Grand Extortion: Coup Risk and the Military as a Protection Racket

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Abstract:

The governments of many developing countries face a risk of a coup d'état perpetrated by their own military establishment. The phenomenon is especially acute in Africa. We develop a game theoretic model in which the military decides to threaten a coup, and the other party, the government, responds by raising military spending. This strategic interdependence can be interpreted as a model of extortion. We show that this behaviour is more likely when the underlying risk of a coup is high. Using both global and Africa-specific data sets we model the interdependence between coup risk and military spending. We find that in countries with low coup risk governments react to it by cutting military spending. However, when coup risk is high, as in Africa, governments respond by increasing spending. Thus, there is evidence for 'grand extortion'.

1. **Introduction**

The governments of many developing countries face a non-negligible risk of a coup d'état perpetrated by their own military establishment. The phenomenon is especially acute in Africa: even since 2000 there have been successful coups in Mauritania, the Central African Republic and Togo, and failed coup attempts in Sao Tome and Principe, Cote d'Ivoire, Equatorial Guinea and Chad. In such countries the military has a dual aspect. It is both a defender of the government against external threats and internal rebellions, and itself a source of threat. Potentially, this threat against the government can become the predominant role: the military becomes a protection racket with the government buying security against coups by conceding higher military spending. Whereas the victims of protection rackets are usually small businesses, military establishments menacing their own governments are extortion on the grand scale. The purpose of our paper is to investigate whether grand extortion is a significant phenomenon: is there a substantial group of countries in which the military is a protection racket rather than just a source of defence?

Extortion involves strategic interdependence: one party, the military, decides to threaten a coup, and the other party, the government, must decide how to respond. In Section 2 we develop a theory of the circumstances in which threat-making behaviour is rational. A key component of this theory is that even in the absence of extortion the underlying risk of a coup can be expected to vary enormously between countries. We show that where the underlying risk of a coup is low, threat-making will not occur. In this range of behaviour, in which there is no strategic interdependence, a small increase in exogenous coup risk will *reduce* military spending. However, where the underlying risk of a coup is sufficiently high, threat-making becomes profitable, this being the range of grand extortion. In this range a small increase in exogenous coup risk will *increase* military spending. This provides a way of distinguishing empirically between militaries that are basically defenders of the nation, albeit posing some threat to the government, and those whose core function has become extortion.

In Section 3 we discuss the two data sets on coups d'états on which our analysis is based. One is standard and provides global coverage on all successful coups. The other, which is new, covers Africa only but includes not only successful coups but both failed attempts and all foiled plots that were reported in the media. Both are for the period since independence to 2003. In Section 4 we develop an empirical model of coups, including an explicit interdependence between coup risk and military spending. Evidently, the risk of a coup may both affect and be affected by the level of military spending. To address this problem of interdependence we draw on our previous work on military spending (Collier and Hoeffler, forthcoming), introducing instrumental variables which strongly affect military spending but do not directly affect coup risk. Section 5 concludes.

2. A Theory of Coups

We first consider the likely exogenous causes of coups, and then introduce military spending as an endogenous variable.

Exogenous influences on coup risk

A coup d'état is a violent challenge to the state, analogous to a rebellion. A useful starting point is thus to hypothesis that the two phenomena have similar causal structures. The incentives for violent change of regime are now commonly thought of as in part reflecting greed and partly grievance (Collier, 2000; Collier and Hoeffler, 2004 and forthcoming, a). While the incentives for rebellions and coups are at least broadly similar, the constraints on them are radically different. We consider in turn the two incentives of greed and grievance and then turn to the constraints.

The greed motivation for a coup reflects the reality of the large rents to sovereignty: leaders and their supporters invariably do well if they capture the government. The most obvious rents to sovereignty are natural resource rents and aid. Hence, potentially each of these might increase the incentives for a coup.

The other likely incentive for a violent challenge to the state is grievance against it. The potential range of such grievances is wide. In our work on the causes of rebellion we considered economic, political and social sources of grievance. The economic grievances were proxied by the level, growth and distribution of per capita income. The distribution of income was insignificant and the first two, though significant, are readily interpretable in other ways. The political sources of grievance were proxied by the extent of political rights and were insignificant. The social sources of grievance were proxied by ethnic and religious diversity: only 'ethnic dominance', the largest group forming a small majority, significantly increased the risk of rebellion. How might such grievances affect proneness to coups? Potentially a key difference between a rebellion and a coup is that the army is part of the state. While there will be exceptions, this suggests that grievances based on the exclusion of some section of society from power and its fruits are less likely to motivate a coup than a rebellion: those excluded from the benefits of power may also be excluded from the army. To the extent that the army is motivated by grievances beyond its own conditions, it may therefore represent national public good concerns, although these face the standard free-rider problem.

The feasibility of a coup is determined by somewhat different considerations from that of a rebellion. A rebellion requires the creation of a private army, which will usually need to be sustained financially for several years. A coup needs no such financial resources since the coup leaders use the government's own army. We have previously found that proxies for finance are significant in the risk of rebellion. However, these proxies are also interpretable as incentives for 'greed'. Hence, whether the same finance variables affect the risk of coups provides some indication as to whether their effect on the risk of rebellion comes through greed or feasibility.

Finally, we turn to the constraint of legitimacy. A government can credibly aspire to building a sense of its legitimacy within its own military. It can screen applicants so as to recruit those predisposed to loyalty. It can promote those that demonstrate the most loyalty. It can reward the army for its loyalty, and it can provide soldiers with selective information that reinforces loyalty. One source of legitimacy is recognition that the

government has come to power through means that the society accepts. Democratic elections may be an important means of legitimizing the accession to power, but other routes to power may also be effective. For example, a regime may be seen as legitimate if it has won a civil war. A third potential source of legitimacy is time: if the regime has been in place a long time people may come to see it as part of the natural order. The type of government with the least claim to legitimacy is evidently one that has itself recently come to power through a coup. It faces the internal contradiction that in claiming that the means by which it came to power were legitimate, it thereby legitimizes an equivalent attempt to replace it. Nor has it acquired the loyalty of tradition. This creates the possibility of a 'coup trap'.

Endogenizing Military Spending

We now introduce military spending. Like the other variables, military spending potentially affects the risk of a coup. However, whereas the others are state variables military spending is a control variable.

Non-strategic endogeneity

One of the striking features of coups is that they can be launched from many positions within the military hierarchy. The threat from a coup is not confined to the chief of staff: colonels, majors and captains have all launched coups. Suppose that each officer in the army has the same underlying scope to launch a coup, this risk, r, being determined by the exogenous variables considered above:

$$r = r(K). \qquad (1)$$

Onto this underlying risk is added a component determined by personal characteristics specific to each officer such as ambition and charisma, μ_i, that are randomly distributed. Then the overall risk of a coup, R, is:

$$R = r + \mu_1 + (r + \mu_2)(1- (r + \mu_1)) +\ldots (r+\mu_n)(1 - \ldots.) \quad (2)$$

For the pertinent range of coup risk all risks are very small, so that for a given value of r and a given pool of idiosyncratic risk, the expected value of R is approximately linear in the number of officers: the larger is the army, the greater is the risk that it contains a budding Napoleon. We assume for the present that the number of officers rises proportionately with the level of military spending, M. Hence, for a given pool of idiosyncratic risk, the expectation of coup risk is approximately linear in the size of spending and the risk-per-officer:

$$R \text{ å } r\partial M. \quad (3)$$

If this is the only way in which coup risk is endogenous to military spending there is no extortion racket. On the contrary, coup risk induces the government to reduce military spending. To see this, consider the government decision problem. Government utility, U_g, is a function of the external threat that it faces, the coup risk that it faces, and its consumption.

We specify the utility from military spending as:

$$U_g = bM - (c/2)M^2 - b\partial rM - \partial M, \quad (4)$$

where the first two terms capture the diminishing returns to defence against external threat, the third term is the disutility of an increase in the coup risk, and the final term is the loss from other consumption forgone. Differentiating and solving for optimal *M, M*,* thus gives us:

$$M^* = (b - \partial - b\partial r)/c. \quad (5)$$

From (5) we derive our first empirically testable proposition. Differentiating (5) with respect to the underlying coup-risk-per-officer, r, the sign of the derivative is unambiguously negative:

$$dM^*/dr = -\partial b/c < 0. \quad (6)$$

Hence, once we can establish empirically a model of underlying coup risk, (1), we can test whether an increase in it indeed reduces military spending, as predicted by the above analysis.

Strategic endogeneity

We now introduce the possibility of strategic endogeneity. We allow the officer corps collectively to make a threat against the government. The threat is that unless military spending is increased by some specified percentage, t, the risk of a coup will be increased by the percentage z. Whereas t is a choice variable for the officer corps, z is given by the technology of command structures: soldiers are only willing to follow their officers within certain parameters. Were the making of such a threat costless, all militaries would make it. We therefore introduce a cost of making a threat, namely a risk of punishment in the form of a purge of the officer corps. If punishment is inflicted it imposes purge costs on the officer corps of P, given by the technology available to the government. Punishment is costless for the government. The utility of the officer corps, U_o, is increasing in the proportionate increase in military spending, which if the government concedes to the threat is t. But it is decreasing in punishment:

$$U_o = dt - P. \quad (7)$$

This turns the choice of military spending into a game. The starting point for the game is a level of military spending chosen prior to strategic considerations, namely M^* as given in (5). The government has thus chosen an overall level of coup risk, R^*, given by (3):

$$R^* = r \circ M^*. \qquad (8)$$

We consider a static (one period) game with the following structure:[1]

Stage 1: The officer corps chooses whether to make a threat, and, contingent upon making a threat chooses a specific demand, t.

Stage 2: The government chooses whether to concede to the threat by increasing military spending.

Stage 3: Nature determines whether there is a coup. If the government concedes the risk of a coup is given by $R^*(1+t)$. If it does not concede the risk is increased to $R^*(1+z)$.

Stage 4: The government decides whether to punish the officer corp. It does not punish if the officer corps has not made a threat. If the officer corps has made a threat, then it suffers a penalty with an expected value of P.

The game is solved by backward induction.

In stage 4 if the officer corps has made a threat to which the government has not conceded it inflicts a penalty with expected value of P. In stage 3 there are no decisions. In stage 2 the government must decide whether to concede to the threat. If it does not concede the outcome is military spending of M^* with a coup risk of $R^*(1+z)$. Note that even if the government concedes, coup risk increases. However, if $z>t$, the decision not to

[1] For a general model of extortion see Konrad and Skaperdas (1998).

concede increases it further. This additional risk consequent upon not conceding reduces government utility by the amount L^{NC}:

$$L^{NC} = \beta(z-t)\omega r M^*. \quad (9)$$

Alternatively, if the government concedes it has to increase military spending to $M^*(1+t)$ which also reduces government utility, this time by L^C:

$$L^C = M^{*2}(ct^2/2). \quad (10)$$

The government will concede if (9)>(10), a necessary condition for which is that $z>t$.

The officer corps will extract as much as possible subject to satisfying this condition that the government will chose to concede. Thus, it will choose a level of t, t^*, such that

$$\beta(z-t^*)\omega r = M^*(ct^{*2}/2). \quad (11)$$

In stage 1 the officer corps must choose whether to make a threat and if so at what level to set its demand. It will only choose to make a threat if the gain exceeds the expected penalty. From (7) there is thus a critical t^*, t^{*c}, above which a threat will be made and below which the gains from strategic behaviour do not justify the risks:

$$t^{*c} = P/d. \quad (12)$$

Treating z and P as exogenously given by technology, there is a critical value of coup risk per officer, r^c, below which the officer corps chooses not to make threats and above which it successfully extorts. The proof is given in Appendix 2. We test this proposition in Section 4.

Military spending is thus endogenous to coup risk in two opposing ways. In the first there is no strategic interdependence. Coup risk is endogenous simply because the larger is the

military the greater the risk that there is someone within it who has the volition and capability of leading a coup. If this is the only endogeneity then military spending is *decreasing* in coup risk. In the second there is strategic interdependence: the military is a giant protection racket with the government as its victim. In this case the higher is the coup risk the greater is the price that the military can demand from the government, and so military spending is *increasing* in coup risk. Although the two responses are opposing, they do not simply offset each other, but co-exist in distinct ranges of the level of exogenous coup risk. At low levels of risk a small increase reduces spending, while at high levels spending is increased.

3. Data

We use two data sets on coups, one global and the other confined to Africa but with more information[2]. The global data were obtained from Banks' Cross-National Time-Series Data Archive. One of the variables in this archive provides the number of extra-constitutional or forced changes in the top government elite and/or its effective control of the nation's power structure in a given year. Unsuccessful coups are not counted. Using these data we constructed a zero-one indicator for coups d'états, taking the value of one if there was at least one coup during the year and zero otherwise. Means and standard deviations for coups d'états and the key explanatory variables are shown in Table 1. The data are presented both for the global average and for Africa and all other developing countries as distinct groups.

We also obtained some remarkable and detailed African coup data for this analysis from Patrick McGowan (McGowan, 2003) who kindly made his original text files available to us. Using published sources this gives a comprehensive coverage of reported coup plots that got no further than plotting, and of coup attempts that failed, as well as of successful coups in Africa during the period 1956 to 2001. Due to restrictions on economic data we only consider these plots, attempts and coups from 1960 onwards. Even so, this gives a

[2] For a full description of the variables see Appendix 1.

substantial number of observations. There were 145 plots that proceeded no further than the plot stage, 109 coup attempts that failed, and 82 successful coups.[3]

Our first task was to code these data into machine-readable form. We assumed, reasonably enough, that all actual attempted coups, successful or not, had been plotted. Thus, our coding classified all three types of event as plots, some of which led on to coup attempts, while in turn some of these attempts were successful.

The more problematic task was to organize the data in a way suitable for statistical analysis. Plots, attempts and coups are rare events, but when they occur they tend to bunch together. In two cases there were five such events in the same country in a single year.[4] Our data have the characteristics of ordered data as well as count data. Conventional statistical approaches are not ideal for this type of event. One approach is an annualized probit analysis. For each year during which any of these three types of event happened - a plot, an attempt or a coup – the researcher simply codes an event. Poisson models and ordered probits are also possible methods. However, each of these approaches involves a loss of information. Our preferred approach conserves information. Since the maximum number of events in any year is five, we organize the data such that each year is divided into five equal periods of 73 days. Each period may or may not have one event. To the extent possible, events are then dated correctly within their appropriate period. In very rare cases, two events fall in the same 73 day period. Since we do not allow for multiple events within a period, we notionally shift the date of the event to the nearest event-free period within the same year. The alternative to this slight misrepresentation of the data would be to greatly increase the number of periods into which a year is divided. In turn, this would compound the problem of rare events, since the same number of events would be distributed over far more observations.

4. Results

[3] In the published article McGowan reports a slightly lower number but since this is an ongoing data collection effort we used all of the plots, attempts and coups that were listed in the data description files, sent to us after the publication date.

[4] Burkina Faso experienced three plots, one attempt and one coup in 1983 and there were five attempted coups in Togo in 1991.

Core results for the global sample

In our model military expenditure and coup risk are interdependent and we thus have to use a method which allows simultaneous estimation of both variables. This is a difficult task since military expenditure is a continuous variable while coups are measured by a dichotomous variable. Conventionally used instrumental variable analysis cannot handle this sort of simultaneous equation system. We follow Keshk (2003) who suggests the use of a two stage least squares probit approach. First, we formulate a simplified military expenditure model based on Collier and Hoeffler (forthcoming). In this model the defence burden depends on the weighted neighbours' defence burden, a post cold war dummy and the years since the last coup. The likelihood of a coup d'état depends on income per capita, growth, the political regime, a time trend, and the years since the previous coup. In the first stage of the simultaneous equation estimation we regress the defence burden on the exogenous variables of the military expenditure model as well as on the determinants of the coup model. Similarly, using a probit model we regress coups on the determinants of coups as well as on the determinants of military expenditure. Based on these first stage regressions we use the predicted risk of a coup d'état in the military expenditure model and the estimated defence burden in the coup d'état model. Keshk's (2003) method adjusts the standard errors accordingly. Using global data we present the second stage regression results in able 2, column 1. The top half of Table 2 shows the results for the military expenditure model and the bottom half the ones for the coup d'état model.

Considering first the regression that explains coup risk, military spending has no significant effect. We will see later that this is only true over a range. The significant influences on coup risk are surprisingly limited, and indeed correspond closely to the factors that cause rebellion. In particular, the significant variables are the level and growth of per capita income. Low income and slow growth significantly increase the risk of a coup. The political system is also significant, but its effect is not straightforward: democracies are neither systematically safer nor more a risk than autocracies. The key

distinction among political systems is between 'anocracy' and other types of regime. 'Anocracy' describes regimes that are partially democratic. We proxy 'anocracy' using the The Polity IV data set which ranges political regimes on the ordinal scale from -10 to +10. Following Gurr and Marshall (2005) we set this dummy to one if the polity indicator falls between -5 and +5. We lag the economic and political system variables to reduce problems of endogeneity. To get a sense of the magnitude of these effects it is useful to take as a baseline the risk of a coup predicted at the sample mean values of the characteristics, this being 1.57%. If the level of per capita income is doubled the risk falls by about 26% and if it is halved the risk increases by 34%. While the implied elasticity with respect to income is fairly low, the range of per capita income among countries is extraordinarily wide so that even this modest elasticity produces large differences in risk. The effect of growth is more modest: when growth is raised by one percentage point the risk falls by 3.9%. Political regime has a strong impact on risk. Comparing the risk between anocracies and either fully democratic or autocratic regimes we find that the coup risk in anocracies is about double that in other regimes. Both autocracies and fully democratic polities seem to be much better equipped to guard themselves against risk from coup d'état. This is in contrast to O'Kane (1981) who concluded that the political system was less important than economic factors.

There is clear evidence of a coup trap: once a coup has occurred, the chances of a further coup sharply increase but the effect itself fades with time. One year after a coup the risk is about 164% higher while after ten years it falls back by 73%. Since the effect fades with time it is not merely picking up a fixed effect – omitted unchanging characteristics of the country. However, we cannot exclude the possibility that it is it picking up some omitted transient effect that was the real cause of the coup. We can, however, guard against this possibility by investigating a large range of other explanatory variables, which we do in our robustness checks below.

The other significant variable is a time trend. Happily, coups are getting less common with time. In 1962 the risk was 131% higher whereas by 2002 it was 55% lower. Recall that this is a pure time effect, controlling for all other changes that are significant.

Since the use of two stage least squares probit estimation is uncommon we compare our results to the more commonly used IV probit estimation results in column 2. Here we do not estimate military expenditure and coup risk simulatenously but instrument military expenditure in the probit model. The results are very similar to the ones obtained in column 1.

We now turn to the examination of a possible non-linear relationship between coup risk and military expenditure. Due to the simultaneous nature of our model this is not straightforward. We explore two different options. First, we examine whether Africa's higher risk of coup d'état suggests a different behavioural pattern and second, we introduce the square of risk of coup d'état in the model. In column 3 we include an Africa dummy in our model. Our results suggest that African defence burden as well as coup d'état risk are determined in the same way as in non-African countries. There is no significant difference between Africa and the global sample. However, we know that Africa has a considerably higher risk of coup d'état: 5.5% of all African observations experienced a coup in contrast to only 3% of non-African observations. We interact the predicted coup risk with the Africa dummy in column 4. While the direct effect of the Africa dummy is still insignificant, the interaction term is positive and significant: something about Africa offsets the negative effect that coup risk normally has on military spending. . Since one of the distinctive features of Africa is that its characteristics predispose it to a much higher coup risk, this suggests that there may be a non-linear relationship between risk of a coup d'état and military expenditure.[5] A further test is to introduce the square of coup risk in the military expenditure function. We converted the linear predictions from the probit into predicted probabilities and squared them. In column 5 we include them in the military expenditure model. Coup risk is negative and significant while the squared term is positive and significant. The coefficient estimates suggest that for countries which have a coup risk of 9 percent or lower the effect of coup

[5] One possible objection to these results is that the standard errors are not adjusted. However, the comparison of adjusted and non-adjusted standard errors in the core model suggests that the adjustment makes hardly any difference. All of the variables are significant at the same level, irrespective of adjustment.

risk on military expenditure is negative while for high risk countries over 9 percent an increase in coup risk results in higher military expenditure.

For the range in which coup risk is low, governments behave in a way consistent with our first proposition: an increase in coup risk significantly reduces military spending. This is a robust result, not dependent upon whether the quadratic term is included or excluded. Note that for this to be a rational response does not depend upon the reduction is spending significantly reducing the risk of a coup. The rationale for governments to choose lower military spending in these circumstances depends upon the *level* of coup risk not its change. A (relatively) high coup risk reduces spending simply because it implies that the net contribution of military spending to government utility is lower.

Although the core regression of coup risk contains few variables, these variables differ so markedly between countries as to produce very large differences in our prediction of coup risk. A country combining the best observed characteristics in our sample on each variable would have faced a coup risk of only 0.001%, whereas a country combining the worst observed characteristics would have faced a risk of 70.2%. These wide differences suggest that the hypothesized bifurcation of government behaviour is at least potentially empirically pertinent. However, based on the results of Table 1 the evidence for grand extortion is weak. If the quadratic is included then the minority of governments that face a coup risk above 9% behave as though they believed themselves to be victims of grand extortion. However, this behaviour looks misplaced since such higher spending appears to be ineffective in reducing coup risk. We will see shortly that this preliminary conclusion must be revised.

Robustness checks

We next turn to a range of robustness checks (Table 3). Of these the most important are the introduction of political, social and historical variables that might be expected to influence the risk of a coup. In Table 3, column 1 we introduce a dummy variable which takes the value of unity if there is a time limit to presidential office. This is significant at

5%. A finite term substantially reduces the risk of a coup. At the mean of other characteristics in the absence of a finite term the risk is 1.57% whereas with a finite term the risk falls to 0.62%. We might note that term limits were widely adopted as part of the wave of democratization in low-income countries during the early 1990s. In Uganda, Chad and Nigeria, all countries with a history of coups, they have recently been abandoned as presidents have reached the limits of their terms. In column 2 we replace this variable with the number of years that the head of government has been in office. This is significant at five per cent and positive: staying in office becomes progressively more risky. When these two variables are combined both are significant: presidents are safer if they have limited terms of office and do not stay in power for many such terms. Hence, presidents who reach the limit of their terms and then change the law are inviting trouble: indeed, these were the antecedents to the latest coup attempt, in Chad in April 2006, an event which is of course out-of-sample. We exclude these two variables from our core regression only because they impose a considerable reduction in sample size.

We investigated a wide range of other variables, some of which are reported in Table 2. Among the variable found to be insignificant were ethnic dominance, ethnic diversity, polarization, inequality, political checks and balances, press freedom, and human rights abuses. Neither was the previous colonial history, whether the time since independence or the identity of the colonial ruler. Although the end of the Cold War significantly reduced military spending it did not significantly affect coup risk.

A further check is the effect of development aid on the risk of coups. Since political instability in the recipient may be correlated with the donors' willingness to provide aid we instrument aid in our regression. We follow the methodology suggested by Tavares (2003) and instrument aid received by aid provided by the top donors. We concentrate on the top five bilateral donors and interact their overall aid allocation with the geographic, cultural and political distance between each donor and recipient. We use a parsimonious model in which all of our instruments are significant in the first stage regression. We present the results from the IV probit regression in which we instrument for military expenditure as well as for aid in column 6. Instrumented in such a way aid is significant

and positive at the five percent level. The effect of aid on the risk of a coup d'état is relatively large: increasing aid from average levels (5.4% of GNI) to African levels (9.9% of GNI) increases risk by 37%. Hence, part of the explanation for the higher incidence of coups in Africa is that it receives more aid.

Military personnel as the dependent variable

In the model of Section 2 coup risk was linear in military spending because the number of officers was assumed to be strictly proportional to spending. This is evidently a simplification. If the risk of a coup inheres in the number of officers, an increase in spending brought about by the purchase of equipment should not affect coup risk. Conversely, an increase in coup risk should lead the government to economize on personnel. We therefore investigate the number of soldiers that the government chooses. This variable becomes both a dependent variable, replacing military spending, and an explanatory variable in coup risk. Data on this variable are limited, especially for Africa. With the number of soldiers as the dependent variable we adapt the core model of military spending (table 2a, column 1) by the addition of population as an explanatory variable. Coup risk now reduces the number of soldiers (Table 2b, column 1), whereas an increase in external threat, as proxied by the military spending of neighbors, increases the number of soldiers, both effects being significant. In column 2 we add military spending as a control variable. With this control, a change in the number of soldiers must be offset either by a change in spending on military equipment, or by a change in the level of military salaries. The previous pattern remains: a higher risk of coups significantly reduces the number of soldiers for a given level of military spending: governments substitute away from the source of the coup risk. Conversely, an increase in external risk increases the number of soldiers for a given level of spending, although the result is now not quite significant. We are, unfortunately, unable to distinguish between equipment and the level of salaries. *A priori*, either is plausible. A rise in coup risk might lead either to a substitution from personnel into equipment, or to a substitution from the number of soldiers to higher pay.

Results for the Africa data

We now analyze the African data set. As a preliminary, still using the global sample we introduce a dummy variable for Africa into both the coup and military expenditure regressions (Table 2, column 3). In neither case is the Africa dummy even close to significance: basically, Africa conforms to the global pattern other than for the already noted difference in the effect of coup risk on military spending.

We next run our core regression on the new data set of African coup plots, coup attempts, and coups. The combination of the three coup-related events actually increases the number of events we are analyzing compared to the global data, which are confined to successful coups. We start from the core global regression (Table 5, column 1) on the 'plots' data, noting that our observations are coup plots which may have also been attempted coups, and that these in turn may have been successful. That is, 'plots' is an inclusive term for all coup-related events. Plot risk is significant at the one percent level. However, the striking feature of this regression is that the sign on plot risk is positive: the opposite of the result for the global sample. Before discussing this further, we refine the regressions further by adding the dummy variable for ethnic dominance into the plot risk regression (column 2). While this was insignificant in the global sample, it is highly significant for the African data: ethnic dominance, is a dummy variable which takes the value of unity when the largest ethnic group constitutes 45-90% of the population. It is highly significant in increasing plot risk. We take this pair of as our 'core' regressions for the African data. We then reproduce this regression for the 'attempts' data (column 3) and for the coups data (column 4).

The Africa results have two key differences from the global results. One is that plot risk, attempt risk, and coup risk all significantly *increase* military spending, whereas in the global sample coup risk significantly reduces spending. Thus, African governments are responding to an exogenous increase in coup-related risk precisely contrary to non-African countries. This is consistent with extortion: African governments are behaving as though they regarded their militaries as protection rackets.

Why might African and non-African governments be responding in such different ways? The reason is probably that although Africa conforms to the global pattern of behaviour, its characteristics place it in a different range of behaviour. Africa's distinctive characteristics give it a far higher risk of coups. At Africa's mean characteristics the risk of a coup is almost double that for the global sample.

The other key difference is in the coup risk regression. Recall that in the global sample military spending did not significantly affect coup risk. While this did not affect the rationality of *reducing* military spending in response to a relatively high coup risk, which is what most non-African governments do, it would most certainly destroy the rationality of *increasing* it, which is what African governments do. Are African governments behaving irrationally, or perhaps misunderstanding the behavioural relationships that they face? They are not: on the African data, an increase in military spending significantly *reduces* coup risk so that buying off the threat of a coup is a rational use of government resources (column 4). The affect on plots and attempts is weaker, suggesting that higher military spending succeeds in buying off the really dangerous military bids for power, but is ineffective at preventing lower level discontents. Clearly, what matters most for African governments is to be able to prevent those bids for power that would be successful and this is what higher spending achieves.

The two key differences evidently reinforce each other. Outside Africa, coup risk is usually not high enough to warrant governments paying protection money, and anyway, higher military spending is ineffective in reducing risk. In Africa coup risk is high enough for governments to pay protection money and such payments work.

One other feature of our Africa results is noteworthy. Whereas globally the end of the Cold War significantly reduced military spending, in Africa it significantly increased it. Hence, during the 1990s Africa was distinctive in not reaping a military spending peace dividend, but indeed experiencing precisely the opposite.

An alternative interpretation of results

While our results are consistent with grand extortion they are also open to a different interpretation. One possible response of governments attempting to reduce coup risk is to create parallel military establishments with each restraining the ambitions of the others.[6] Thus, alongside the military there might be a presidential guard, and a paramilitary police force. Such a strategy may well involve an increase in overall military spending, but it would not be the result of extortion, or indeed of strategic interaction. Rather, it would be a reformulation of (2), with risk *falling* as the number of military personnel increased, due to rising difficulties of coordination among officers. While *a priori*, such an account is plausible, and would provide an alternative explanation for why African governments expand their military budgets in response to coup risk, it is in direct conflict with our core result that globally, governments respond to coup risk by significantly reducing military spending.

5. Conclusion

We have used global and Africa-specific data sets to analyze the risk of a coup d'état and its relation to military spending. Over time coups have been going out of fashion and are closely related to economic weaknesses: low income and low growth. As a consequence, outside Africa the phenomenon is now rare. However, because of the prolonged failure of the growth process in Africa, within the region coup risk remains high and this has had significant consequences for military spending. In particular, we find that African governments respond to a high level of coup risk by increasing military spending. By contrast, in the global sample, dominated by countries with much lower coup risk, the normal government reaction to coup risk is to cut military spending, and most especially to cut the size of the army. We find that this distinctive behaviour of African governments may indeed by appropriate. Whereas on the global sample there is no evidence that an increase in military spending is effective in reducing coup risk, in Africa it achieves a significant reduction. This distinctive behaviour of African governments,

[6] For a fascinating handbook on how to both design a coup and protect against it see Luttwak (1968).

and the distinctive response of their militaries, is consistent with 'grand extortion' – a successful protection racket in which the military extorts a higher budget from its government by means of the threat of a coup d'état. This is consistent with a theory in which such extortion becomes rational only at high levels of coup risk such as prevail in Africa due to its low income and low growth.

Finally, we should note an uncomfortable implication of our results for aid agencies. We have found that aid significantly and substantially increases coup risk. This suggests that one inadvertent consequence of the large and increasing aid inflows to Africa will be to increase the risk of coups and thereby augment military spending. Since we have previously found that in Africa around 40 per cent of military spending is indirectly aid-financed due to fungibility (Collier and Hoeffler, forthcoming), donors are inadvertently implicated both in the high risk and its dysfunctional consequences.

Appendix 1 - Data Sources

Anocracy
Is a dummy variable taking the value of one for country year observations with polity scores between -5 and +5. 'Polity' is the combined score of democracy and autocracy and ranges from –10 (least democratic) to +10 (most democratic). Source: Marshall and Jaggers (2002)

Coups d'Etat,
Sources: (1) Global: Banks' Cross-National Time-Series Data Archive http://www.scc.rutgers.edu/cnts/about.cfm. (2) Africa: McGowan, 2003. This data set provides information on successful coups d'états as well as attempted coups and plots.

Economic growth
Using WDI 2003 data for GDP per capita we calculated the annual growth rates.

Ethnic Dominance
Dummy taking the value of one if the largest ethnic group in society is between 45 and 90 percent of the population. Source: Fearon and Laitin (2003).

Finite Term in Office
Dummy variable taking the value of one if there is a finite term in office. Source: Keefer (2002)

Fractionalization
The fractionalization variables are computed as one minus the Herfindahl index of group shares, and reflects the probability that two randomly selected individuals from a population belonged to different groups. Higher values proxy more heterogeneous countries. Source: Alesina et al (2003).

GDP per capita
We measure GDP per capita annually. Data are measured in constant 1995 US dollars and the data source is WDI 2003.

Natural Resource Rents
Using data from the World Bank's adjusted savings project we calculated the rents for each commodity by subtracting the cost from the commodity price. We then multiplied the rents per unit by the amount extracted and summed across the different commodities. We then calculated the share of rents in GDP. Since the rents are provided in current US dollars we used the WDI 2003 GDP in current dollars to calculate this share. Natural resources for which rent data were available are: oil, gas, coal, lignite, bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, silver and gold. The data are are described in Hamilton and Clemens (1998) and available from:
http://lnweb18.worldbank.org/ESSD/envext.nsf/44ByDocName/GreenAccountingAdjustedNetSavings

Military expenditure
We measure military expenditure as a percentage of GDP, data source: Stockholm International Peace Research Institute. We merged two different series, one for years prior to 1988 and one post 1988. We investigated whether there is a structural break between the two series by introducing a dummy in our core regression taking a value of one for the years 1988 and later. The dummy was insignificant and was hence dropped from our specification. We transformed the military expenditure variable by adding 1 to all of the values before taking the logarithm. This transformation reduces the problem of excessive weight in the low and high observations.

Military Personnel
Total military personnel. Armed forces personnel refer to active duty military personnel, including paramilitary forces if those forces resemble regular units in their organization, equipment, training, or mission. Source: World Bank, WDI

Post Cold War
Dummy taking the value of one for years 1990 and later.

Years in Office
Years the chief executive has been in office. Source: Keefer (2002)

Years since Independence
Source for the date of independence: Gleditsch and Ward (1999).

Appendix 2:

Proposition: There is a critical value of coup risk below which the officers make no threats and above which they successfully extort.

Proof:

The key step in establishing this is the proof that the maximum threat, t^*, is a monotonic increasing function of the coup risk per officer, r. The proof starts from the behaviour of the officer corps in the neighborhood of r=0. From (9), as rŸ 0, L^{NC}Ÿ 0. Hence, (10) can only hold if t is chosen so that L^{C}Ÿ 0. But from (9) this requires that t^*Ÿ 0. Thus, when the coup risk per officer is negligible the optimal threat is negligible.

Again starting from the neighborhood of r=0, now consider the effect of an increase in r on L^{NC}:

$$dL^{NC}/dr = ƃ(z-t)ɔM^* - ŭt/ŭr(ƃɔrM^*) >0. \quad \text{(A2.1)}$$

Since the increase in r increases L^{NC}, to maintain (10) t must alter so as to achieve an equal increase in L^{C}. Differentiating L^{C} with respect to t:

$$dL^{C}/dt = M^{*2}ct^2 >0. \quad \text{(A2.2)}$$

Thus, as r increases from zero, the maximum threat also increases from zero. As r increases further, the second term of (A1.2) becomes non-negligible. However, this term can only be negative while $ŭt/ŭr$ >0. Suppose that at some stage t ceases to be increasing in r, so that $ŭt/ŭr$ = 0. At this point the second term of (A1.2) collapses to zero, leaving only the first term, which, as long as $z>t$, is strictly positive. Hence, an increase in r must continue to increase L^{NC}, requiring an equal increase in L^{C} which must be achieved by an increase in t. Hence, as long as $z>t$, $ŭt/ŭr$ >0.

Tables

Table 1: Means and Standard Deviations

Variable	*Sample*	*Non Africa*	*Africa*
Proportion of observations with	0.038	0.029	0.055
Coup d'Etats	(0.191)	(0.166)	(0.228)
Military expenditure	3.349	3.662	2.782
(% of GDP)	(3.995)	(4.461)	(2.893)
ln Military Expenditure	1.252	1.294	1.175
	(0.596)	(0.635)	(0.509)
ln Neighbours Military	1.208	1.214	1.198
Expenditure t-1	(0.649)	(0.725)	(0.483)
Military Personnel	177,289	249,038	34,246
	(454,056)	(541,353)	(48,884)
ln Military Personnel	10.733	11.271	9.662
	(1.651)	(1.540)	(1.306)
GDP per capita	2424	3406	650
(const US$)	(4427)	(5226)	(891)
ln GDP per capita t-1	6.924	7.443	5.987
	(1.267)	(1.150)	(0.865)
Income growth t-1	1.237	1.603	0.577
	(5.985)	(5.832)	(6.199)
Anocracy dummy	0.228	0.232	0.221
	(0.419)	(0.422)	(0.415)
Post Cold War dummy	0.387	0.402	0.358
	(0.487)	(0.490)	(0.480)
Years since last Coup	24.856	26.518	21.854
	(16.887)	(16.669)	(16.870)
Time Trend	24.155	24.521	23.493
	(11.608)	(11.677)	(11.458)
Observations	3267	2103	1164

Note: Standard Deviations in parentheses.

Table 2a: Coup Risk and Military Expenditure

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Equation 1: ln Mil. Ependiture					
Coup risk	-0.288***		-0.258***	-0.276***	-8.429***
	(0.059)		(0.062)	(0.037)	(0.966)
ln Neighb.Milex t-1	0.413***		0.414***	0.412***	0.415***
	(0.027)		(0.025)	(0.014)	(0.014)
Post Cold War	-0.144***		-0.137***	-0.137***	-0.125***
	(0.040)		(0.038)	(0.023)	(0.022)
Years since last Coup	-0.005***		-0.004***	-0.004***	-0.004***
	(0.002)		(0.002)	(0.001)	(0.001)
Africa dummy			-0.033	0.104	
			(0.034)	(0.076)	
Africa dummy*				0.081**	
Coup risk				(0.039)	
Coup risk squared					44.486***
					(5.977)
R^2	0.23		0.23	0.23	0.23
Equation 2: Coup Risk					
ln military expenditure	0.075	0.081	-0.077		
	(0.188)	(0.187)	(0.188)		
Ln GDP t-1	-0.172***	-0.170***	-0.149***		
	(0.044)	(0.044)	(0.053)		
Growth t-1	-0.016**	-0.016***	-0.016**		
	(0.007)	(0.007)	(0.007)		
Anocracy t-1	0.289***	0.289***	0.301***		
	(0.095)	(0.095)	(0.097)		
Time since last coup	-0.018***	-0.017***	-0.018***		
	(0.003)	(0.003)	(0.003)		
Time trend	-0.016***	-0.016***	-0.016***		
	(0.004)	(0.004)	(0.004)		
Africa dummy			0.085		
			(0.111)		
Number of observations	3267	3267	3267		
Pseudo R2	0.11		0.11		
Log likelihood	-469.2	-2941.47	-468.92		
Number of coups	124	124	124	124	

Notes: Columns (1) and (3) are estimated by two stage least squares probit. Estimation in column (2) is based on IV probit. Columns (4) and (5) are estimated by OLS. p values in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, all regressions include an intercept.

Table 2b: Coup Risk and Military Personnel

	(6)	*(7)*
Equation 1: ln Military Personnel		
Coup risk	-0.486**	-0.535**
	(0.221)	(0.247)
ln Neighb.Milex t-1	0.577***	0.181
	(0.095)	(0.121) p=0.14
Post Cold War	0.093	0.231*
	(0.119)	(0.138)
Years since last Coup	-0.006*	-0.007*
	(0.003)	(0.004)
ln GDP t-1	0.238**	0.184**
	(0.072)	(0.084)
ln population	0.893***	0.923***
	(0.032)	(0.038)
ln military expenditure		0.845***
		(0.100)
R^2	0.76	0.83
Equation 2: Coup Risk		
ln military personnel	-0.014	-0.018
	(0.056)	(0.061)
Ln GDP t-1	-0.245***	-0.250***
	(0.074)	(0.086)
Growth t-1	-0.020**	-0.022**
	(0.009)	(0.010)
Anocracy t-1	0.087	0.002
	(0.159)	(0.190)
Time since last coup	-0.011***	-0.010**
	(0.004)	(0.005)
Time trend	-0.022	-0.027
	(0.015) p=0.14	(0.018) p=0.15
Number of observations	1833	1962
Pseudo R2	0.12	0.12
Log likelihood	-172.02	-120.11
Number of coups	41	41

Notes: Two stage least squares probit estimation. p values in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, all regressions include an intercept.

Table 3: Coup Risk – Some Robustness Checks

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	(6)
ln military expenditure	-0.403	-0.321	-0.064	-0.078	0.107	0.101
	(0.332)	(0.300)	(0.190)	(0.188)	(0.196)	(0.210)
ln GDP t-1	-0.170***	-0.194***	-0.212***	-0.170***	-0.186***	-0.102*
	(0.066)	(0.059)	(0.052)	(0.044)	(0.045)	(0.064)
Growth t-1	-0.021**	-0.021**	-0.016**	-0.016**	-0.015*	-0.018**
	(0.009)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)
Years since last coup	-0.012***	-0.020***	-0.016***	-0.017***	-0.017***	-0.021***
	(0.004)	(0.005)	(0.004)	(0.003)	(0.003)	(0.004)
Time trend	-0.027***	-0.026***	-0.017***	-0.017	-0.017	-0.022***
	(0.009)	(0.008)	(0.004)	(0.004)***	(0.004)***	(0.006)
Anocracy t-1	0.181	0.250*	0.271***	0.292***	0.283***	0.378***
	(0.144)	(0.137)	(0.096)	(0.095)	(0.908)	(0.106)
Finite term (dummy)	-0.351**					
	(0.175)					
Years in office		0.019**				
		(0.009)				
Years since Independence			0.001			
			(0.001)p=0.12			
Natural Res. Rents				0.052		
				(0.041)p=0.2		
Ethnic dominance					0.076	
					(0.093)	
Aid						0.030**
						(0.013)
Number of observations	2185	2212	3267	3267	3202	2568
Pseudo R2	0.13	0.13	0.11	0.11	0.11	
Log likelihood	-240.94	-270.14	-468.04	-468.45	-460.12	-10601.66

Notes: Columns (1)-(5): Two stage least squares probit estimation, only probit results presented. Column (6) IV probit, military expenditure and aid are instrumented; instruments for aid: geographic distance*French aid, UN voting*French aid, geographic distance*Japanese Aid, religion*German aid. p values in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, all regressions include an intercept. We also tried including the following variables in our core model: polity index, number of checks (veto players), income inquality (Gini), ethnic diversity (Alesina et al.), former British colony and press freedom. None of these variables were significant.

Table 4: Coup Risk in Africa: Plots, Attempts and Successful Coups

	(1)	*(2)*	*(3)*	(4)
	Plots	Plots	Attempts	Coups
		Equation 1: ln Mil. Ependiture		
Risk	0.588***	0.708***	0.109**	0.086**
	(0.001)	(0.000)	(0.045)	(0.049)
ln Neighb.Milex	0.403***	0.409***	0.395***	0.391***
t-1	(0.000)	(0.000)	(0.000)	(0.000)
Post Cold War	0.146***	0.148**	0.118***	0.065**
	(0.010)	(0.018)	(0.000)	(0.015)
days since	0.0001***	0.0001***	0.0000	0.00002***
last event	(0.000)	(0.000)	(0.307)	(0.000)
R^2	0.090	0.102	0.07	0.07
		Equation 2: Coup Risk		
Military	-0.161	-0.212	-0.243	-0.814***
expenditure	(0.333)	(0.217)	(0.242)	(0.011)
ln GDP t-1	-0.119**	-0.089*	-0.178**	-0.219**
	(0.024)	(0.091)	(0.017)	(0.033)
Growth t-1	-0.022***	-0.029***	-0.024**	-0.039***
	(0.008)	(0.001)	(0.026)	(0.014)
days since last	-0.0001***	-0.0001***	-0.0001***	-0.00003
Event	(0.000)	(0.000)	(0.000)	(0.158)
Time trend	-0.010***	-0.010***	-0.007	-0.016***
	(0.004)	(0.003)	(0.108)	(0.011)
Ethnic		0.273***	0.182*	0.343***
Dominance		(0.078)	(0.059)	(0.009)
Number of	5090	5090	5090	5090
observations				
Pseudo R2	0.05	0.06	0.07	0.09
Log likelihood	-808.53	-802.81	-491.36	-252.02
Number of events	203	203	109	49

Notes: Two stage least squares probit estimation, only probit results presented. p values in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, all regressions include an intercept.

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