles in the United States affect the performance of US military companies, as measured by their revenue growth rates. Theoretically, the direction of this effect is not straightforward. Incumbents face a trade-off as elections approach: they can support the defense sector for political reasons, such as national security, and economic reasons, utilizing defense spending as a stimulus for the economy. Conversely, they must consider voter preferences, which may favor other forms of public spending over defense.

A key contribution of this paper is the investigation of the relationship between political cycle and revenues of defense companies, whereas the majority of existing literature on this topic focuses on the relationship between political cycle and defense spending.

To empirically investigate the relationship between the political cycle and the growth rate of defense revenues in the United States, we construct a novel dataset (MILFIRM) of US defense firms by cross-referencing company data and patent data. This methodology serves to address the *dual engagement* issue in the identification of military companies. By *dual engagement*, we refer to the fact that most of the companies involved in the production of military products also produce goods for the civilian market. Furthermore, to distinguish between revenues collected from the sale of military products and total revenues, we utilize business line data provided in the financial statements.

Based on the empirical findings, we draw two main conclusions. Firstly, not all elections are equal in their impact. Although the defense budget is approved by the legislative body, suggesting that deputies might have more influence over it, our findings indicate that only executive elections affect the growth rate of defense revenues. Secondly, during the year of an executive election, the growth rate of defense revenues is significantly higher compared to non-election years. This observation suggests that as executive elections approach, incumbent demonstrate an increased propensity to support the defense industry.

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