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The Correlates of Brazil's Military Expenditures, 1822-1945: The Politics of Defense Policy in a Non-Democratic Era

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Abstract: The complex relationships between domestic factors, the armed forces, and the international system are key to analyzing any country's defense policy. Defense spending is the most tangible product of defense policymaking. This article delves into the intricacies of those relationships by examining the correlates of the defense burden in a pre-democratic period in Brazil, where the democratically informed guns-versus-butter trade-off was not a central concern for policymakers because there was no national mass-based political party. Leveraging an original dataset created through meticulous historiographical research and employing time series analysis techniques, we investigate the factors shaping Brazil's military expenditures in 1822-1945. This is the first study of its kind looking into the Brazilian case for this period. Our findings indicate that political instability often led governments to increase military funding. Yet, levels of electoral democracy, greater military political power, and military-generated political crises were not systematically associated with defense spending, challenging conventional hypotheses. Finally, the article provides systematic quantitative evidence on the negative association between defense spending and Brazil's freeriding on the US security umbrella throughout the first half of the 20th century.
Keywords: Oligarchical regimes; political vulnerability; political power of the military; mass-based political parties; international factors.

Introduction

The relationship between governments and their armed forces is a key component of most political regimes. Defense spending is arguably one of the most tangible expressions of the dynamic of this relationship. In Brazil, this has been essentially investigated by qualitatively-oriented scholars. It is thus not surprising that there is a dearth of quantitative studies of the correlates of Brazil's defense spending, particularly regarding the 19th century and the first half of the 20th century. This article attempts to address this gap by conducting a time series analysis of the country's defense outlays between 1822 and 1945. To do so, we identify the correlates of the allocation of budget shares to defense portfolios. The correlates include domestic and international factors. Our empirical analysis contributes to the scholarly literature by devising original operational indicators for a crucial period of Brazilian history characterized by the consolidation of the Brazilian nation-state, four political regimes, ample geopolitical changes in South America, the political rise of the army, economic modernization, and two world wars.

Our main findings suggest that political vulnerability significantly influenced defense spending, with unstable governments allocating more resources to the military. Interestingly, increased military influence within the executive branch did not necessarily lead to higher defense spending. Additionally, the study shows that, while engagement in international conflicts predictably increased military expenditures, internal political tensions and the specific nature of civil-military relations presented a more nuanced impact, not always correlating with increased defense spending. These insights underline the multifaceted influences on military budget allocations in a non-democratic context, driven by a blend of domestic political considerations and external geopolitical pressures.

The article will proceed as follows. The next section presents its theoretical framework, the hypotheses to be tested, and the indicators of the independent variables. The third section details how our dependent variable — defense spending in 1822-1945 — is measured. Then, we discuss the results of our time series analysis. The final section presents the conclusion.

Theorizing and Measuring the Correlates of Defense Spending

A recent literature review highlights the primacy of politics in defense spending (CONRAD and SOUVA, 2020). Its main explanatory factors are both international and domestic. International factors include external threats, wars, and long-standing interstate rivalries. Domestic factors include coups, electoral competition, economic

downturns, and regime type (democratic versus authoritarian). These factors influence a leader's length of tenure, which, in turn, affects defense spending.

Stepan (1988) and Zaverucha and Rezende (2009) look into the relationship between governability and defense budgets in Brazil since the 1960s. Governability is the ability of governments to stay in power for the duration of their terms of office and the ability to implement their policy agendas at acceptable costs. In other words, governability is a mixture of political survival and policymaking capacity. Both aspects feed into each other. The more durable a government is, the more it can get things done — and vice versa. Both Stepan (1988) and Zaverucha and Rezende (2009) attribute upward trends in defense spending to governability risks faced by Brazilian presidents, prompting chief executives to rely on the military for the sake of political stability and exchange it for larger shares of budget expenditures. This relationship is also likely to be found in the 1822-1945 period. We can thus state the first hypothesis to be tested:

H1: The more vulnerable the chief executive is, the more he will spend on defense[1].

How do we measure the vulnerability of chief executives? Our main argument in this article is that political considerations regarding survival in office are key to shaping military expenditures. Empirically, the challenge here is to operationalize vulnerability because Brazil had different systems of government in 1822-1945: a parliamentary monarchy in 1822-1889 and a presidential system in 1889-1945. We adopted a variable that represents the "discount rate" estimated by a ruler at the beginning of their term. The rate reflects a chief executive's expectation of remaining in office. It is a measure of political (in)stability or vulnerability, which varies according to future expectations of durability based on considerations relating to the longevity of previous governments. The variable also incorporates the percentage change in GDP as a control to estimate the risk to which a ruler is exposed. The variable "discount rate" was conceived by Cheibub (1998), inspired by Levi (1988), as an indicator or proxy of the discount rate of the future length in office estimated by rulers or, in other words, the risk they face of leaving power. According to Cheibub (1998), governments that discount the future at high rates tend to prioritize short-term objectives, while lower discount rates allow for a focus on the long run. The measure is defined as the risk incumbents face of being removed from power, considering their length of time in office, economic growth rate, and previous governments' turnover rates. The higher the value of the variable, the higher the expected risk for the leader.

Three indicators were combined to estimate the "hazard," i.e., the risk of discontinuity of the ruler, which was then used to calculate the discount rate. They are described below:

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[1]There were only male chief executives and heads of state in the period investigated here.

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Average time in office

We constructed different alternatives to measure average time in office. This variable serves as an estimate made by each chief executive at the time he entered office regarding his duration in office. The political instability of the period prior to ascension to office of each head of government has an important effect on the value assumed by the variable for each head of government/year. Given wide variations in the duration of governments over the 124 years under study, some specific criteria were adopted for each key constitutional period:

- 07/Sep/1822 to 07/Apr/1831: estimated average length of time ministers stayed in office between Independence and the end of the First Reign.
- 08/Apr/1831 to 22/Jul/1840: estimated average length of time ministers stayed in office during the Regency Period.
- 22/Jul/1840 to 15/Nov/1889: estimated average length of time ministers/the President of the Council of the Empire stayed in office (from 1847 onwards) during the Second Reign.
- 15/Nov/1889 to 15/Nov/1894: averages here include only the length of time a President of the Council of the Empire was in office from 1879 onwards, seeking to reflect the high instability of the period between the end of the monarchical regime and the beginning of the republican regime.
- 15/Nov/1894 to 31/Dec/1945: average time in office of heads of government calculated from the beginning of the first civilian government of the First Republic, on 15/Nov/1894.

Time to the end of term

Values were estimated per head of government/year, i.e., they refer to how much time a head of government expected to remain in office. In the case of presidents, as a rule, it refers to the expected time a head of government — either the original holder of the office or whoever would replace him for the final fulfillment of the term — had until the end of his constitutionally established term at their inauguration, discounting the time already served in office until then. For the times the Republic was operating without a proper constitutional framework, such as the period right after the 1930 Revolution, we assumed that the head of government would initially expect to remain in office for 10 years. For each subsequent year, the time spent in office since taking office was deducted from the original 10-year expectation.

For the monarchical period, as there was no expected tenure for the head of government, values were estimated using the average based on the time to the end of the legislature's term and the head of state (emperor or regent). Again, the time since inauguration was used to discount the expected tenure for the years following entry. The discount was applied to the average length of tenure of the legislature and the head of state.

While the parliamentary regime was only officially installed in Brazil after the Additional Act of 1847, we assumed that, even before it, the emperor did not perform the role of head of government. We therefore considered the main minister of each cabinet as head of government in the years prior to the Additional Act.

The start and end dates of the tenure of each head of government in the monarchical period was extracted from two different sources: for the period between 1840 and 1889, we drew on data used by Ferraz (2012); for the period between 1822 and 1840, we collected data from the book *Organizações e Programas Ministeriais*, by Javari (1962), which is also the source of information regarding the beginning and end dates of legislatures. As there are no precise dates, only the years of duration, the first and last day of each year were adopted as the start and end dates, respectively. The tenures of the holders of the post of head of state are defined below:

- D. Pedro I (1822-1831): an estimated 20 years of regency, considering the instability prior to Independence, with the regime transition led by the Portuguese Crown's heir.
- Provisional Triune Regency (1831): the 1824 Constitution did not establish a maximum duration for the Provisional Regency, but it did set forth its brief character by foreseeing the need for a Permanent Regency. We therefore estimated that it would last for a maximum of one year.
- Permanent Triune Regency (1831-1835): the Constitution of 1824 determined that the regents would remain in power until the emperor reached adulthood. The period of permanence was, therefore, the time elapsed between the date of inauguration and the 18th birthday of Pedro II.
- Diogo Feijó's Regency (1835-1837): 4 years of expected permanence, as provided for in the Additional Act of 1824, which changed the Regency from Trine to Personal (one).
- Araújo Lima's Regency (1837-1840): for the first year, the 4-year term of Feijó's administration was discounted, as Araújo Lima succeeded him after Feijó's resignation. From 1838 onwards, with the election of Araújo Lima, a new 4-year term is considered.
- D. Pedro II (1840-1889): a 50-year expectation of permanence was defined, based on the age at which he became emperor (only at 15 years of age) and the life expectancy for a king at the time. Had he been older when he assumed the Crown, this expectation of permanence would have been adjusted.

GDP per capita

Finally, the percentage change in GDP per capita was used to calculate the discount variable devised by Cheibub (1998). Here, the major difficulty concerns the availability of reliable data for the 19th century. Fortunately, the useful work by Tombolo and Vaz (2013) estimates this variation for the period between 1822 and 1900. For the period

between 1900 and 1945, we drew on the values published by the Brazilian Institute of Geography and Statistics (IBGE) in its 'Estatísticas do Século XX' series (IBGE, 2003).

To sum it up, the discount rate calculates the probability that the termination of a government occurs in year t, conditioned on its survival up to t. The rate estimates the risk for the early termination of a government each year based on a survival analysis model with a Weibull distribution. The estimate assumes low values in periods of greater political stability and relatively higher values in more turbulent periods, as seen in some examples. In 1875, for instance, the last year of the cabinet led by Viscount of Rio Branco, who took office in 1871, the risk of early termination of his government was low, with a value of 0.000179. In contrast, in moments of political instability, the discount rate generates higher values. The first and turbulent decade of the republican regime established in 1889 is a good example. In 1892, the second year of the Floriano Peixoto presidency (which began in November 1891), the risk of failure had the value of 0.000715. However, in 1922, the last year of Artur Bernardes's four-year presidency, after a succession of elected presidents had completed their terms, the risk of interruption was low, at 0.0000569.

Then comes the issue of the role of the military in politics. The effects of military coups on defense spending were investigated by Bove and Nisticò (2014). Looney and Frederiksen (2000) also studied the relationship between defense spending and military influence, with a specific focus on Latin America. This work shows that defense spending decreased as military forces became less influential.

Military organizations are large bureaucracies interested in maximizing their autonomy and resources, as any bureaucracy (PION-BERLIN, 2001). However, the military is a unique institution because its members are experts on organized violence and have a monopoly on the use of large weapons systems (such as battleships or artillery). This *per se* grants the military a considerable amount of political power in any state. However, if the armed forces, for any reason, amass even more political power than they normally have as guardians of a nation, they are likely to leverage their surplus power to extract more resources from the government. This is one of the main reasons why it is so important to analyze the political role of the military in political regimes. Conversely, if the armed forces are, for any reason, politically weak, they tend to receive lower budgets. The Argentine armed forces, after their defeat in the Falklands/Malvinas War in 1982 and the onset of a new democratic regime in 1983, are a good example (PION-BERLIN, 2020).

Moreover, the military can also expand their ability to obtain budgetary resources by undertaking direct political action. The top brass may openly clash with the civilian leadership over defense and foreign policy or domestic issues. Whenever such conflicts take place, governments are likely to feel very vulnerable. Politicians are often eager to placate the wrath of the legions by buying off the military with higher wages and defense budgets.

There was a wide variation in the political role of the military in Brazil from the Independence in 1822 to the fall of Getúlio Vargas in 1945. The country's first regime was a parliamentary monarchy, whose first chief of state was Emperor Pedro I. After a turbulent decade in power, he abdicated in 1831. The fifty-two years between his abdication and 1883 — the onset of the so-called "military question" (referred to as "*a questão militar*" in Portuguese) — constitute a unique period in Brazil's history in terms of civil-military relations and civilian control over the military, as the governments of the period never had to contend with armed forces possessing political autonomy (CARVALHO, 1980, p. 45).

Therefore, during the monarchy, domestic, foreign, and defense policy were largely determined by the country's civilian leadership. The creation of a national guard with responsibility over internal security significantly contributed to the civilian character of the regime. At the same time, the army was responsible for national defense with the assistance of the national guard (PINTO, 2016, p. 33). It is also worth highlighting that the civilian nature of this period is fully expressed in the 1824 Constitution, which emphasizes obedience of the military to the executive branch (see Table 01)

Table 01. Articles on the Armed Forces according to the 1824, 1891, 1934, and 1937 Constitutions of Brazil

Constitution	Article	Role of the military
1824	47 – The Military is essentially obedient and can never assemble without being ordered to do so by legitimate authority. 48 – It is the exclusive responsibility of the Executive Branch to employ naval and land forces as it deems necessary for the security and defense of the Empire.	No political or policing role
1891	14 – Land and sea forces are permanent national institutions, intended for the defense of the homeland abroad and the maintenance of law and order within. The armed forces are essentially obedient, within the limits of the law, to their hierarchical superiors and obliged to support the constitutional institutions.	Political and policing role
1934	162 – The armed forces are permanent national institutions and essentially obedient, within the law, to their hierarchical superiors. They are intended to defend the homeland and guarantee the constitutional branches of government, order, and law.	Political and policing role
1937	161 – The armed forces are permanent national institutions, organized on the basis of discipline and faithful obedience to the authority of the President of the Republic.	No political or policing role

Source: Elaborated by the authors based on Brazil (2025).

After the end of the War of the Triple Alliance (1864-1870) and the emergence of the "military question" referred to above, civilian control over the military was eroded due to the politicization of the army. This leads us to November 15th, 1889, the day of the military coup that established the Republic. Following the 1889 coup, there were two very unstable military governments, those of Marshals Deodoro da Fonseca (1889-1891) and Floriano Peixoto (1891-1894), marked, among other crises, by a massive rebellion led by the Navy. In addition, the army's frustrating performance in the *War of Canudos* (1896-1897), a domestic conflict, stands out. These conditions created a relative and temporary withdrawal of the military from the center of political life during the presidency of Campos Sales (1898-1902).

Nonetheless, conflicts between civilians and the military marked the so-called First Republic: there was a high level of military intervention in politics, as reported by Carvalho (2005, p. 15), and revolts led by junior officers in the 1920s, culminating in the so-called 1930 Revolution. Therefore, as Carvalho states, *contra* Stepan (1971), the armed forces constituted "the destabilizing power" of the period (CARVALHO, 2005, pp. 13-61).

Given the oligarchic nature of Brazil's presidential system in the first three decades of the 20th century, this system of government only gained the plebiscitary and populist aspects that later distinguished it with the emergence of Getúlio Vargas's charismatic leadership in the 1930s (LAMOUNIER, 1994, pp. 181-190). However, the political and policing roles extensively played by the armed forces throughout the century were already clearly outlined in Article 14 of the 1891 Constitution, as shown in Table 01.

Therefore, we can state our hypotheses regarding the impact of civil-military relations on defense spending:

H2A: The more extensive the political power of the military, the higher the defense spending, 'ceteris paribus'.

H2B: The more intense the political tensions between the government and the military, the greater the defense spending, 'ceteris paribus'.

To test H2A, we had to develop measures representing the formal political power of the military at the domestic level. Here we used an indicator proposed by Huntington (1957, p. 89): the proportion of active-duty and retired military personnel holding cabinet positions each year. In order to calculate it for the entire 1822-1945 period, extensive and detailed research was conducted to obtain information on the length of time each minister was in office and the military service record of each minister. Our search involved consulting the official websites of the National Archives (more specifically, the *Memória da Administração Pública Brasileira* Project) (ARQUIVO NACIONAL, 2025), the Federal Senate, the Chamber of Deputies, as well as those of the army, navy, and air Force. It also included the *Centro de Pesquisa e Documentação*

de História Contemporânea do Brasil (CPDOC, 2025) website (specifically the entries regarding the names of cabinet members) and, as a last resort, a search on Wikipedia pages.

Once primary data was obtained, we calculated the proportion of military personnel in cabinet-rank positions for each year of each government. The annualized proportion is the sum of days in office of each minister with a military background divided by the sum of days of existence of each ministry. The numerator was calculated by adding the length of time in office, counted in days, of each minister with a military background in each year. The denominator is the sum of time all ministries have existed each year. In years when no cabinet portfolio was created or eliminated, the denominator is equivalent to 365 days times the number of existing ministries.

To test H2B, we had to evaluate episodes of tension between the government and the military. As mentioned, the military has played different roles in Brazilian politics. On several occasions, confrontational attitudes towards the prevailing political order resulted in coups that led to the early demise of administrations and even regime changes. At other times, military-generated conflicts with rulers have led to crises with less radical effects. Therefore, the operationalization challenge presented by military-generated political crises concerns the measurement of their intensity. The variable titled "military crises" was built by mapping out episodes of conflict between members of the armed forces and the government, both in terms of their frequency and of the severity of the crises. For all periods, we also drew on the *Centro de Pesquisa e Documentação de História Contemporânea do Brasil* (CPDOC)'s online archives. Once all the episodes were identified, they were classified based on a brief description of the events that occurred, according to a typology of military crises based on Carvalho (2005) and Feaver (2003), as seen in Table 02.

Table 02. Typology of military crises

Activity by the Military	Crisis intensity score
Inactivity, delay in complying with directions from civilian authorities	1
Disobedience, express refusal to comply with orders or imposition of conditions to fulfill missions	2
Open criticism of the government by retired military personnel	3
Open criticism of the government by active-duty military personnel	4
Military pressure on the government	5
Protests by military personnel	6
Mutinies	7
Coup attempts or conspiracies involving military officers	8
Coups with overthrow of the incumbent government	10

Source: Elaborated by the authors.

We relied on one measure for our statistical analysis: the weighted total of military crises. It refers to the sum of the scores assigned to each episode of military crisis, according to the encoded category, using the following formula:

$$Y = \sum_{i}^{n} Event\ Score_i = Event\ Score_i + \cdots + Event\ Score_n$$

So far, we have essentially focused on the domestic political factors shaping defense expenditures: the vulnerability of the executive and civil-military relations. Yet, any analysis of defense spending must include other predictors theorized by the literature.

The first one to be included is the nature of the political regime. In a democracy, because electoral competition shapes political dynamics, politicians may use defense policy as a signaling mechanism showing that incumbents genuinely care about the issues that are salient to voters. The literature on the guns-versus-butter trade-off discusses when, why, and how governments allocate resources to defense policy (GIFFORD, 2006; MINTZ and HUANG, 1991; RIPSMAN, ZIELINSKI and SCHILDE, 2018; WHITTEN and WILLIAMS, 2011). Governments invest in defense to the detriment of social expenditures or vice versa. If external threats are not salient, governments will invest in civilian activities. These trade-offs are particularly salient in more unequal and less economically developed democracies.

In addition, Sabaté (2016) and Fordham and Walker (2005) have shown that regime type plays a key role in defense resource allocation: democracies generally allocate proportionally less to defense efforts. Brauner (2015) and Goldsmith (2003) also find that democracies allocate a smaller percentage of GDP to defense than non-democracies. Electoral uncertainty in democracies tends to lower military spending.

Regarding Brazil, Hunter (1997) argues that the democratic regime initiated in 1985 resulted in politicians prioritizing social programs over defense spending for the sake of electoral gains. She portrays the military as a dwindling political force in democratic Brazil, losing out in the competition for budget resources.

However, it is not plausible to assume that the propositions described in the three paragraphs right above hold for 1822-1945 Brazil. Why?

Since Independence in 1822, sizeable sectors of the Brazilian elites have aspired to have a country with solid constitutional foundations and representative institutions (LYNCH, 2014, p. 50). The liberal Constitutions promulgated in 1824, 1891, and 1934 attest to such aspirations. In the first half of the 20th century, democratization became the overriding goal of some important political groups and movements. However, between 1822 and 1945, Brazil was never able to develop the key instrument to run democratic regimes, namely, national mass-based political parties.

The monarchy had two national parties, the Conservative and the Liberal, but they were markedly oligarchic (GRAHAM, 1990). Ominously, the First Republic did not feature national political parties, only state-based ones. No wonder Brazil's first republican regime became even more oligarchic than the monarchy had ever been (LYNCH, 2014). Finally, the period between 1930 and 1937 witnessed some attempts at creating national political parties, but political parties were banned after the 1937 coup and the enactment of the 1937 Constitution.

Thus, despite its significant constitutional and electoral traditions, in 1822-1945, Brazil failed to develop political organizations able to translate the preferences of popular majorities into public policies and to hold governments accountable to the preferences of the people — national mass-based political parties. This also means that, despite enacting four constitutions and establishing four political regimes, there was a great deal of continuity throughout those 124 years. Therefore, we can state our third hypothesis:

H3: The nature of political regimes did not significantly affect defense spending in Brazil in 1822-1945, 'ceteris paribus'.

How do we verify H3? Even though we consider the period between 1822 and 1945 a non-democratic age, there was variation in the openness of political regimes. To tap into this variable, we relied on the electoral democracy index, produced by the Varieties of Democracy Institute (V-Dem) (COPPEDGE et al., 2021). This measure captures electoral pluralism, suffrage, the freedom and fairness of elections, and the extent to which elected officials are the primary policymakers.

In addition, we must also consider how threats and conflicts can affect defense outlays. International factors were expected to be strong predictors of military spending. Nordhaus et al. (2012) and Hauenstein et al. (2021) emphasize the significant impact of external threats on military spending. Markowitz and Fariss (2018) argue that competitive geopolitical environments drive states to invest more in power projection capabilities, which include boosts in defense spending. In the Latin American context, Kollias et al. (2018) find that both domestic and external factors shape military spending patterns.

In the case of Brazil's defense spending, we must consider the historical rivalry between Brazil and Argentina. Until the early 1980s, Brazil felt threatened by Argentina. Argentina's economic decline from 1946 onwards weakened this rivalry, but it only ceased to be intense after the Argentine defeat in the Falklands/Malvinas War in 1982.

We must also account for the impact hegemonic powers have on Brazil's defense spending. Proença Jr. and Diniz (2008) argue that, throughout the 20th century, Brazil placed itself under the security umbrella provided by the USA. This freeriding or

bandwagoning incentivized lowering Brazil's defense spending. While this process became very clear from the beginning of the 20th century (RESENDE-SANTOS, 2007), it had already been underway since the 19th century with the Monroe Doctrine.

Finally, we must account for the wars Brazil fought. The country fought the Cisplatine War in 1825-1828, the War of the Triple Alliance in 1864-1870, and participated in the two world wars of the 20th century. In addition, the Brazilian armed forces deployed troops and fought within the country's borders in 1822-1945 on several occasions. In short, this was a period of consolidation of Brazil as a nation-state, and military strength certainly played a role. Therefore, we propose another set of hypotheses.

H4A: The more engaged the country was in fighting international and/or domestic conflicts, the more Brazil spent on defense.

H4B: The more capabilities Brazil had vis-à-vis the global hegemon, the less the country spent on defense.

H4C: The more intense the geopolitical competition was, the more Brazil spent on defense.

To account for Brazil's engagement in international and domestic conflicts, we produced a list of all domestic and international conflicts involving the Brazilian military from historiographical work. Then, we calculated the yearly percentage of days where the country fought a conflict abroad or within the Brazilian territory.

As mentioned before, any credible analysis of defense spending must account for the national capabilities and resources of the hegemonic powers in the Americas throughout the 1822-1945 period (the United Kingdom and then the United States). The most straightforward measure is the Composite Index of National Capabilities (CINC) (SINGER, BREMER and STUCKEY, 1972). The CINC index is a composite index that estimates the material power of each country relative to others, calculated by aggregating demographic, economic, and military power measures. The index identifies the material capabilities of almost 200 countries from 1816 to 2016. In our statistical analysis, we calculated the ratio between Brazil's CINC and the United Kingdom's CINC in the 19th century and the United States' CINC in the 20th century.

To complement the analysis, we had to account for geopolitical competition. Markowitz and Fariss (2018) propose a measure of the level of geopolitical competition each state faces, which incorporates the relative position of a country in relation to its geographic neighbors, the relative economic power of these countries, and the degree of alignment and compatibility between a country's interests and those of its neighbors. The measure is estimated per country, per year. The main innovation introduced by Markowitz and Fariss is as follows: when calculating the level of competition faced by each country, each year, the authors weight the economic

power of the other countries, measured by traditional indicators such as GDP and GDP per capita, and by the geographical distance relative to the state of interest (Brazil in our work). The "competition" variable for each country is measured considering all other countries involved in the international system, weighting their economic power by their physical proximity to the measured country. Therefore, the variable captures a country's proximity to more powerful countries, considering whether the more powerful countries cooperate or compete with the country of interest.

Finally, it was necessary to include socioeconomic control variables, commonly found in quantitative works on defense spending (FORDHAM and WALKER, 2005; GIFFORD, 2006; GOLDSMITH, 2003; YILDIRIM and SEZGIN, 2005; ZIELINSKI et al., 2017). Richer countries spend more on defense than poorer ones. Therefore, the higher the per capita income, the higher the defense spending — *ceteris paribus*.
To sum up, the independent variables of hypotheses H1 to H4 capture governments' political vulnerability, civil-military relations, the political regime, and the threat environment.

Measuring the Dependent Variable: Defense Spending as a Share of National Government Expenditures

One of the main challenges we had to overcome to conduct this analysis was to operationalize the dependent variable properly. We show this below. We employed a measure of defense spending in Brazil that puts it in the context of what is spent on other portfolios of the national government. We regard this as an important empirical contribution of our work, as it involves calculating defense expenditures as a share of governmental expenditures, allowing us to determine how much of a priority defense spending has been for governments in Brazil. There is no single dataset that presents estimates of military spending for such a comprehensive period as the one investigated here.

The Brazilian Institute of Geography and Statistics (IBGE) provides data on government spending, which can be extracted either in aggregate form or broken down by military branch (army, navy, and air force) from the 'Estatísticas do Século XX' series, available only for the period between 1901 and 2000 (IBGE, 2003). The figures are presented in local currency. In addition to absolute expenditure figures, IBGE data also allow the calculation of percentages of military expenditure as a fraction of total government expenditures, total national revenue, and the Brazilian Gross Domestic Product.

For the period before 1901, we collected data from the Center for Research Libraries Digital Delivery System (CRL), which extracted information from reports by the Ministry of Finance. The documents obtained are part of the Latin American Materials Project

(LAMP), carried out by CRL, which digitized several official documents of the Brazilian executive branch from 1821 to 1993. The digitized reports include both budget proposals as well as public account balance sheets from previous years, which served as a source for measuring government spending and military spending during the monarchical period. We complemented our data collection with data from 'História Financeira do Império', by Carreira (1889), which reports data on Brazil's revenues, expenditures (aggregate and by ministry), and imports and exports under the monarchical period, specifically between 1831 and 1888. This source also provides a measure of military spending as a percentage of government spending, aggregated and broken down by military branch.

Figure 01 shows defense expenditures as a percentage of cabinet portfolio expenditures from 1822 to 1945. It is segmented into three historical periods: the Monarchical Period, the First Republic, and the Vargas Era, indicated by vertical dashed lines.

Figure 01. Defense expenditures as a share of cabinet portfolio expenditures (1822-1945)
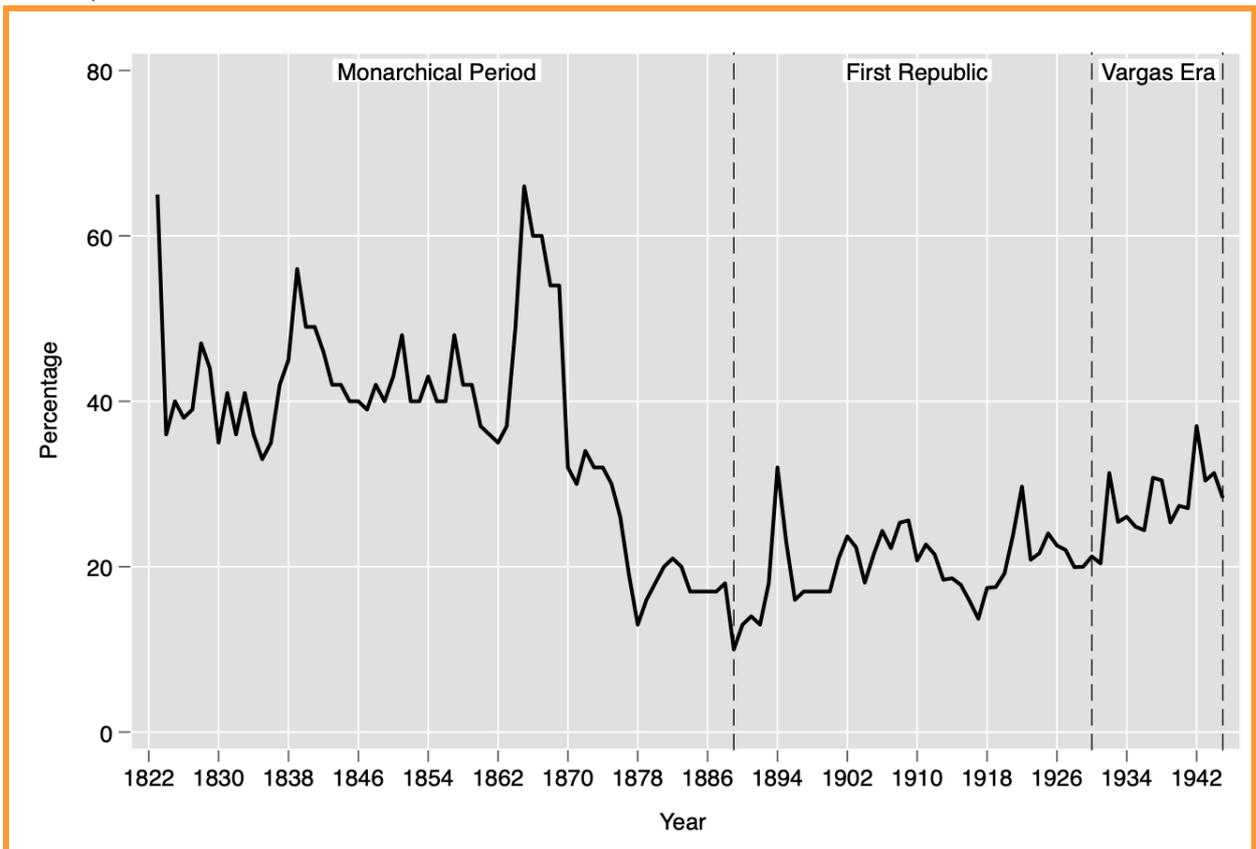
Source: Elaborated by the authors.

There were significant fluctuations in the percentage of defense expenditures in the monarchical period. Peaks occurred around the time right after Pedro I became emperor of Brazil and when there were military engagements to secure the country's

independence, followed by another peak between 1835-1845 at the height of Brazil's civil wars, and another peak in 1864, where the percentage of defense expenditures exceeds 60%, consistent with expenditures connected to the War of the Triple Alliance.

The First Republic (1889-1930) began with a sharp decline in the percentage of military spending to below 20% in the early years of the new regime. Defense expenditures then gradually increased, recording some peaks and valleys and stabilizing toward the end of the period, but remaining significantly lower than the highest peaks of the monarchical period. Finally, starting around 1930, military spending percentages began to increase steadily, reaching up to around 40% by the mid-1930s and maintaining a relatively stable level with minor fluctuations through to 1945. These are consistent with both a civil war Brazil fought in 1932 (the so-called Constitutionalist Revolution in São Paulo) and the deployment of troops in World War II. The graph above illustrates how military expenditures as a portion of total cabinet expenditures varied significantly through these periods.

Analyzing Defense Spending in Brazil in a Non-Democratic Era

Table 03 displays the descriptive statistics for the variables in our models. Our comprehensive analysis of the correlates of Brazil's defense spending in 1822-1945 uses Ordinary Least Squares with Newey-West standard errors.[2] The use of Newey-West standard errors is highly appropriate for analyzing models where the dependent variable is the percentage of the national budget allocated by governments to defense expenditures. This statistical method is particularly valuable in contexts where the conventional assumptions of homoscedasticity and no autocorrelation in the error terms may not hold.

Defense spending as a share of the national budget is likely to be influenced by a combination of overlapping economic, political, and social factors that could introduce serial correlation and heteroscedasticity in the residuals of a time series model. First, defense spending is often reactive and influenced by domestic policies and international geopolitical events. This leads to potential autocorrelation issues, as decisions made in one period could have implications for subsequent periods. For instance, an increase in the defense budget due to a geopolitical threat one year could lead to similar increases in the following years as the threat continues or escalates. Newey-West standard errors adjust for this autocorrelation, providing more reliable statistical inference than traditional standard errors.

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[2]See the appendix for a discussion on bivariate models and how consistent they are with our multivariate models.

Table 03. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Defense Expenditures	123	30.42	12.404	10	66
Defense Expenditures (t-1)	122	30.43	12.453	10	66
Discount Rate	123	.001	.002	0	.016
% of Military Officers in Cabinet	124	27.01	15.771	0	63.6
Weighted Military Tension Score	123	8.967	19.918	0	104
Electoral Democracy Index	124	.193	.054	.056	.303
Relative Capabilities (BR vs. Hegemon)	124	.038	.011	.017	.061
Geopolitical Competition	122	.016	.003	.011	.026
Civil Conflicts	124	19.58	37.006	0	100
International Conflicts	124	15.90	33.78	0	100
GDP per capita	124	1.047	.225	.838	1.77

Source: Elaborated by the authors.

Secondly, heteroscedasticity is another concern in such models, as the variance of the error terms might change over time in response to the scale and intensity of political and economic shifts. For example, in times of intense conflict or when major new defense initiatives are launched, variation in defense spending as a proportion of the budget might increase significantly. The Newey-West method addresses this issue by correcting for any group-wise heteroscedasticity present in the residuals, thereby enhancing the robustness of the estimated coefficients.

By adopting Newey-West standard errors, the analysis of defense budget allocations becomes more robust against the typical problems encountered in time series data, leading to more accurate and trustworthy conclusions about the factors influencing defense spending. This methodological choice is crucial for scholarly work, ensuring that decisions are based on the best possible understanding of the underlying dynamics of defense expenditure.

Further enhancing the rigor of our analysis, models 02 and 04 include a lagged dependent variable. This lag accounts for the inertial nature of defense expenditures and addresses autocorrelation concerns: defense budgets do not fluctuate wildly from year to year but rather depend largely on spending decisions made in the past. In Newey-West corrected models, predictor variables are also lagged by one year.[3] This approach mitigates endogeneity concerns where simultaneous causality between the predictors and the dependent variable could confound the results. By using lagged predictors, we ensure that the causal direction runs from the independent variables to the dependent variable, thus bolstering the validity of our findings.

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[3]Partial Autocorrelation Function (PACF) test indicates one lag is sufficient to properly model this temporal dynamic (p<0.0001).

Table 04 displays the models. Figures 02 and 03 display a coefficient plot, presenting standardized coefficients with 90% confidence intervals. Such plots for models 01, 02, 03, and 04 (Figures 02 and 03) display the standardized coefficients, allowing us to examine the relative size of various coefficients and their association with military expenditures in Brazil from 1822 to 1945.

Table 04. The correlates of defense expenditures in Brazil (1822-1945)

	Model 01 Newey-West	Model 02 Newey-West, lagged DV	Model 03 Newey-West	Model 04 Newey-West, lagged DV
Discount Rate	681.329*	373.154**	618.95*	510.647*
	(369.391)	(187.149)	(333.548)	(290.308)
% of Military Officers in Cabinet	-.151*	-.024	-.182**	-.009
	(.08)	(.031)	(.084)	(.028)
Weighted Military Tension Score	.044	.007	-.019	-.004
	(.049)	(.022)	(.047)	(.022)
Electoral Democracy Index	-79.481***	-23.028	-22.51	-9.654
	(26.364)	(19.888)	(31.441)	(18.792)
Relative Capabilities (BR vs. Hegemon)	-569.961***	-131.754**		
	(105.847)	(54.257)		
Geopolitical Competition			2055.756***	-158.027
			(725.46)	(511.589)
International Conflicts	.114**	.033*	.09	.034*
	(.054)	(.018)	(.056)	(.019)
Civil Conflicts	.06**	.012	.041	.005
	(.028)	(.013)	(.03)	(.013)
GDP per capita	-19.264***	-4.292	.52	-3.633
	(5.426)	(3.709)	(7.989)	(3.647)
Defense Expenditures (t-1)		.77***		.831***
		(.068)		(.048)
Constant	88.12***	20.326**	3.629	12.315
	(11.218)	(8.521)	(19.206)	(10.598)
Observations	123	122	122	122
F-statistic	13.67	40.41	6.23	50.45

Source: Elaborated by the authors.
Note: Newey-West Standard Errors are in parentheses. Statistical significance: *** p<.01, ** p<.05, * p<.1.

Hypothesis 1 (H1) posited that the vulnerability of an executive, as measured by their discount rate, correlates with increased defense spending. The regression results across all models consistently show a positive and significant relationship between the discount rate and defense expenditures at the 10% level at least. This pattern suggests that, as governments perceive a greater probability of being removed from office, as indicated by higher discount rates, they allocate more resources to defense. This response likely reflects a precautionary measure to bolster defense expenditures as an insurance mechanism.

Figure 02. Standardized coefficients, 90% confidence intervals (Models 01 and 02)
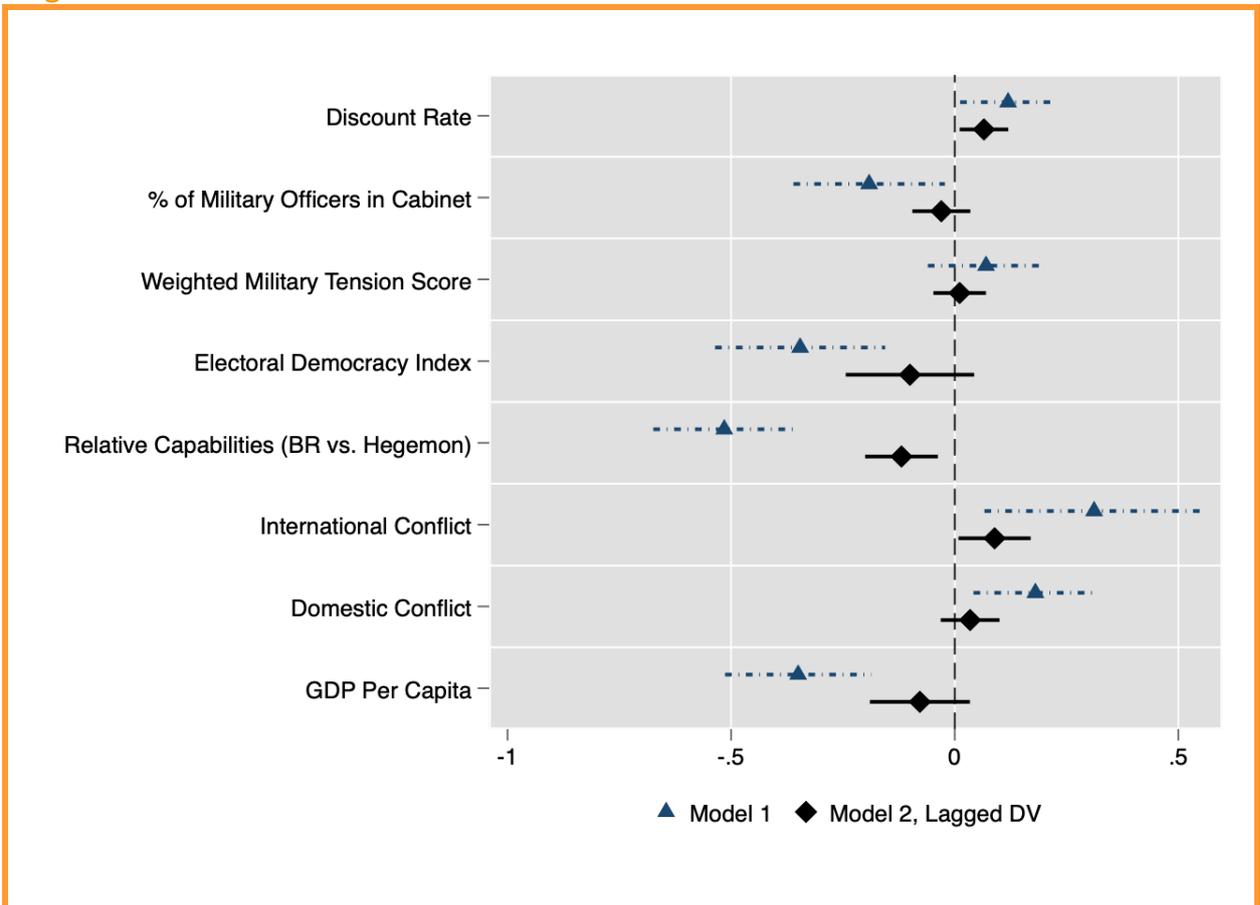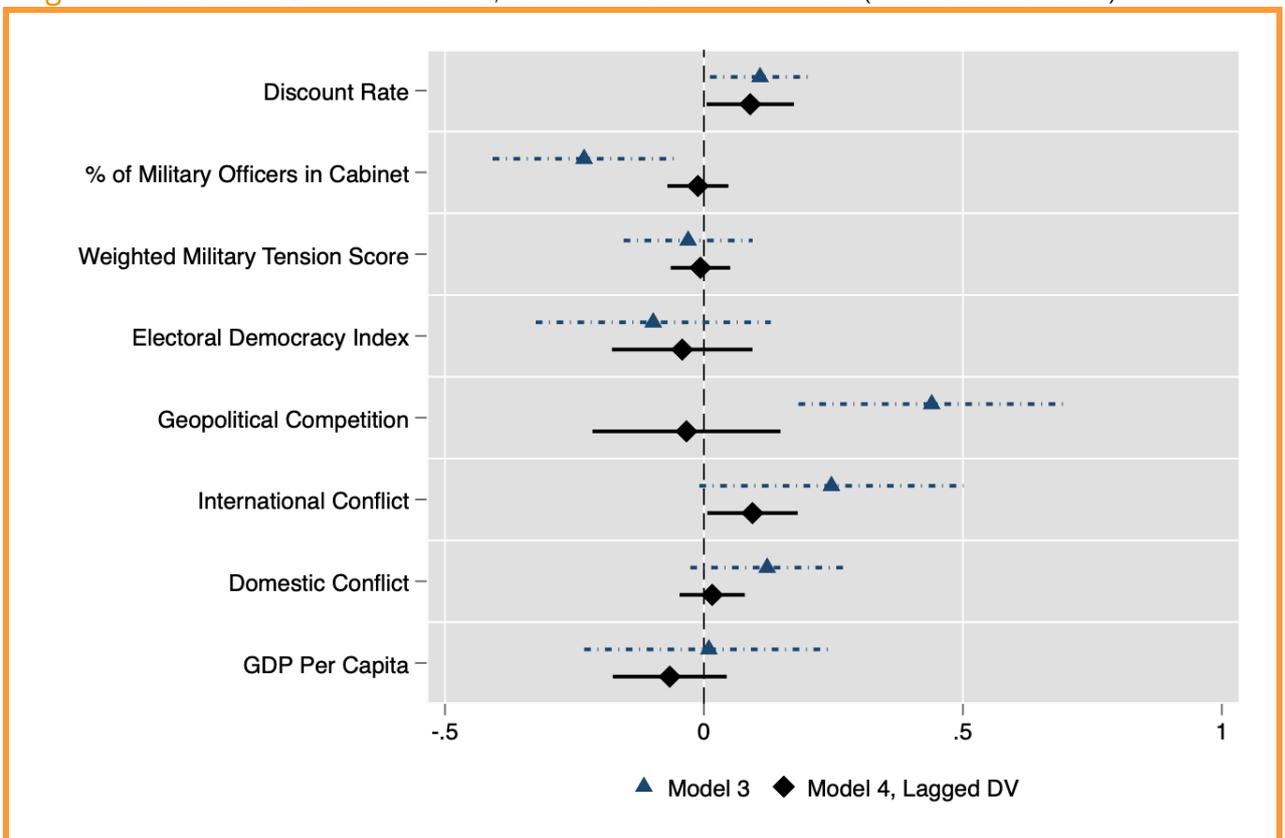

Source: Elaborated by the authors.
Note: Constant and Lagged DV Coefficients Omitted for Brevity.

Hypotheses 2A and 2B explored the impact of the military's political power and the intensity of tensions between the government and the military. The results here are intriguing. Hypothesis 2A expected that a higher percentage of military officers in the cabinet would correlate with increased defense spending. Contrary to this, the coefficients are negative across all models, with significant results at the 10% and 5% levels in Models 01 and 03, respectively. This may be due to the fact that this is precisely the period in which the armed forces were still developing as an institution with their own organizational interests. In other words, in 1822-1945, the armed forces were not sufficiently professionalized and cohesive to have a discernible impact on defense spending, despite their significant presence in the political arena. Only after the 'Tenentismo' movement in the 1920s and the development of "the politics of the army doctrine" by General Góis Monteiro in the 1930s did the armed forces start acting cohesively in national politics (COELHO, 1976). Yet, this negative finding must be taken with a grain of salt because the coefficient is not statistically significant in the models where a lagged dependent variable is included. Hypothesis 2B, which posited that increased military tensions would lead to higher defense spending, did not find consistent support in the data.

Hypothesis 3 addressed the absence of impact resulting from the nature of political regimes. The assumption was that higher scores on the electoral democracy index would not lead to lower defense spending, contrary to what the extant cross-national scholarship proposes. Model 01 provides evidence to counter our hypothesis, with a highly significant coefficient (1% level). The negative relationship suggests that more democratic governments might limit excessive military expenditures. However, it is important to highlight that this relationship is not statistically significant in other models, including the ones with a lagged dependent variable. Therefore, as theorized above, the absence of national mass-based political parties throughout the 1822-1945 period seems to have neutralized the impact of the nature of political regimes on defense spending.

Figure 03. Standardized coefficients, 90% confidence intervals - (Models 03 and 04)

Source: Elaborated by the authors.
Note: Constant and Lagged DV Coefficients Omitted for Brevity.

Hypotheses 4A, 4B, and 4C focused on the role of the threat environment in accounting for defense expenditures. Hypothesis 4A finds robust support across models, indicating that engagement in international and domestic military conflicts led to increased defense spending, as expected. The positive coefficients for international conflicts in Models 01 and 02 and civil conflicts in Model 01 underline the reactive nature of defense spending in response to direct threats. We must highlight that

international conflicts are statistically significant in more models than domestic conflicts.

Hypothesis 4B expected that greater relative capabilities compared to the global hegemon would decrease defense spending. The significant negative coefficients in Models 01 and 02 support this view, suggesting that Brazil possibly felt more secure and spent less on defense when it perceived itself as more capable relative to dominant powers.

Finally, Hypothesis 4C, which posited that geopolitical competition increases defense spending, finds strong support in Model 03, as evidenced by the large positive coefficient. This indicates that, in periods of high competition, Brazil likely felt the need to significantly increase its military expenditures to maintain its strategic position. Yet, the coefficient for geopolitical competition does not reach statistical significance in the presence of a lagged dependent variable.

GDP per capita displays a statistically significant coefficient in Model 01, suggesting mixed evidence for a negative association between economic development and military expenditures. Finally, the coefficient for the lagged dependent variable is large and statistically significant, highlighting that there is an inertial component to military spending, and denoting that it is appropriate to use models 02 and 04 as benchmarks for the consistency of our findings.

By focusing on the relative size and statistical significance of these coefficients, as seen in the coefficient plots, we can discern which factors were most influential in shaping defense spending during the 1822-1945 period. The discount rate is prominently positive across all models, with the relative size of the coefficients indicating a substantial impact. This suggests that higher discount rates, reflecting perceptions of political and economic vulnerability or risk, consistently led to increased defense spending. The statistical significance across the models underscores the robustness of this relationship, highlighting the discount rate as a key correlate of military expenditures, followed by variables related to the threat environment, both international and domestic. Contrary to the bulk of the cross-national scholarship on defense spending, levels of electoral democracy are not a significant correlate of military outlays in Brazil in 1822-1945.

In addition, a note on the appropriateness of these findings is in order, given that the associations reported above could be regarded as spurious. Considerations of stationarity and cointegration of variables are crucial, especially when analyzing time series data across such an extended historical period. While several variables did not pass stationarity tests, which could typically raise concerns regarding spurious regression results, this issue was addressed through cointegration tests. The presence of cointegration among variables ($p<0.0001$ across all models) implies that, despite some being non-stationary, they move together in the long run, thus forming

a stable relationship that validates the use of the variables without using first differences.

Conclusion

In this article, we have undertaken the first detailed exploration of the correlates of defense spending in Brazil in 1822-1945. The central goal of our research has been to elucidate the complex interplay between domestic politics, civil-military relations, and the threat environment, and how these factors collectively shaped the country's military outlays.

Our study covered four distinct political regimes in Brazilian history. The monarchical period in 1822-1889, with its parliamentary system of government, saw the military playing a relatively subdued role, as outlined in the constitution of the period. The First Republic (1889-1930), with its presidential system of government, introduced more direct military participation and intervention in politics, coinciding with heightened political instability. The first seven years after the 1930 coup (1930-1937) witnessed unsuccessful attempts at democratization and the promulgation of a new liberal Constitution in 1934 that would be revoked after three years. Finally, the Estado Novo in 1937-1945 was markedly authoritarian, with the military assuming a central role in the governance structure, under the direction of a civilian dictator, which was reflected in increased defense expenditures and intense engagement in World War II. However, variation in the character of these regimes, as measured by the level of electoral democracy, did not significantly impact defense spending. We argued that the absence of national mass-based political parties throughout those 124 years is key to explaining this surprising finding.

One of the pivotal findings from our analysis is the significant impact of the vulnerability of governments on defense spending. Our models consistently show a positive correlation between the perceived instability of a government and its likelihood to allocate greater resources to defense. This relationship underscores the notion that defense spending in Brazil was not merely a function of external threats but was deeply intertwined with domestic political considerations. Governments perceived to be at higher risk of being unseated or facing significant internal opposition were more likely to increase military spending, possibly as a strategy to fortify their position against potential coups or popular uprisings. In a way, spending more on soldiers is a mechanism to reinforce incumbency.

Furthermore, the role of civil-military relations in this context cannot be overstated. Our study challenges the conventional wisdom that a more extensive participation of military officers in government translates into increased defense spending. Contrary to this expectation, our findings reveal a complex relationship whereby increased military presence in the cabinet did not always correlate with higher military expenditures. Additionally, our exploration into the intensity of political tensions

between the government and the military unveils another layer of complexity. Our data does not support a straightforward hypothesis that greater tensions lead to higher defense spending. Instead, it suggests that the dynamics of these military-generated crises were multifaceted, involving negotiations and power plays that did not always translate into increased military budgets. This finding is crucial for understanding the mechanisms through which military influence was exerted in non-democratic settings, highlighting that overt conflict between military and civilian authorities is just one of many factors impacting defense policy decisions.

The international context during this period also played a significant role. Our article is the first to provide systematic quantitative evidence on the negative effect on defense spending resulting from Brazil's freeriding on the US security umbrella throughout the first half of the 20th century, theorized by Resende-Santos (2007) and Proença Jr. and Diniz (2008). Our analysis also shows that engagement in international and domestic conflicts led to significant increases in military expenditures, aligning with the general trend of countries boosting defense capabilities in response to direct threats. The involvement in the War of the Triple Alliance and World War II are notable examples where external pressures precipitated substantial increases in Brazil's defense spending.

In synthesizing these insights, this article contributes to the scholarly understanding of defense spending. It highlights the intricate balance between internal political instability and external threats in shaping a country's defense policy. In conclusion, we highlight that our study not only chronicles the historical trajectory of Brazil's defense expenditures but also provides a framework for analyzing defense spending in other non-democratic contexts.

The findings of this article open several promising avenues for further investigation into the politics of defense spending, particularly in non-democratic or institutionally weak regimes. First, future research should further explore the mechanisms through which executive vulnerability shapes defense budgeting. While this study finds consistent evidence that politically insecure leaders allocate more resources to the military, it remains unclear whether this is driven primarily by attempts at co-opting the armed forces, deterring coups, or reinforcing state capacity. Comparative historical case studies or archival work could illuminate the causal pathways behind this relationship, especially by examining specific episodes of regime crisis and corresponding military budget shifts.

Second, the surprising negative or null effect of military influence within the executive — contrary to prevailing expectations — deserves deeper investigation. Future research should examine the evolving professionalization and internal fragmentation of the Brazilian armed forces during the 1822-1945 period. Disaggregating the military by branch (e.g., army vs. navy), regional bases of power, or institutional alignments may reveal divergent interests and varying capacities to influence budgetary

outcomes. This line of inquiry underscores the importance of treating the military not as a monolithic actor but as a complex organization with internal cleavages that shape its political behavior. Importantly, the period studied here coincides with the formative stages of Brazil's military professionalization. The armed forces had not yet become the cohesive and politically assertive institution often described as a praetorian force in the post-1945 literature on civil-military relations. This historical context may help explain our negative or null finding on the impact of the share of military officers in the cabinet on defense spending.

Third, while this article finds that regime type had a limited association with defense spending in Brazil from 1822 to 1945, it raises important questions about the institutional foundations of democratic accountability. Future work could investigate whether the absence of national mass-based political parties — as identified here — conditions the relationship between democracy and military spending more broadly. A comparative analysis across Latin America or other semi-democratic contexts could test whether democratic institutions only constrain military budgets when accompanied by robust representation and accountability mechanisms, including national mass-based political parties.

Finally, recent contributions to the study of defense spending have expanded the availability of long-run, cross-national data on military expenditures, using military expenditures as a share of GDP as a standardized metric (ANDERS, FARISS and MARKOWITZ, 2020; BARNUM et al., 2024). This is a related, yet different concept from the one adopted in our contribution. However, using military expenditures as a share of GDP in a cross-national analysis is well worth the trade-offs to test our hypotheses comparatively. Taken together, these future research directions could refine theories of civil-military relations, defense economics, and state-building, especially in authoritarian or hybrid regimes.

<div align="right">Revised by Aline Scátola</div>

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Acknowledgments

Appendix

Comparing Bivariate and Multivariate Analyses of the Correlates of Military Expenditures in Brazil (1822–1945)

Figure A1 presents a matrix of correlations between all the variables. Table A1 presents the results of bivariate models. The bivariate and multivariate models largely converge in identifying the key determinants of military expenditures in Brazil in 1822-1945. However, notable differences in the magnitude and significance of coefficients highlight the value of multivariate modeling in accounting for confounding factors.

Figure A1. Visual correlation map of the explanatory variables and defense expenditures

	Defense Expenditures	Defense Expenditures (t-1)	Discount Rate	% of Military Officers in Cabinet	Weighted Military Tension Score	Electoral Democracy Index	Relative Capabilities (BR X Hegemon)	Geopolitical Competition	Civil Conflicts	International Conflicts	GDP Percapita
Defense Expenditures	1.00	0.89	0.24	-0.10	-0.16	0.20	-0.52	0.45	0.10	0.29	-0.21
Defense Expenditures (t-1)	0.89	1.00	0.19	-0.12	-0.16	0.20	-0.49	0.48	0.10	0.25	-0.22
Discount Rate	0.24	0.19	1.00	0.15	0.02	0.38	-0.32	0.42	0.29	-0.09	-0.23
% of Military Officers in Cabinet	-0.10	-0.12	0.15	1.00	0.03	0.09	-0.03	0.23	0.28	-0.05	-0.15
Weighted Military Tension Score	-0.16	-0.16	0.02	0.03	1.00	-0.50	0.34	-0.27	-0.10	-0.16	0.40
Electoral Democracy Index	0.20	0.20	0.38	0.09	-0.50	1.00	-0.47	0.57	0.25	-0.08	-0.77
Relative Capabilities (BR X Hegemon)	-0.52	-0.49	-0.32	-0.03	0.34	-0.47	1.00	-0.57	-0.05	-0.13	0.29
Geopolitical Competition	0.45	0.48	0.42	0.23	-0.27	0.57	-0.57	1.00	0.21	0.13	-0.65
Civil Conflicts	0.10	0.10	0.29	0.28	-0.10	0.25	-0.05	0.21	1.00	-0.24	-0.20
International Conflicts	0.29	0.25	-0.09	-0.05	-0.16	-0.08	-0.13	0.13	-0.24	1.00	0.10
GDP Percapita	-0.21	-0.22	-0.23	-0.15	0.40	-0.77	0.29	-0.65	-0.20	0.10	1.00

Source: Elaborated by the authors.

Variable	Obs.	Coef.	Std. Error
Defense Expenditures (t-1)	122	0.864***	0.058
Discount Rate	123	1318.615***	355.033
% of Military Officers in Cabinet	124	-0.079	0.103
Weighted Military Tension Score	123	-0.095***	0.036
Electoral Democracy Index	124	44.900***	16.073
Relative Capabilities (BR vs. Hegemon)	124	-558.105***	82.716
Geopolitical Competition	122	2026.713***	330.476
Civil Conflicts	124	0.033	0.039
International Conflicts	124	0.106*	0.058
GDP per capita	124	-11.439***	4.368

Source: Elaborated by the authors.
Note: Newey-West Standard Errors. Statistical significance: *** p<.01, ** p<.05, * p<.1.

The 'discount rate' is positively associated with defense spending ($p<0.01$), lending support to H1. 'Relative capabilities' vis-à-vis the hegemon consistently emerge as a robust negative predictor of military spending across both models. Bivariate analysis estimates a strong and significant ($p<0.01$) negative coefficient (–558.105), and this remains statistically significant in Models 01 and 02 of the multivariate analysis (–569.961 and –131.754**, respectively). This is consistent with H4B. Geopolitical competition also displays a strong positive association ($p<0.01$), supporting H4C and suggesting that regional or global rivalry spurred military investment. Finally, international conflict shows a positive relationship ($p<0.1$), thus offering support for H4A. Defense expenditures show high persistence over time, with the lagged dependent variable yielding a coefficient of 0.864 ($p<0.01$), suggesting that defense spending patterns in Brazil in 1822-1945 were highly inertial. This finding has implications for the interpretation of other variables, as it suggests that any contemporaneous correlation with military spending may partially reflect long-standing budgetary trajectories rather than independent causal effects. Several variables behave in line with theoretical expectations.

Some of the most striking divergences arise with 'democracy' and 'military participation in the cabinet'. In the bivariate analysis, the 'Electoral Democracy Index' is positively and significantly associated with higher military expenditures (coef.=44.900***), a counterintuitive result. However, once controls and lagged variables are included, the sign flips and loses statistical significance in the multivariate models (e.g., –79.481*** in Model 01, but no significance in Models 02–04). This suggests that the initial bivariate correlation may be spurious, likely capturing broader institutional development or omitted temporal dynamics. A similar pattern is observed for 'military officers in the cabinet'. In the bivariate analysis, this variable is not statistically significant, but in multivariate Models 01 and 03, it becomes significant and negatively associated with expenditures (–0.151* and –0.182**, respectively). This

shift indicates that a larger share of military officers in cabinets may constrain spending once we control for confounding geopolitical and institutional variables. The variable 'military tension' is significant and negative in the bivariate model (–0.095***), but not statistically significant in the multivariate regressions.

While the bivariate analysis offers initial support for several hypotheses — particularly those related to international and structural pressures (H1, H4A, H4B, H4C) — it also highlights the limitations of examining variables in isolation. By accounting for temporal dynamics and confounders, the multivariate models reveal more nuanced relationships and correct for potential omitted variable bias. Notably, the coefficients for democracy and share of military officers in the cabinet (H2A, H2B, H3) diverge significantly between models, underscoring the importance of multivariate analysis for drawing reliable inferences about institutional influences on military spending in Brazil.