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African Junta and Defense Spending: A Capture Effect or Self-Preservation?

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Abstract

This paper examines the effect of the presence of a military ruler on military expenditure using a panel of sub-Saharan Africa countries. The paper also explores whether the relationship reflects a capture effect, is an outcome of the confrontational climate of the cold war, or is an effort by military rulers for self-preservation. The Pooled OLS and fixed effects OLS estimations show that the presence of a military ruler has a statistically significant negative effect on military spending as a percentage of GDP. The coefficients are also not significantly different before or after the end of the cold war era. This implies that the negative relationship is driven by an effort by military rulers to preempt the ability of their peers to overthrow them from power. We also attempt to deal with potential endogeneity, and consider the possibility of persistence in military spending. The paper uses the Arellano and Bond (1991) estimation technique that shows a negative but insignificant effect of the presence of a military ruler on military expenditure, while military spending shows a high degree of persistence.

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1 Introduction

This paper explores the effect of the presence of a military ruler on military expenditure in sub-Saharan Africa. The paper also examines whether this relationship reflects a capture effect, is an outcome of the confrontational climate during the cold war era, or indicates a self-preservation effort by military rulers to protect their power by preempting a takeover by their military peers.

In this context, the paper attempts to examine if there is a capture effect when the military establishment imposes a ruler affiliated with the armed forces to promote its interests. Regulatory capture theory, associated with Stigler (1971), posits that regulatory agencies which are charged with acting in the public's interest can be dominated by the industries or interests they are supposed to be regulating. In this case, regulatory agencies act in the best interest of the industries they are supposed to regulate, advance the commercial concerns of special interest groups that dominate the industries they are charged with regulating, and prioritize the interests of firms, organizations, or groups over the interests of the public. This occurs because those who have a stake in the outcome of policies allocate their immense resources to secure the policy outcomes they prefer. This allows these interest groups to succeed in capturing influence with the members of the regulatory agency, so that their preferred policy outcomes are embraced and implemented. These ideas can be applied in the context of this paper where a country's leader is supposed to oversee the actions and the finances of the government agencies, including the military institution. However, when a country's leadership is dominated by the agency it is supposed to oversee, a capture effect can occur. Thus, when the military establishment uses its resources to impose a ruler from

its midst it will expect a preferential treatment from the country's leadership to promote the interests and perquisites of the top brass on the expense of the public. This can be reflected in an increase in military expenditure as a share of national income.

There are several factors to support the argument for a capture effect in this framework. Military rulers may increase spending by the military establishment to strengthen the capabilities of the armed forces in order to use its power to impose their will on the entire populace and to suppress any opposition. A military ruler may increase military expenditure as a bribe to ensure the loyalty of the top brass and to guarantee the allegiance of the rank-and-file in the armed forces. Military leaders can also increase military spending to pretend to defend the country from manufactured threats that they concoct as a pretext for military rule. Finally, military rulers may also increase defense spending in order to earn commissions that are tied specifically to weapons procurement.

Besides a capture effect, an alternative explanation is that the effect of military rule on military spending is driven by the cold war confrontational climate. This implies that countries, during the cold war era, had to increase their defense spending to cope with a highly antagonistic environment where you have to survive in a world squeezed between the conflicting interests of the two super powers. Thus, we cannot attribute a positive association between military rule and military spending to a capture effect unless we compare this relationship before and after the end of the cold war era.

In addition to the previous two explanations of a possible positive association between military rule and military spending, there is also another potential negative effect driven by self-preservation. In this context, military rulers attempt to protect their powers by limiting the ability of their peers in the armed forces to overthrow them. This can be achieved by allocating resources away from the military establishment. Military rulers may also want to undermine their peers in the armed forces, by limiting their budgetary allocations, to prevent their interference in state affairs. Military rulers may also reallocate

resources toward more productive investments to gain the approval of the civilians as a way to counterbalance any threat from their military peers. Military rulers may also attempt to portray an image of a powerful leader who instills fear and brings order. This image can act as a sufficient deterrent to their military peers, the civilian opposition, and neighboring powers. This deterrent, thus, precludes the need for a military buildup. In this context, we would expect that the presence of military rule to have an adverse effect on military spending.

Some theoretical contributions support these arguments. For instance, Besley and Robinson (2010) address the question of whether a civilian government should build a strong army. On one hand, a strong armed forces allows the civilian government to establish a monopoly of power. On the other hand, the stronger the army the easier it is to mount a military coup to overthrow the civilian authority and to control the state. The authors conclude that as the members of the military are self-interested, they have an incentive to strengthen the army since this allows them to allocate state resources to themselves. Acemoglu et al. (2010) show that the civilian elite may build a strong army to behave as their agent. Alternatively, they can face a political moral hazard problem where the military can turn against the elite and take direct control of the government. Thus, we also expect a military ruler to either enhance the capacity of the armed forces to stay in power, or alternatively to limit military capabilities to preempt any takeover of power by his peers.

Our paper can be considered as an empirical estimation of the theoretical findings in these papers that attempt to explain the relationship between military rule and military spending. This paper also attempts to explore whether the relationship reflects a capture effect, is an outcome of the confrontational atmosphere of the cold war, or a self-preservation endeavor of military rulers to preempt any attempt by their peers to overthrow them from power. It is worth noting that this line of research is relevant in the current global geopolitical environment where democracy is receding before a wave of systems of governance

centered around strong autocratic leaders. In lots of cases, these strong leaders are affiliated with the armed forces or have a military background. This is particularly pertinent in the case of sub-Saharan Africa that used to be one of the fields of confrontation between the two superpowers during the cold war, but also went through a wave of democratization afterwards that is facing significant challenges nowadays. The effect of that autocratic trend on military spending has repercussions on the potential of conflict worldwide and has ramifications on the future of global security.

To achieve its objective, this paper uses a panel of sub-Saharan African countries to examine the effect of the presence of the military in power on military spending. The Pooled OLS and fixed effects OLS estimations show that the presence of a military ruler has a statistically significant negative effect on military expenditure as a percentage of Gross Domestic Product GDP. This is the case even after the inclusion of control variables such as GDP per capita, ethnic fractionalization, an oil dummy, the occurrence of conflict, democracy, and the degree of openness. This implies that the results do not reflect a capture effect. We also consider the relationship between military rule and military spending during the cold war and in the post cold war era, after 1990. The results show that the coefficient is negative before and after the end of the cold war. This implies that the results are not driven by the cold war confrontational climate either. These results, however, imply that the relationship is driven by a self-preservation attempt by military rulers to protect themselves from their peers and to appeal to the public to counterbalance the power of the military establishment.

Finally, the key difficulty in determining a causal effect of the presence of a military ruler on military expenditure is that the former is endogenous to the latter. As much as the presence of a military ruler can increase military spending, it is also possible that an increase in military spending allows the military establishment to be sufficiently powerful to impose a ruler from its ranks. Thus, we expect that a high level of military expenditure

may lead to the installation of military rulers. There is also the possibility of persistence in military spending. If a country increases its defense spending this year, it is expected to increase it in subsequent years as well. Thus, we need to include lagged military expenditure as another explanatory variable. To account for potential endogeneity and the bias caused by the inclusion of the lagged dependent variable, the paper uses the Arellano and Bond (1991) estimation technique. Arellano and Bond (1991) propose an estimation technique that corrects not only for the bias introduced by the lagged endogenous variable, but also permits a certain degree of endogeneity in the other explanatory variables. The analysis shows that the presence of a military ruler does not have a statistically significant effect on military expenditure. On the other hand, military spending shows a high degree of persistence as lagged military spending has a statistically significant positive coefficient.

The remainder of the paper is organized as follows: section 2 discusses the literature survey, section 3 includes the description of the data, section 4 includes the empirical estimation, the robustness tests and the sensitivity analysis, and section 5 concludes. References and tables are included thereafter.

2 Literature

This paper comes at the intersection of two strands of literature. The first examines the effect of military rule on economic and political outcomes, while the second explores the determinants of military expenditure. Our paper is the first attempt in the literature to examine the relationship between military rule and military spending in sub-Saharan Africa. Even though some studies attempt to explore the effect of the system of governance on defense spending, this paper focuses specifically on the effect of military rule. This allows the paper to examine whether the relationship is an example of a capture effect, is an outcome of the confrontational climate of the cold war, or is driven by the effort by

military rulers for self-preservation.

The first stream of literature argues that an increase in defense spending can have adverse effects on the economy as it diverts scarce resources from spending on human capital, increases the leverage of the armed forces compared to other political actors, allows rulers to strengthen the military to suppress any opposition which curbs democratic governance, and allows the military institution to impose rulers with military credentials which hinders civilian governance. On the other hand, an increase in military spending can ensure political stability, provides a deterrence against enemies from contemplating any aggression on the country, offers protection from internal and external threats, allows for the development of new technologies that can be used in the war effort or in the private sector, provides public infrastructure, and increases employment in the defense sector.

As the theoretical relationship between defense spending and economic outcomes seems inconclusive, many studies attempt an empirical estimation. In this context, few studies find that defense spending is conducive to economic growth, such as Benoit (1973, 1978) who show that countries with a heavy defense burden have the highest growth rates. On the other hand, a plethora of studies find that defense spending hinders economic growth, such as Lim (1983), Smith (1980), Deger and Smith (1983), Deger (1986), Deger and Sen (1983), Faini et al. (1984), Mintz and Huang,(1990, 1991), Chang et al. (2011), , Huang et al. (2017), d'Agostino et al. (2017), and Ortiz et al. (2019). Others concluded that there is no significant effect of defense spending on economic outcomes as in Biswas and Ram (1986), Desli et al. (2017), and Dunne and Smith (2019).

The second stream of literature is concerned with identifying the determinants of military expenditure with a special focus on the system of governance. For instance, Töngür et al. (2015) find that social democratic systems have a tendency to spend less on armaments as a share of national income while all other political regimes have higher defense burdens. The authors conclude that this indicates a negative association between the level

of democracy and military expenditure. Albalate et al. (2012) investigate the effects of government form and electoral rules on military spending. The authors show that presidential democracies spend more than parliamentary ones on defense, whereas its interaction with a majoritarian electoral rule decreases the defense burden. Yildrim and Sezgin (2005) examine the hypothesis that democracy decreases the likelihood of conflict between countries and that democracies allocate less of their scarce resources to defence purposes. The authors show that a higher degree of democracy is associated with lower levels of military expenditure. Brauner (2015) examines whether military expenditure is correlated with democracy. The authors finds that it is democracy that Granger causes military expenditure and not the other way around. Bove and Brauner (2016) examine whether there are systematic differences in defense spending between different types of autocratic regimes. The authors conclude that military regimes should have the highest, whereas personalist dictatorships should have the lowest, level of defense spending.

There are also other studies that examine the effect of the abundance of natural resources on military expenditure. Bove et al. (2018) show that the volume of arms transfers to a specific country is affected by the degree of dependence on its supply of oil, which instigates arms exports to oil-abundant countries. This finding implies that the abundance of oil creates incentives for oil producers to buy weapons to protect their natural wealth. Cotet and Tsui (2013) examine the effect of oil wealth on political violence using a historical dataset of oil discoveries. The authors find that oil wealth is significantly correlated with defense spending in nondemocratic countries.

The closest paper to ours is Bove and Nisticò (2014a) who investigate the effect of the armed forces involvement in politics on budgetary allocations for defence. The authors find that a higher degree of military interference in policy-making increases the probability that the military obtain a larger share of output. Our paper deviates from this contribution in the main variable of interest. In their paper, the authors use subjective estimates of the level

of military intervention in the decision-making of the government, while we use an objective estimate of the presence of military rule. The other contribution that is closer to ours is Stadelmann et al. (2015) who investigate whether politicians with a military background vote differently on military affairs. The authors find that politicians who served in the armed forces have a higher probability of supporting legislative proposals that promote military affairs, even after controlling for party affiliations and the revealed preferences of their constituents. Our paper is also different from this paper as we focus on the effect of military rule on military spending, but not on legislations that might promote the interests of the armed forces but might not be directly related to military spending. Our paper also differs from these studies as it also attempts to explain whether the association between military rule and military spending reflects a capture effect, is an outcome of the cold war climate, or is an indication of self-preservation efforts by military rulers.

3 Data

The sub-Saharan African countries included in the analysis are: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Republic of Congo, Democratic Republic of Congo, Cote D'ivoire, Djibouti, Equatorial Guinea, Ethiopia, Eritrea, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe. The period of the analysis is 1975-2000. The summary statistics of the variables used in the analysis are included in table 1.

3.1 Military Expenditure

The dependent variable is military expenditure as a percentage of Gross Domestic Product GDP. This variable is derived from the Stockholm International Peace Research Institute SIPRI. The military expenditure data include all current and capital expenditure on "(a) the armed forces, including peacekeeping forces; (b) defence ministries and other government agencies engaged in defence projects; (c) paramilitary forces, when judged to be trained and equipped for military operations; and (d) military space activities. This should include expenditure on: i. personnel, including salaries of military and civil personnel, retirement pensions of military personnel, and social services for personnel; ii. operations and maintenance; iii. procurement; iv. military research and development; v. military infrastructure spending, including military bases. and; vi. military aid (in the military expenditure of the donor country). Civil defence and current expenditures on previous military activities, such as veterans' benefits, demobilization, conversion and weapon destruction are excluded."

3.2 Military Ruler

The presence of a military ruler is captured by a dummy variable equal to one for military rule and zero otherwise. Data are derived from the Authoritarian Regime data set version 5. Detailed description of the data is included in Hadenius and Teorell (2007) and Wahman et al. (2013).

3.3 Controls

Several control variables are used in the analysis to test the robustness of the results. These are political, economic, and social factors that are known in the literature to explain the variations in the level of defense spending. The first variable used is Real Gross Domestic Product GDP per capita which is derived from the Penn World Tables version 6.3. The

logarithm of real Gross Domestic Product per capita is used in the analysis. We expect that developed countries either choose a higher defense spending given that they can afford it compared to developing countries, or instead prefer to allocate their resources to other types of spending that allow them to maintain their higher living standards.

Another variable used is trade openness which is proxied by (Exports + Imports)/GDP derived from the Penn World Tables 6.3. Greater involvement in international trade decreases the incentive for armed conflict, and accordingly it is expected to have an adverse effect on defense spending. We also include a dummy variable that is equal to 1 if the share of oil export exceeds 10% and 0 otherwise. This oil dummy is extracted from the CIA Factbook. The abundance of oil can create incentives to increase the level of defense spending to protect this type of natural wealth.

We use a democracy variable extracted from the Polity IV Project. The Polity score captures a country's political regime on a 21-point scale ranging from -10 (strongly autocratic) to +10 (strongly democratic). As shown in the literature survey, several studies argued that a democratic system is less likely to engage in conflict and, thus, democratic governance is expected to be associated with lower levels of defense spending. The ethnic fractionalization indicator is derived from Alesina et al. (2003)[1]. Fractionalization measures the probability that two randomly selected individuals from a country are from different ethnic groups. Several studies find that heterogeneity along ethnic lines can lead to ethnic conflict, and thus is expected to be accompanied by an increase in defense spending. We also use the number of years under armed conflicts, derived from UCDP/PRIO Armed Conflict Data set[2]. The longer the country suffers from previous armed conflict, the higher the expected level of defense spending.

[1] The dataset can be found at: http://www.anderson.ucla.edu/faculty_pages/romain.wacziarg/papersum.html
[2] https://www.prio.org/Data/Armed-Conflict/UCDP-PRIO/

4 Estimation

4.1 Baseline Results

In this section, we empirically estimate the effect of the presence of a military ruler on military expenditure as follows

$$MExpenditure_{it} = \alpha + \beta MRuler_{it-1} \ + X_{it-1}\gamma + \delta_i + \mu_t + \varepsilon_{it} \tag{1}$$

where $MExpenditure_{it}$ is military expenditure as a percentage of Gross Domestic Product in country i in year t. $MRuler_{it-1}$ is a dummy for the presence of a military ruler in country i in year $t-1$. X_{it-1} is a vector of control variables in country i in year $t-1$. δ_i is the unobserved time-invariant individual country effect, such as historical or institutional factors. The μ_t denotes a full set of time effects that capture common shocks to defense spending of all countries. ε_{it} is the error term capturing all other omitted factors, such that $E(e_{it}) = 0$ for all i and t.

The baseline results are included in table 2. Columns 1-3 of table 2 include the pooled OLS estimation results while columns 4-5 of table 2 include the fixed effects OLS estimation results. The pooled OLS is identical to our regression equation except for the omission of the fixed effects that reflect country dummies. These country dummies capture any time-invariant country characteristics that affect defense spending. When the true model is given by our regression equation, and the δ_i's are correlated with $MRuler_{it-1}$ or X_{it-1}, then pooled OLS estimates are biased and inconsistent. More specifically, let X^j_{it-1} denote the jth component of the vector X_{it-1} and let Cov denote population covariances. Then, if either $Cov\left(MRuler_{it-1}, \delta_i + \varepsilon_{it}\right) \neq 0$ or $Cov\left(X^j_{it-1}, \delta_i + \varepsilon_{it}\right) \neq 0$ for some j, the OLS estimator will be inconsistent. On the other hand, even when these covariances are non zero, the fixed effects estimator will be consistent if $Cov\left(MRuler_{it-1}, \varepsilon_{it}\right) = Cov\left(X^j_{it-1}, \varepsilon_{it}\right) = 0$ for all j $(asT \to \infty)$. In this context, even though the fixed effects estimator is more

consistent, we do not assume that the fixed effects estimations indicate a causal effect of the presence of military rule on military expenditure. We discuss and deal with this issue later.

The results in table 2 of the pooled OLS and fixed effects OLS show that the presence of a military ruler has a statistically significant negative effect in all specifications. This is not consistent with the findings of Bove and Brauner (2016) who find a higher demand for defense spending in autocratic countries with monarchies and military regimes compared to those with single party rule. This result implies that military rulers attempt to preempt a subsequent military coup by stripping their peers from resources. Military rulers may also allocate these resources toward satisfying the demands of the civilians to gain their support against any potential threat from the military establishment.

Table 2 also shows that GDP per capita has a significant negative effect in the pooled OLS estimation, which indicates that a more developed country is expected to dedicate a larger portion of its income to other types of spending, compared to military expenditure, that allows it to sustain its higher living standards. The oil dummy has a positive effect in the pooled OLS estimations which implies that oil producing countries are more tempted to increase their defense spending to protect their natural wealth. The results also show that the occurrence of conflict increases defense spending in all specifications. Fractionalization, however, has a significant negative effect in all specifications. This could be attributed to the fact that some studies argue that the variable that capture the likelihood of conflict is ethnic polarization and not ethnic fractionalization. The openness and the democracy variables, however, do not have statistically significant coefficients.

4.2 Sensitivity Analysis

We conduct a sensitivity analysis where we consider the effect of the presence of a military ruler on military expenditure that is above or below certain percentiles using fixed effects

OLS estimations. The outcome of this sensitivity analysis is included in table 3. Columns 1-3 show the fixed effects OLS estimation results using White (1980) heteroskedasticity correction. Columns 4-6 of table 3 include the fixed effects OLS estimation results using robust standard errors clustered by country. The results show that military rule has a statistically significant negative effect on military expenditure in columns 1-3 using White (1980) heteroskedasticity correction..

Our sensitivity analysis also considers the relationship between military rule and military spending during the cold war and in the post cold war era, after 1990. This is because it is possible that the relationship is driven by the confrontational atmosphere during the cold war. This is significant in the context of sub-Saharan Africa which has been one of the arenas of confrontation between the two super powers during the cold war. Columns 1-2 of table 4 show the pooled OLS results before and after the end of the cold war. Columns 3-4 of table 4 show the fixed effects OLS estimation results before and after the end of the cold war. The results show that the coefficient is significantly negative before and after the end of the cold war in columns 1-2, and insignificant in columns 3-4. Thus, we observe that there is no significant difference between the effect before and after the end of the cold war. This implies that the relationship between military rule and military expenditure is not driven by the cold war climate.

4.3 Persistence and Endogeneity

We also consider the possibility of persistence in military spending. When countries increase their spending on weapons and armaments in one year, they are expected to increase their defense spending in subsequent years. This is because the purchase of weapons in one year is expected to be followed by the purchase of ammunitions in subsequent years, the procurement of armaments in one year is expected to be followed by an increase in employing and training those who will use them in the following years, and the acquisition of war

materiel in one year is also expected to be followed by continuous spending on parts, on maintenance of the military arsenal, and on weaponry upgrades as well. Thus, we include in our estimation lagged military expenditure as another explanatory variable as follows

$$MExpenditure_{it} = \alpha + \beta MRuler_{it-1} + X_{it-1}\gamma + \sigma MExpenditure_{it-1} + \delta_i + \mu_t + \varepsilon_{it} \quad (2)$$

The standard techniques that can be employed for panel estimation, such as fixed effects and random effects, cannot be used in this case. The problem with these techniques is that the equation contains a lagged endogenous variable, which is lagged military expenditure. In this case, estimation by fixed effects and random effects is not consistent. In addition, we also have the problem of endogeneity of military rule. As much as the presence of a military ruler can increase military spending to suppress any opposition and to ensure the loyalty of the top brass, it is also possible that an increase in military spending provides the armed forces enough power to impose a ruler from its ranks.

To deal with potential endogeneity and the lagged dependent variable, we use the Arellano and Bond (1991) estimation technique. This technique not only corrects for the bias introduced by the lagged endogenous variable but also allows for a certain degree of endogeneity in the other explanatory variables. This generalized method of moments (GMM) estimator first-differences each variable so as to eliminate the country specific effect and then uses all possible lagged values of each of the variables as instruments. Table 5 includes the outcome of the Arellano and Bond (1991) estimation. Column 1 includes the results of the entire sample, column 2 includes the results during the cold war, and column 3 includes the results after the end of the cold war. The results show that the coefficient for the presence of a military ruler is negative but not statistically significant for the whole sample. In addition, the coefficients before and after the end of the cold war are not significantly different. The analysis also provides evidence for a high degree of persistence, as

the coefficient of lagged military spending is statistically significant and positive.

4.4 Additional Controls

To test the robustness of our results, we also include other control variables that may affect defense spending such as coup d'tats and terrorism. Military rulers in a country that witnesses recurrent coup d'etats will be induced to either increase military expenditure to protect themselves from any potential threats or alternatively decrease defense spending to limit the ability of their peers in the armed forces to overthrow them in a military coup. In this context, Bove and Nisticò (2014b) explore how political changes through coup d'états can affect military expenditure. The authors find that successful coups lead to a large increase in the military burden, unless a democratization process is triggered by the coup. The authors also show that failed coups produce a smaller positive effect on the military burden as the incumbent attempts to avert further challenges by buying off the military. Leon (2014) examines the relationship between military spending and coups. The author finds that successful coups increase military spending by more than failed ones, and argues that this is evidence that the military may stage coups in order to increase its resources.

Therefore, we use an indicator of coup d'etats from Bjørnskov and Rode (2020). The authors define a coup d'etat as follows. "First, the objective must be to overthrow the executive branch. Second, actors have to be previously linked to the state apparatus in some way. Third, a coup or coup attempt cannot last longer than a week at most. To enter the data, the authors require that a coup attempt is verifiable by more than one source, and the information on failed coups in the sources cannot only derive from the incumbent government. The authors also do not include any events in which there were rumors of an attempt or coup plots for which no independent information exists." The coup indicators include four numerical variables capturing the number of coups in a country in a given year (All coups), the number of coup attempts that were successful (Successful coups) or failed

(Failed coups), and an indicator of whether any more coup attempt occurred (First coup, Second coup, Third coup). In total, the coup database includes 498 country-years in which coups occurred.

We also include another variable that indicates fatalities due to terrorist incidents. Countries that suffer frequent terrorist attacks may be induced to use the power of the armed forces to suppress the ability of extremist groups to execute such attacks. This may lead to an increase in military expenditure. In this context, we include a variable for terrorism derived from the National Consortium for the Study of Terrorism and Responses to Terrorism (START) and the Global Terrorism Database[3]. This variable indicates the number of total confirmed fatalities in a terrorism incident. The number includes "all victims and attackers who died as a result of the incident. When there is evidence of fatalities but the figure is not reported or is too vague to be of use, the observation is left blank. If information is missing on the number of victims killed in an attack, but perpetrator fatalities are known, the value reflects only the number of perpetrators who died in the incident. If information is missing on the number of perpetrators killed in an attack, but victim fatalities are known, the value reflects only the number of victims who died in the incident. Where several independent sources report different numbers of casualties, the database reflect the number offered by the most recent source unless it is of questionable validity or if the source bases its numbers on claims by the perpetrators."

Table 6 includes the results after adding the indicators for coup d'etats and the number of total confirmed fatalities of terrorist incidents. Column 1 of table 6 includes the results of the fixed effects OLS estimation using White (1980) heteroskedasticity correction. Column 2 of table 6 includes the results of the fixed effects OLS estimation using robust standard errors clustered by country. Column 3 of table 6 includes the Arellano and Bond (1991) estimation results. The results show that the presence of military rule has a statistically

[3]National Consortium for the Study of Terrorism and Responses to Terrorism (START). Global terrorism database (GTD). www.start .umd.edu/gtd/.

significant negative effect on military expenditure in the fixed effects OLS estimations, but not a significant effect in the Arellano and Bond (1991) estimation. The results also show that the coup d'etats and the terrorism indicators do not have significant effects on military expenditure. The insignificant effect of the terrorism variable could be attributed to the fact that authorities usually react to terrorist attacks through an increase in police and law enforcement presence, rather than an increase in reliance on the armed forces. The insignificant effect of the coup d'etat indicator could be due to the fact that in countries facing recurrent coups the increase in military expenditure by the military establishment following a coup in some cases could be offset by a cut in military expenditure to limit the potential of another coup in other cases.

5 Conclusion

This paper examines the effect of the presence of a military ruler on military expenditure, and whether the relationship reflects a capture effect, is an outcome of the cold war confrontational climate, or indicates an effort for self-preservation by the military ruler. A military ruler could have more of an incentive to strengthen the armed forces to stay in power, to suppress any opposition, to maintain the loyalty of the top brass, and to earn commissions on arms procurement. A military ruler could also decrease defense spending to limit the ability of his peers to challenge his power.

The Pooled OLS and fixed effects OLS estimations shows that the presence of a ruler from a military background has a statistically significant negative effect on military expenditure as a percentage of Gross Domestic Product. The sensitivity analysis also shows that the results are not significantly different in the cold war and the post cold war era. This shows that the association between military rule and military spending reflects neither a capture effect nor an outcome of the cold war climate, but rather an effort by military rulers

for self-preservation.

To deal with potential endogeneity and the inclusion of the lagged military spending in the analysis, we use the Arellano and Bond (1991) estimation technique that corrects for the bias introduced by the lagged endogenous variable and permits a certain degree of endogeneity in the other explanatory variables. The estimation results show a negative but insignificant association between the presence of a military ruler and military expenditure, while military spending shows a high degree of persistence. The findings of our paper emphasize the shortcomings of previous studies that attempted an investigation of the effect of the political regimes on defense spending without examining what drives the relationship or properly addressing the issues of endogeneity and persistence in military spending.

References

[1] Acemoglu, Daron, Davide Ticchi and Andrea Vindigni. "A Theory of Military Dictatorships." American Economic Journal: Macroeconomics 2: 1-42, 2010.

[2] Albalate, Daniel, Germa Bel and Ferran Elias. "Institutional Determinants of Military Spending." Journal of Comparative Economics, 40(2): 279-290, 2012.

[3] Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat and Romain Wacziarg. "Fractionalization." Journal of Economic Growth, 8: 155–94, 2003.

[4] Arellano, Manuel and Stephen Bond. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. Review of Economic Studies, 58: 2; 277-97, 1991.

[5] Benoit, Emile. Defense and Economic Growth in Developing Countries. Lexington: Lexington Books, 1973.

[6] Benoit, Emile "Growth and Defence in Developing Countries." Economic Development and Cultural Change, 26:271–80, 1978.

[7] Besley, Timothy and James. "Quis Custodiet Ipsos Custodes? Civilian Control over the Military." Journal of the European Economic Association 8: 655-663, 2010.

[8] Biswas, Basudeb and Rati Ram. "Military Expenditures and Economic Growth in Less Developed Countries: An Augmented Model and Further Evidence." Economic Development and Cultural Change 34:361–72, 1986.

[9] Bjørnskov, Christian and Martin Rode. "Regime Types and Regime Change: A New Dataset on Democracy, Coups, and Political Institutions," The Review of International Organizations, 15(2): 531-551, 2020.

[10] Bove, Vincenzo and Jennifer Brauner. "The Demand for Military Expenditure in Authoritarian Regimes." Defence and Peace Economics, 27(5), 609-625, 2016.

[11] Bove, Vincenzo and Roberto Nisticò. "Military in Politics and Budgetary Allocations." Journal of Comparative Economics, 42(4), 1065-1078, 2014a.

[12] Bove, Vincenzo and Roberto Nisticò. "Coups d'état and Defense Spending: A Counterfactual Analysis." Public Choice, 161 (3-4): 321-344, 2014b.

[13] Bove, Vincenzo, Claudio Deiana, and Roberto Nisticò. "Global Arms Trade and Oil Dependence" The Journal of Law, Economics, and Organization, 34(2): 272–299, 2018.

[14] Brauner Jennifer "Military Spending and Democracy." Defense and Peace Economics, 26(4): 409-423, 2015.

[15] Chang, Hsin-Chen, Bwo-Nung Huang, and Chin Wei Yang. "Military Expenditure and Economic Growth across Different Groups: A Dynamic Panel Granger-Causality Approach." Economic Modelling, 28 (6): 2416–2423, 2011.

[16] Cotet, Anca and Kevin Tsui. "Oil and Conflict: What Does the Cross Country Evidence Really Show?" American Economic Journal: Macroeconomics, 5 (1): 49-80, 2013.

[17] d'Agostino, Girogio, J.Paul Dunne, and Luca Pieroni. "Does Military Spending Matter for Long-run Growth?" Defence and Peace Economics, 28(4): 1-8, 2017.

[18] Deger, Saadet. "Economic Development and Defense Expenditure." Economic Development and Cultural Change, 35(1): 179-96, 1986.

[19] Deger, Saadet and Ronald Smith. "Military Expenditure and Growth in Less Developed Countries." The Journal of Conflict Resolution, 27(2): 335-53, 1983.

[20] Deger, Saadet and Somnath Sen. "Military Expenditure, Spin-off and Economic Development." Journal of Development Economics, 13(1): (1983): 67-83, 1983.

[21] Desli, E., A. Gkoulgkoutsika, and C. Katrakilidis. "Investigating the Dynamic Interaction between Military Spending and Economic Growth." Review of Development Economics, 21(3), 511-526, 2017.

[22] Dunne, J. Paul and Ron Smith. "Military Expenditure, Investment and Growth." Defence and Peace Economics, 1-14, 2019.

[23] Faini, Riccardo, Patricia Annez and Lance Taylor. "Defense Spending, Economic Structure, and Growth: Evidence among Countries and over Time." Economic Development and Cultural Change, 32(3): 487-98, 1984.

[24] Hadenius, Axel and Jan Teorell. "Pathways from Authoritarianism." Journal of Democracy, 18(1): 143-157, 2007.

[25] Hewitt, Daniel. "Military Expenditures Worldwide: Determinants and Trends, 1972–1988." Journal of Public Policy,12(02): 105-152, 1992.

[26] Huang, Tsai-Yuan, Po-Chin Wu and Shiao-Yen Liu. "Defense–Growth Causality: Considerations of Regime-Switching and Time- and Country-Varying Effects." Defence and Peace Economics, 28(5): 568-584, 2017.

[27] Leon, Gabriel. "Loyalty for Sale? Military Spending and Coups." Public Choice, 8, 1-21, 2014.

[28] Lim, David. "Another Look at Growth and Defense in Less Developed Countries." Economic Development and Cultural Change 31(2): 377-384, 1983.

[29] Mintz, Alex and Chi Huang. "Defense Expenditures, Economic growth, and the "Peace Dividend"." The American Political Science Review, 84(4): 1283-93, 1990.

[30] Mintz, Alex and Chi Huang. "Guns versus Butter: The Indirect Link." American Journal of Political Science, 35(3): 738-57, 1991.

[31] Mintz, Alex and Randolph Stevenson. "Defense Expenditures, Economic Growth, and the "Peace Dividend: A Longitudinal Analysis of 103 Countries." The Journal of Conflict Resolution, 39(2): 283-83, 1995.

[32] National Consortium for the Study of Terrorism and Responses to Terrorism (START). Global Terrorism Database. Codebook: Inclusion Criteria and Variables, pp.49-50, 2019.

[33] Ortiz, Ortiz, Rafael Alvarado and Aldo Salinas. "The Effect of Military Spending on Output: New Evidence at the Global and Country Group Levels using Panel Data Cointegration Techniques." Economic Analysis and Policy, 62: 402-414, 2019

[34] Smith, Ronald. "Military Expenditure and Investment in OECD Countries, 1954–1973." Journal of Comparative Economics 4 (1): 19–32, 1980.

[35] Stadelmann, David, Marcon Portmann, and Reiner Eichenberger. "Military Careers of Politicians Matter for National Security Policy." Journal of Economic Behavior and Organization, 116(C), 142-156, 2015.

[36] Stigler, George. "The Theory of Economic Regulation." The Bell Journal of Economics and Management Science, 2(1): 3-21, 1971.

[37] Töngür, Ünal, Sara Hsu and Adem Yavuz Elveren. "Military Expenditures and Political Regimes: Evidence from Global Data, 1963–2000," Economic Modelling, 44(C), 68-79, 2015.

[38] Wahman, Michael, Alex Hadenius, and Jan Toerell. "Authoritarian Regime Types Revisited: Updated Data in Comparative Perspective." Contemporary Politics, 19(1): 19-34, 2013.

[39] White, Halbert. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." Econometrica, 48(4): 817-838, 1980.

[40] Yildrim, Julide and Selami Sezgin. "Democracy and Military Expenditure: A Cross-country Evidence." Transition Studies Review, 12: 93-100, 2005.

Variable	Observations	Mean	Standard Deviation	Min	Max
Military Expenditure	1,119	2.636483	3.094549	0.0000171	34.37777
Military Ruler	1,119	0.411975	0.4924107	0	1
GDP per capita	1,119	7.457909	0.7724308	5.743135	10.04608
Fractionalization	1,119	0.6917568	0.1809393	0.255	0.9302
Oil	1,119	0.1403038	0.3474573	0	1
Openness	1,119	63.87472	33.94327	4.830907	196.3923
Conflict	1,119	0.2314567	0.4219521	0	1
Polity	1,098	-6.410747	19.39419	-88	10
Coup d'etat	1,088	o.0854779	0.310874	0	2
Terrorism	385	66.91429	159.8913	0	1571

Table 1: Statistical Summaries

	Pooled OLS			Fixed effects OLS	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Military$_{t-1}$	-0.864***	-0.986***	-1.017***	-0.986*	-1.017*
	(0.231)	(0.226)	(0.232)	(0.585)	(0.601)
GDP per capita $_{t-1}$	-0.509**	-0.561***	-0.543***	-0.561	-0.543
	(0.214)	(0.212)	(0.210)	(0.633)	(0.626)
Fractionalization $_{t-1}$	-2.521***	-2.538***	-2.579***	-2.538***	-2.579**
	(0.304)	(0.303)	(0.309)	(0.933)	(0.963)
Oil dummy $_{t-1}$	0.705**	0.806**	0.702**	0.806	0.702
	(0.339)	(0.339)	(0.318)	(0.804)	(0.726)
Conflict $_{t-1}$	2.439***	2.544***	2.565***	2.544***	2.565***
	(0.355)	(0.354)	(0.355)	(0.615)	(0.599)
Democracy $_{t-1}$	-0.001	0.001	0.003	0.001	0.003
	(0.004)	(0.004)	(0.005)	(0.007)	(0.007)
Openness $_{t-1}$	0.006	0.008*	0.006	0.008	0.006
	(0.004)	(0.004)	(0.004)	(0.010)	(0.010)
Year	No	Yes	Yes	Yes	Yes
Country	No	No	Yes	No	Yes
Constant	7.538***	91.532***	93.792***	91.532***	93.792***
	(1.561)	(14.409)	(14.542)	(26.034)	(26.328)
R^2	0.135	0.149	0.156	0.149	0.156
Observations	1.023	1.023	1.023	1.023	1.023
Robust to heteroskedasticity	White	White	White	Clustered by country	Clustered by country

significance: 0.01 - ***; 0.05 - **; 0.1 - *;

Table 2: Pooled OLS and Fixed Effects OLS Estimations

	Fixed effects OLS			Fixed effects OLS		
	ME > 5 Percentiles	ME < 95 Percentiles	ME > 5 Percentiles and ME < 95 Percentiles	ME > 5 Percentiles	ME < 95 Percentiles	ME > 5 Percentiles and ME < 95 Percentiles
Military$_{t-1}$	-0.977***	-0.234**	-0.164*	-0.977	-0.234	-0.164
	(0.236)	(0.094)	(0.091)	(0.620)	(0.256)	(0.250)
GDP per capita $_{t-1}$	-0.396*	0.125*	0.354***	-0.396	0.125	0.354*
	(0.224)	(0.070)	(0.067)	(0.641)	(0.274)	(0.182)
Fractionalization $_{t-1}$	-2.723***	-2.265***	-2.468***	-2.723***	-2.265***	-2.468***
	(0.312)	(0.223)	(0.214)	(0.965)	(0.638)	(0.532)
Oil dummy $_{t-1}$	0.733**	0.225	0.136	0.733	0.225	0.136
	(0.328)	(0.151)	(0.141)	(0.723)	(0.396)	(0.314)
Conflict $_{t-1}$	2.672***	1.114***	1.207***	2.672***	1.114***	1.207***
	(0.360)	(0.113)	(0.105)	(0.617)	(0.214)	(0.193)
Democracy $_{t-1}$	0.004	-0.008***	-0.007***	0.004	-0.008**	-0.007**
	(0.004)	(0.002)	(0.002)	(0.007)	(0.003)	(0.003)
Openness $_{t-1}$	0.007*	-0.001	0.001	0.007	-0.001	0.001
	(0.004)	(0.001)	(0.001)	(0.010)	(0.004)	(0.003)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	107.937***	65.733***	75.434***	107.937***	65.733***	75.434***
	(14.946)	(9.249)	(8.840)	(29.040)	(18.800)	(19.094)
Observations	976.000	970.000	923.000	976.000	970.000	923.000
R^2	0.166	0.227	0.308	0.166	0.227	0.308
Robust to heteroskedasticity	White	White	White	Clustered by country	Clustered by country	Clustered by country

significance: 0.01 - ***; 0.05 - **; 0.1 - *

Table 3: Sensitivity Analysis: Effect on different values of ME (Military expenditure as a percentage of GDP).

	Pooled OLS		Fixed effects OLS	
	Cold War	**Post Cold War**	**Cold War**	**Post Cold War**
Military$_{t-1}$	-0.746***	-1.202***	-0.746	-1.202
	(0.286)	(0.314)	(0.552)	(0.803)
GDP per capita $_{t-1}$	-0.572***	-0.588**	-0.572	-0.588
	(0.193)	(0.293)	(0.438)	(0.871)
Fractionalization $_{t-1}$	-2.293***	-2.872***	-2.293*	-2.872***
	(0.506)	(0.424)	(1.155)	(1.054)
Oil dummy $_{t-1}$	1.711**	0.083	1.711	0.083
	(0.746)	(0.279)	(1.272)	(0.646)
Conflict $_{t-1}$	2.824***	2.398***	2.824***	2.398***
	(0.499)	(0.498)	(0.815)	(0.782)
Democracy $_{t-1}$	-0.004	0.004	-0.004	0.004
	(0.007)	(0.006)	(0.009)	(0.010)
Openness $_{t-1}$	0.000	0.015**	0.000	0.015
	(0.003)	(0.006)	(0.006)	(0.017)
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Constant	-107.379*	124.396***	-107.379	124.396**
	(54.784)	(38.936)	(99.614)	(48.606)
R^2	0.190	0.179	0.190	0.179
Observation	460	563	460	563
Robust to heteroskedasticity	White	White	Clustered by country	Clustered by country

significance: 0.01 - ***; 0.05 - **; 0.1 - *

Table 4: Sensitivity Analysis: Cold war and Post Cold war.

	Whole Sample	Cold War	Post Cold War
Military$_{t-1}$	-0.146	0.125	-0.412
	(0.280)	(0.443)	(0.273)
GDP per capita $_{t-1}$	0.773	-1.158	1.587***
	(0.508)	(1.092)	(0.586)
Fractionalization $_{t-1}$	-75.081	51.352	
	(212.544)	(184.900)	
Oil dummy $_{t-1}$	0.688	0.839	0.916**
	(0.481)	(1.023)	(0.430)
Conflict $_{t-1}$	0.347	-1.127	1.016
	(0.621)	(1.252)	(0.669)
Democracy $_{t-1}$	0.002	-0.002	0.003
	(0.003)	(0.004)	(0.003)
Openness $_{t-1}$	-0.011	-0.006	-0.011
	(0.010)	(0.015)	(0.008)
Military Expenditure $_{t-1}$	0.469***	0.679***	0.272***
	(0.072)	(0.070)	(0.081)
Year	Yes	Yes	Yes
Observations	954	418	536
AR(2)	0.247	0.375	0.161
Hansen test	1.000	1.000	1.000

significance: 0.01 - ***; 0.05 - **; 0.1 - *

Table 5: Arellano and Bond (1991) Estimation.

	Fixed effects OLS	**Fixed effects OLS**	**Arellano-Bond**
Military$_{t-1}$	-0.515*	-0.515	0.109
	(0.307)	(0.494)	(0.287)
Coups d'etat $_{t-1}$	-0.025	-0.025	-0.504
	(0.339)	(0.294)	(0.451)
Terrorism $_{t-1}$	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.000)
Military expenditure $_{t-1}$			0.259***
			(0.035)
Constant	196.256***	196.256***	
	(32.390)	(41.897)	
Year	Yes	Yes	Yes
Country	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes
Observations	354	354	229
R^2	0.304	0.304	
AR(2)			0.293
Hansen test			1.000
Robust to heteroskedasticity	White	Clustered by country	

significance: 0.01 - ***; 0.05 - **; 0.1 - *

Table 6: Sensitivity Analysis: Additional Control Variables.