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Abstract

Over the last several decades, both economists and political scientists have shown interest in coups d'état. Numerous studies have been dedicated to understanding the causes of coups. However, model uncertainty still looms large. About one hundred potential determinants of coups have been proposed, but no consensus has emerged on an established baseline model for analyzing coups. We address this problem by testing the sensitivity of inferences to over three million model permutations in an extreme bounds analysis. Overall, we test the robustness of 66 factors proposed in the empirical literature based on a monthly sample of 164 countries that covers the years 1952 to 2011. We find that slow economic growth rates, previous coup experiences, and other forms of political violence to be particularly conducive to inciting coups.

JEL-Codes: D740, F520, H560, K100.

Keywords: coups d'état, military coups, coup-proofing, extreme bounds analysis.

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"*I have often wondered why people with guns ever obey people without them. And I think we still do not know – at least I do not.*" (Przeworski 2011, p. 180)

1. Introduction

Few political events attract as much attention as coups d'état. Their occurrence is almost inevitably linked to fierce debates about their normative desirability and their consequences for future political development in the respective country. A recent example is the ouster of Egypt's first democratically elected president, Mohamed Morsi, in 2013. Some observers claim that this coup was staged as a power grab by traditional elites and members of the military (including General El-Sisi, who was later elected president) to regain political control over the country. Others saw the coup as an intervention by the military to address a national crisis caused by civil unrest and a creeping Islamization of what was hitherto a rather secular Muslim majority country (Baker 2013). Both sides, however, would certainly agree that this event fundamentally altered the trajectory of Egypt's political development. Given their seeming momentousness, it is not surprising that political scientists, and to a lesser extent economists, have been extremely interested in the causes, as well as the effects of coups and have studied them for decades.

Powell and Thyne (2011, p. 252) define coups as "*illegal and overt attempts by the military or other elites within the state apparatus to unseat the sitting executive*". Note that according to this definition, the mere attempt to unseat the sitting executive is considered to be a coup. The definition also allows for the possibility of coups not being led by the military (which could be referred to as a military coup), but undertaken by any elite that is part of the state apparatus.[1] Whether or not the perpetrators of a coup are able to hold on to power for at least seven days is often used to distinguish successful from unsuccessful coups. Here, however, we are not interested in the successes or failures of coups, but only in their determinants.

Aside from the obvious political turmoil they create, coups have adverse consequences for economic growth and investment. This was first demonstrated empirically by Barro (1991). Levine and Renelt (1992) confirm coups' detrimental impacts on investment, while Sala-i-Martin (1997) corroborates their negative effects on economic growth. According to Alesina

[1] We use the terms "coup" and "coup d'état" interchangeably here. "Military coups" are based on a narrower definition, as the perpetrators would have to include the military.

et al. (1996), coups not only diminish economic growth rates, but are themselves possibly caused by adverse economic conditions in a country. Recent research has shed more light on the particular channels through which coups cause economic downturns. Leon (2014) demonstrates that coups (successful ones in particular) result in increased military spending (see also Bove and Nisticò 2014). Meyersson (2016) shows that the negative growth effect of coups d'état is driven by successful coups against democratic regimes. Successful coups lead to both worse democratic institutions and greater violence. Given these harmful effects, identifying the determinants of coups d'état is of great importance.

Starting in the 1970s, myriad empirical studies contributed evidence in an effort to establish the key determinants of coups. This body of work has led to a long list of factors claimed to be conducive to the staging of coups. Yet, little effort has been made to identify which of these factors, and their underlying theories, are supported by robust empirical evidence relative to the most important competing explanations for the occurrence of coups. This problem is spelled out very openly by Feaver (1999, p. 224): "One of the weaknesses in the civil-military relations literature is that there are relatively few efforts to systematically compare explanatory factors … . Even where different sets of factors are pitted against each other, it is rare for the analyst to do more than give rough comparable weights to one or the other." A more encompassing test of the determinants of coups is not only desirable for recording and summarizing the state of academic knowledge in this field, but it also serves to support researchers in their selection of control variables when a new theory is subjected to econometric testing. As it is, empirical studies have not converged on a homogenous set of standard explanatory variables. This fact might incentivize researchers to select model specifications that back their own theoretical priors with seemingly conclusive and robust empirical evidence.

In this paper, we assume that existing theories alone cannot provide sufficient guidance for researchers in specifying empirical models that describe the occurrence of coups most appropriately. To discover which candidate variables are the most likely explanations for coups, we propose to follow the recommendation of Leamer (1983, 1985) and apply extreme bounds analysis (EBA) to study the determinants of coups. Although Leamer's argument was broader and concerned all kinds of sensitivity analyses, we focus here on testing the sensitivity

of regression results to permutations of the set of possible independent variables.[2] This approach was popularized in economics by Levine and Renelt (1992) and Sala-i-Martin (1997).

The idea behind EBA is not to estimate a small set of model specifications and hope that the true model of the data-generating process is among them, but to estimate millions of models and show that the assumed model specification is largely inconsequential for statistical inferences regarding some variables. If a variable does not pass the EBA test, this should not be interpreted as evidence that this factor is irrelevant for explaining the incidence of coups. If, however, a variable does pass this very rigorous test, the finding indicates that the respective variable may be a core determinant of coups and should be considered when alternative explanations are tested empirically.

Our contribution is to identify a set of "robust" determinants of coups that will inform both researchers and policy-makers regarding which predictors of coups receive the most systematic support from the data. Thus far, one article by Miller et al. (2016) has applied EBA to the determinants of coups. There, EBA is used to test for the robustness of spatial diffusion only when a number of alternative weighting matrices are employed. Their results indicate that coups are not spatially contagious, independent of which connections between countries are assumed to be most relevant. In contrast, democratization seems systematically to diffuse regionally; strikes and protests likewise appear to spread across countries. Here we go one step further and put to the test all determinants of coups that have been used in the empirical literature.

Our analysis of the determinants of coups is one of the first to use monthly data for at least some independent variables (as well as the dependent variable, of course).[3] This allows us not only to obtain more precise estimates regarding the effect of democracy on the incidence of coups, but also to measure more precisely the effect of recent coups on coup risk in the following years. In total, we estimate over three million regressions with either region- or

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[2] As Plümper and Neumayer (2015) point out, this standard approach does not deal systematically with model uncertainty regarding distributional assumptions, measurement error processes, and so on. Thus, the results of an EBA can be considered "robust" only in such a narrow sense.

[3] We are aware of three studies of coup determinants that use monthly data: Thyne (2010), Bell (2016), and Johnson and Thyne (2016). Johnson and Thyne report similar findings when using country-day and country-year data. Eventually, they opt for using country-month data to increase precision without unnecessarily reducing standard errors by inflating the number of observations.

country-fixed effects to ascertain the robustness of 66 potential coup determinants. Our results are encouraging, since most of the tested variables turn out not to be robust. Consequently, the required complexity of a model specified to explain the occurrence of coups is much less than the combined empirical literature seems to suggest.

Section 2 briefly summarizes the main theories of the determinants of coups. In Section 3, we introduce the dataset and the technical details of our EBA. Section 4 summarizes and interprets our findings. Section 5 concludes.

2. Theories of the determinants of coups

In this section, we introduce a framework to structure the theoretical arguments in the literature regarding the major causes of coups. Many explanations pointing to different factors that could facilitate coups and a number of alternative classifications of these factors have been proposed. Belkin and Schofer (2003), for example, distinguish structural from proximate causes of coups. Their classification, hence, focuses on the volatilities of these potential determinants. Our approach here is closer to the traditional view in the civil-military relations literature that separates motives from opportunities for staging coups. We start from the assumption that coup perpetrators act rationally and aspire to maximize their utility, as described in Becker's (1968) seminal contribution to the economics of crime. Thus, the decision to stage a coup against the executive branch of government depends on whether the expected utility of doing so

$$E(U) = p \times B + (1 - p) \times C \quad (1)$$

outweighs the level of utility of the *status quo*. Here, p is the probability of successfully removing the executive from office, B describes the payoff (i.e., the net benefit) of a successful coup for its perpetrators, and C is the negative payoff (i.e., their cost) in case the coup fails. In the following, we use this categorization to structure our theoretical arguments. Although some plausible determinants of coups are related to more than one element of this equation, we mention each factor only with respect to its seemingly most important incentivizing effect on coup perpetrators.

Starting with the benefit side of the equation formulated above, staging a coup would seem to be more attractive (and B should hence be larger) if one or more of the following three conditions are fulfilled. First, control over the state promises control over resources (which is,

for instance, the case if property rights are not secure, natural resources are abundant, inequality is high and the state apparatus is large).[4] Second, the *status quo* of the elites or the military has been negatively affected by government policies that could be reversed easily in the aftermath of a coup (for instance, reduced military expenditure or liberalized economic sectors). In a similar vein, Tullock (2005) has argued that dictators maintain control by paying out benefits to those on whose loyalty they depend (see also Wintrobe 2012). If these payments are reduced by the incumbent regime, the net benefits of staging a coup may become positive for some actors. And third, the state does not depend financially on foreign governments being well-disposed toward it (e.g., low dependence on foreign aid, not being under programs of the IMF or the World Bank, limited foreign trade). Coups are less likely if their failure would be very costly for the perpetrators, i.e., *C* is large. This is primarily the case when coups are directed against autocratic and repressive regimes because they are more likely to use harsh sanctions against perpetrators of a coup, such as exile, torture or outright executions.

In the literature, most of the predictors of coups are justified by their effect on the difficulty of organizing coups, which is reflected in the probability *p* of being successful. These factors can be sorted into four categories. First, countries are threatened by coups if their perpetrators can rise to power at low cost. This is, for example, the case when countries have an old, small, or predominantly rural population or when they are only sparsely inhabited. Since coups are likely carried out by professional soldiers, it could also make a difference if the military is large and financially well-endowed.

Second, countries may be more vulnerable to coups, if they have weak political institutions and lack informal institutions that could support resistance against a regime that itself came to power by staging a coup. This is the case for countries that are non-democratic or have a low income per capita, countries that recently gained independence or experienced regime change, as well as countries with low levels of education (Przeworski 2011).

Third, another important factor is whether the collective action that is necessary to prepare a coup can be organized effectively and with the required secrecy (see, for example, Kim 2016). This can be described as a coordination problem. Coup plotters not only need to exchange information, but also reassure each other about their willingness to participate in the coup. At

[4] Given that resources can be used to protect the incumbent regime from threats, it is very plausible that coups frequently will be unsuccessful (Crespo Cuaresma et al. 2011).

the time of plotting the coup, they have to expect that the general population or significant parts of the political elites would accept a newly installed regime. Political instability and conflict, high population growth and inflation, as well as weak economic growth can help coup plotters to coordinate and form positive expectations about their chances of being successful. This is also the case if the country has experienced a coup already and particularly if this happened recently. A recent coup demonstrates that the collective action problem can be overcome. Fractionalization of a society (ethnic, linguistic or religious) may facilitate the organization of collective action within small homogenous groups against a political regime that is, e.g., not comprised of members of the same ethnicity. Of course, politicians also take measures to make the organization of collective action among members of the military more difficult. Such "coup-proofing" measures usually divide the military into many smaller entities, which makes it more difficult to coordinate their actions in secrecy against the political leadership (e.g., Powell 2012).

Fourth, the organization of coups may also be affected by what is happening outside the national borders (see, for example, Miller et al. 2016 and Powell et al. 2016). Coups in nearby countries can create a focal point for moving against an unpopular domestic political regime. This is analogous to the formation of revolutionary movements throughout Central and Eastern Europe in 1989, or during the so-called Arab Spring that started with the Tunisian revolution in 2010. In contrast, a large share of neighboring democratic countries might make coups less attractive, because democratic governments have an incentive not to support insurgent political regimes in their neighborhood and some of them are even legally bound to do so.

We have presented the theoretical arguments regarding coup determinants with reference to their positive or negative association with the expected utility of the involved actors. If one tries to quantify these costs and benefits, disagreement among contributors to the debate looms large. Here, we mention three such contentious issues.

The first issue deals with the relevance of the regime type for coup-proneness. One standard argument (see, for example, Lindberg and Clark 2008) is that democracies are less susceptible to coups because on average they enjoy more legitimacy than autocracies. Critics would reply that this may be the case, but autocrats can spend more resources on preventing coups (see, for example, Svolik 2009). It remains theoretically unclear which argument is more important. Bell (2016) argues and provides evidence that democracy matters for coup success, rather than for the occurrence of coups.

A second contentious issue revolves around the relevance of economic variables. Londregan and Poole (1990) argue that being less economically developed is almost a necessary condition for coups. This position is echoed by many researchers, sometimes formulated in a more precise fashion. Others object that the effect of income should be at most ambiguous, but economic growth plays an important role (Galetovic and Sanhueza 2000). Kim (2016), for example, asserts that short-run economic shocks increase the risk of a coup. And others again argue that economic conditions are rather unimportant as coup predictors. Powell (2012) insists that the characteristics of the military are more important than economic factors. Slater et al. (2014) propose an argument that refers to democratic breakdowns only. In their opinion, these breakdowns have political, not economic origins. As a political origin, they refer explicitly to weak states. Casper (2015) makes an argument that seems to refer to economic conditions, but he insists that they do not trigger coups. He conjectures instead that a country under IMF conditionality is subject to a significantly greater coup risk because the government's capacity to redistribute wealth is curtailed seriously under conditionality. The trigger of the coup is, hence, not the economic crisis itself but the reduced capacity of the government to hand out benefits to the elite.

The third contentious issue is the relevance of coup-proofing, i.e., the steps taken by the current regime to prevent coups. Early on, Belkin and Schofer (2003) proposed to separate coup-proofing from proximate coup triggers (such as recessions) and structural causes of coups (like democracy and income). Ever since, a debate has emerged about various aspects of coup-proofing that span from its effectiveness, through its implementation, to its measurement. Different policy instruments have been proposed to reduce the risk of a coup. The size of the military in terms of personnel or budget may be important, but also whether the head of the executive branch is a military officer and the degree to which the military is split into multiple independent operational units. Of course, sudden reductions in the armed forces' budget might provoke a coup by the military intent on restoring its financial position. It is unclear theoretically which of these factors are most important and the empirical evidence is mixed.

These three issues are just examples of theoretically contested arguments. The extreme bounds analysis performed in this paper helps to separate the wheat from the chaff.

3. Data and extreme bounds analysis

We employ variants of EBA to tackle the problem of model uncertainty that arises because of the many alternative explanations for the incidence of coups summarized above. The EBA approach enables us to examine whether the variables proposed in the extant literature are indeed robust determinants of coups d'état, independent of the combination of variables included in the regression model. In the EBA, we estimate linear probability models of the determinants of coups.[5] Standard errors are clustered at the country level, which is particularly important here as we use monthly data. Owing to limited data availability for some of the independent variables, the final dataset employed in this analysis includes monthly data from 1952 to 2011 for 164 countries. We use two alternative empirical approaches. We estimate pooled cross-sectional models with region-fixed effects (which comprise time-invariant variables), as well as specifications with country-fixed effects (controlling for all unobserved time-invariant heterogeneity between countries).

To conduct an EBA, models of the form described by the following equation are estimated:

$$Coups_{it} = \beta_M M_{it} + \beta_F F_{it} + \beta_Z Z_{it} + \upsilon_{it}, \qquad (2)$$

where *Coups* is the occurrence of an attempt to overthrow the sitting chief executive, *M* is a vector of "commonly accepted" explanatory variables, which we include in all models, and *F* is a vector containing the variable of interest. The vector *Z* contains, as in Levine and Renelt (1992), up to three possible explanatory variables, in addition to those in *M*. According to the broader literature, all indicators in *M*, *F*, and *Z* are related to our dependent variable. The error term is υ. The indices *i* and *t* denote countries and months, respectively.

The original EBA test uses a single criterion to determine whether a variable in *F* is to be considered robustly related to coups. This criterion implies that the relationship is not robust if the lower extreme bound for β_F (i.e., the lowest estimated value for β_F minus two standard deviations) is negative and the upper extreme bound for β_F (i.e., the highest estimated value for β_F plus two standard deviations) is positive. Sala-i-Martin (1997) argues that this criterion is far too strong for any variable to pass. If the distribution of the parameter of interest has both

[5] In the literature, linear probability models, logit, and probit models are roughly equally common. Calculation speed, the absence of convergence problems, the ability to include country-fixed effects as well as the possibility of interpreting the resulting coefficients directly strongly favors the linear probability model in our EBA.

positive and negative support and enough regressions are run, then a researcher is bound to find at least one regression model for which the estimated upper and lower bounds have opposing signs. In what follows, we report the percentage of the regressions in which the coefficient of the variable *F* is statistically different from zero at the 5 % level.

Rather than analyzing the extreme bounds of the coefficient estimates for a particular variable only, we follow Sala-i-Martin's (1997) recommended procedure and analyze the entire distribution of point estimates. Accordingly, we report the unweighted parameter estimate of β_F and its standard error as well as the unweighted cumulative distribution function (CDF). The CDF indicates the area under the density function that is either above or below zero, whichever is larger. Thus, the CDF can take values between 0.5 and 1.[6]

In order to fill our vectors with variables we have indexed 42 empirical studies of the determinants of coups d'état. The very large variation in the selection of independent variables is noteworthy. Many variables are tested in just one study. Even the most frequently used indicator, income per capita, was included in less than 80 % of all studies. These studies and their findings are summarized in Appendix B. In our selection of variables for the *M*-vector, we follow the bulk of the literature. Given the absence of an encompassing theoretical model, we rely on a count of the number of times a variable was used in this literature and choose only those variables that appeared in at least a dozen studies. The seven variables fulfilling this criterion are (in descending order of frequency of use): the natural log of real GDP per capita (33), the lagged growth rate of real GDP per capita (21), a dummy for democracy (17), a dummy indicating whether the country has experienced at least one previous coup (12), and the number of months since the last coup occurred in that country in linear, squared, and cubic form (12). Except for income and its growth rate, all variables in *M*, i.e., the variables included in every model specification of our EBA, are based on monthly data. We also include a set of dummy variables for decades and months, and either region- or country-fixed effects.

We have collected another 59 variables that may influence the incidence of coups for inclusion in our *Z*-vector. Of these, 51 are measured annually and 8 are time invariant. All of these

[6] Sala-i-Martin (1997) proposes using the integrated likelihood to construct a weighted CDF. However, missing observations for some variables pose a problem. Moreover, Sturm and de Haan (2002) show that the goodness-of-fit measure may not be a good indicator of the probability that a model is the true model and that weights constructed as in Sala-i-Martin (1997) are not invariant to linear transformations of the dependent variable. Hence, changing scales can result in different estimates and conclusions. We therefore employ the unweighted version of the CDF.

variables have been tested in previous studies and are listed in Appendix A, along with their exact operationalization and data source. Some variables from the literature could not be considered because of limited data availability or inability to test them in a general cross-country setting. We test all variables in either linear or logarithmic form, even if some of them also have been tested for a nonlinear effect. Appendix B shows all variables that have been used in previous studies and their estimated effects.

The EBA works as follows. First, we evaluate simultaneously the robustness of the variables in the baseline specification (*M*) by adding all possible combinations of up to three variables from the *Z*-vector. In the second step, we evaluate the robustness of one variable that we take from *Z* (this variable now represents the *F*-vector) and, again, we use all possible combinations of up to three of the remaining 58 (or 50 when fixed effects are included) variables in the *Z*-vector to evaluate the robustness of the one variable in *F*. At the end, the variable in the *F*-vector is returned to *Z* and this procedure is repeated for every variable in *Z*. The first part of the analysis evaluates whether the variables in the base model are robustly related to coups, whereas the second part determines whether the relationship with any other variable is robust.

The criterion for a variable to be considered robust is a CDF of greater than 0.9, according to Sala-i-Martin (1997), or greater than 0.95, according to Sturm and de Haan (2005). The latter argue that the testing criterion needs to be stricter because the EBA is a two-sided test. As we report the results according to Sala-i-Martin's criterion, the reader can choose which threshold to apply in evaluating robustness. Before we present the robust determinants in the next section, some of the indicators used in the EBA should be explained in more detail.

We construct our dependent variable from a dataset by Powell and Thyne (2011), which consolidates 14 existing datasets on coups that have been used in the empirical literature. An important value added by Powell and Thyne, beyond merging the information contained in those different sources, is to evaluate the resulting candidate events based on a consistent and clear definition of coups (see Section 1). Moreover, Powell and Thyne add information on the precise date of each event. The authors report that the original data sources omit many events, or code false positives by conflating wars, assassinations or protests with coups. Finally, Powell and Thyne compare the coups in their consolidated dataset to all coups mentioned in major media sources. This leads to the addition of seven completely new events to the dataset.

Based on these data, we generate a binary indicator for our country-month panel dataset. It comprises 465 coups in total, about half of which were successful. These represent all coups worldwide since 1950, or the respective country's year of independence. We ignore seven coups, which took place in a month during which a coup already had occurred.[7] Thus, we take into account only the first coup in a given country in each month. Our use of monthly data significantly reduces the incidence of multiple coups within a single observation, as 14 % of all coups happen in a year that has seen at least one coup already.

We also use this monthly coup data to generate a set of indicators that have been used in the literature to explain the incidence of coups. First, we create a dummy that takes the value 1 if a country in our dataset experienced any previous coups (i.e., since the year 1950 or the country's independence). It is argued in the literature that prior experience with coups lowers the cost of organizing another coup. Another important argument is that coups are even more likely if a country experienced one recently (see Londregan and Poole 1990). We thus measure the number of months since the most recent coup. We follow common practice in recent articles and include the third polynomial of that indicator into our regressions.

Another indicator created specifically for this study is our democracy dummy. It is based on a binary indicator by Cheibub et al. (2010), which reflects whether key government offices are filled through contested elections and incumbents relinquish power if they lose the election. Since its introduction, this indicator has become popular in empirical research because of its conceptually clear distinction between democracies and autocracies. Using this minimalist procedural definition of democracy has the advantage of maintaining a discernable causal mechanism linking democracy to coups, while not confusing democracy with other concepts, such as the rule of law (Gutmann and Voigt 2016).

The indicator by Cheibub et al. is coded to reflect whether a country is a democracy at the end of a given year according to a number of clearly specified criteria. In a country-year panel analysis, one would thus estimate whether the fact that a country was democratic (or not) at the end of the previous year influences the likelihood that a coup occurs in the current year. This test ignores the possibility that the political regime might have changed between the beginning of the year and the incidence of a coup. It is quite plausible, however, as we expect newly

7 This criterion eliminates coups in Argentina (12/1975), Bolivia (05/1981), Congo (08/1968), Haiti (04/1989), Sierra Leone (03/1967), Sudan (12/1966) and Togo (10/1991).

installed political regimes to be more vulnerable to coups and coups might be reactions to a legal or illegal assumption of executive office. For example, Fiji experienced two coups in May and October 1987, after parliamentary elections in April 1987 resulted in the replacement of a government led by indigenous politicians.

Because the question whether democracies or autocracies are more resilient to coups is an important one, and democracy indicators are used frequently in the literature, we recoded the democracy dummy by Cheibub et al. (2010) to prevent biased estimates. To save on coding costs, we recoded only those years in which a coup took place. The precise timing of regime changes in all other years should be inconsequential to our analysis. We used version 4 of the Archigos dataset by Goemans et al. (2009) to determine whether the executive changed in the respective year. If not, we could rely on the data by Cheibub et al. from the previous year. In some cases, we could infer the regime type of a new government from the Cheibub et al. data, if Archigos showed that it survived until the end of the year. This is, of course, possible only if coups were unsuccessful or the new government was able to resume office after the coup (i.e., after losing political power for at least seven days). In the few dozen cases wherein new governments were removed permanently from office within the calendar year in which they took office, we coded their regime type manually, following the coding rules spelled out in Cheibub et al. (2010).[8] All coding was done by at least two trained research assistants. The fact that this task was reasonably straightforward is reflected in the high inter-coder reliability; less than one percent of the codings differed between research assistants. The variables discussed here are those contained in the *M*-vector only. Appendix A describes all indicators and their data sources.

4. Results

Our robust results are summarized in Tables 1 and 2 while our non-robust variables are presented in Appendices C and D. They display the mean coefficient estimate over all regressions, as well as the corresponding mean standard error. The share of all regressions in which the coefficient is statistically different from zero at the 5 % level also is reported. CDF refers to the cumulative distribution function, which is the area under the density function on one side of zero (either above or below zero, whichever is larger). Finally, we list the number

[8] We followed a very similar procedure for the years after 2008, which are not covered by Cheibub et al. (2010). In many cases, we were able to rely on codings by Bormann and Golder (2013).

of regressions estimated to determine the robustness of a variable of interest (which is either in the *M*-vector or in the *F*-vector), as well as the average number of observations in these regressions.

The robust determinants of coups displayed in Table 1 are estimated with region-, decade- and month-fixed effects.[9] Only 8 of the 59 variables in the *Z*-vector of the EBA can be considered robust according to our criterion, i.e., the (respectively larger) proportion of the CDF to one side of zero exceeds 0.9. If we apply the stricter threshold of CDF>0.95, only one variable passes the test. Most of the commonly used predictors of coups in our *M*-vector fulfill this criterion. However, income per capita and our democracy dummy clearly are below both CDF-thresholds. Poor countries and democracies seem to be somewhat more susceptible to coups, but these relationships are not robust according to our EBA. The other commonly used indicators show the expected signs. Low growth rates and experience with coups robustly increase the incidences of coups.

<< Table 1 about here >>

The additional indicators that turn out to have robust relationships with coups can easily be summarized. Unstable countries (e.g., owing to government crises, purges and strikes) and governments that repress their citizens are more vulnerable to coups. The positive effect of repression contradicts our simple deterrence argument in the theory section. This result is, however, consistent with the political economy model of Acemoglu and Robinson (2006), which allows for equilibrium coups against non-democracies that have capabilities to repress. Acemoglu and Robinson (2006) predict that repression is used by the elites as means of holding onto power, either when redistribution and the transfer of political power would be insufficient to content the citizens, or when repression is simply cheaper than alternative policy instruments. Yet, it is assumed that repression may backfire (with a certain probability), which leads to the removal of the government. In this model coups may occur even in situations where it would have been possible to buy the loyalty of the citizens, but the elites prefer to run a calculated risk of being overthrown.

[9] We run F-tests for the joint significance of the fixed effects. To summarize these tests, we calculate the average p-value of the tests for all regressions run. The results are: 0.218 (regions), 0.170 (decades), 0.544 (months).

The result that population growth reduces coup risk is completely unexpected. Wells (1974) is the only study in the literature to test the effect of population growth on coup incidence. He expected that population growth would put pressure on a country's resources and, hence, contribute to a higher coup risk. In Wells's study, population growth turns out to be one of the strongest predictors of coups in Africa. It is curious that this variable has not been used in later studies of the determinants of coups, and our unexpected negative result indicates need for further inquiry.

Finally, institutions seem to play an important role in coup incidence as well. Countries with secure property rights and those surrounded by democracies are less likely to experience coups. This is in line with our theoretical predictions. In countries where the state does not have to respect property rights, incentives to gain political control by staging a coup against the government become stronger. Moreover, as argued by Acemoglu and Robinson (2006), economic elites may support the removal of a government that does not respect their property rights. In contrast, neighboring (regional) democracies deter coups, possibly because those countries deny cooperation to insurgent regimes. Wobig (2015) suggests that this is due to "democracy clauses" enforced by regional international organizations.

Table 2 presents the robust determinants of coups estimated with country fixed effects (as opposed to regional fixed effects, as displayed in Table 1) plus month- and decade-fixed effects.[10] The results for the baseline variables appear to be similar to those reported in Table 1. Two exceptions are the coefficient on the previous coup indicator and the individual coefficient estimates for the time since the last coup, which no longer exceed the CDF threshold. The former result can easily be explained by the limited time variability of the variable, while the latter remain jointly significant.[11] Our results for income per capita and democracy are again not robust.

<< Table 2 about here >>

[10] The average p-values for the F-tests of the fixed effects are: 0.616 (months) and 0.303 (decades).

[11] The average p-value for the test of joint significance of the three coefficients is 0.089 and the median is 3.4E-06.

After removing the time-invariant variables for the fixed effects estimation, 11 of the 51 remaining variables in our Z-vector can be considered robust. The same determinants as before contribute to the occurrence of coups, plus three new ones: civil war, a smaller population size, and regime durability.

5. Conclusion

We apply extreme bounds analysis (EBA) to identify the robust determinants of coups d'état. Running regressions with month- and decade-fixed effects, and either region- or country-fixed effects, we find that most of the variables proposed in the existing literature are not robust predictors of coups by the standards of our EBA. It is particularly interesting to note that democracy and income do not affect countries' vulnerability to coups, despite being frequently included in empirical studies. Also, characteristics of the military (including instruments for coup-proofing) do not show up among the robust predictors of coups. Coups are, however, more likely to occur in countries that are politically unstable, economically weak, have small populations and slow population growth. It is also evident that institutions play a role in lowering coup risk. A country in a region with many democracies is less likely to experience coups, and improving the protection of property rights is an instrument to actively lower coup risk. Among the robust determinants of coups we have identified, the only one that by and large is under the control of the government is respecting and protecting property rights. This result is in line with recent literature that found effects on coup activity from trade and investment, both of which are encouraged by effective property rights protection (see Bak and Moon 2016; Powell and Chacha 2016).

It has to be emphasized that an EBA is a very rigorous test and the fact that some variables do not pass it cannot be interpreted as evidence that they do not influence the occurrence of coups. However, variables that pass the EBA should be taken seriously as determinants of coups and might be considered standard control variables for empirical studies of the causes of coups. It is important to note that the approach taken herein allows us only to make statements about correlation and not about causation. Future work could compare the results of our EBA with alternative statistical approaches to identifying robust determinants of coups (see, e.g., Plümper and Neumayer 2015), or explore whether the robust associations presented here are indeed causal. Hendry and Krolzig's (2004) provocative claim that only one regression is really needed could be put to the test by applying general-to-specific model selection.

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Table 1: Results EBA, Robust Variables, Linear Probability Models

Variable	Avg. β	Avg. SE	% Sign.	CDF	Combi	Avg. N
Base variables						
Log-Income per capita	-0.0002	0.0005	22.35	0.7041	34,276	48,183
Growth rate of real GDP per capita, t-1	-0.0148	0.0073	78.88	0.9557	34,276	48,183
Previous coup, dummy	0.0132	0.0027	98.99	0.9969	34,276	48,183
Months since last coup	-0.0016	0.0019	90.60	0.9796	34,276	48,183
Months since last coup^2	0.0003	0.0004	86.30	0.9580	34,276	48,183
Months since last coup^3	-1.2E-05	2.2E-05	80.34	0.9400	34,276	48,183
Democracy, dummy	0.0004	0.0012	1.09	0.6156	34,276	48,183
Additional variables						
Government crises	0.0057	0.0014	97.86	0.9907	32,564	47,446
Political Stability and Absence of Violence	-0.0011	0.0006	66.48	0.9416	32,399	15,336
Purges	0.0045	0.0023	76.48	0.9352	32,564	47,446
Political terror scale	0.0012	0.0005	82.39	0.9325	32,564	37,163
General strikes	0.0014	0.0008	63.90	0.9308	32,564	47,446
Population growth	-0.0592	0.0368	55.46	0.9286	32,564	47,721
Legal structure and security of property rights	-0.0008	0.0005	68.17	0.9148	32,564	14,760
Share of democratic countries in the same region, t-1	-0.0069	0.0051	43.51	0.9005	32,563	46,923

Note: ‘‘Avg. β’’ and ‘‘Avg. SE’’ give the mean over all regressions of the coefficient and the standard error, respectively. ‘‘% Sign.’’ denotes the share of regressions in which the respective coefficient is statistically significant at the five-percent level. ‘‘CDF’’ is the proportion of the area under all density functions to one side of zero. The cutoff value for a variable to be considered robustly linked to our dependent variable, and hence to be reported, is CDF>0.9. Finally, ‘‘Combi’’ and ‘‘Avg. N’’ report the total number of regressions analyzed to test each variable and the average number of observations in each regression. All regressions include region-, month-, and decade-fixed effects. Standard errors are clustered at the country level.

Table 2: Results EBA, Robust Variables, Country-Fixed Effects

Variable	Avg. β	Avg. SE	% Sign.	CDF	Combi	Avg. N
Base variables						
Log-Income per capita	-0.0017	0.0017	37.70	0.7987	22,147	44,639
Growth rate of real GDP per capita, t-1	-0.0122	0.0067	68.55	0.9303	22,147	44,639
Previous coup, dummy	-0.0012	0.0029	73.19	0.6781	22,147	44,639
Months since last coup	-0.0010	0.0012	77.52	0.8792	22,147	44,639
Months since last coup²	0.0002	0.0003	77.25	0.8878	22,147	44,639
Months since last coup³	-1.0E-05	1.8E-05	71.45	0.8769	22,147	44,639
Democracy, dummy	0.0006	0.0015	19.53	0.5257	22,147	44,639
Additional variables						
Government crises	0.0058	0.0008	96.85	0.9869	20,871	43,852
Magnitude score of episode(s) of civil warfare	0.0014	0.0005	83.77	0.9619	20,871	42,931
Legal structure and security of property rights	-0.0018	0.0007	82.78	0.9523	20,871	14,130
Purges	0.0043	0.0011	83.04	0.9517	20,871	43,852
Population growth	-0.0906	0.0450	71.95	0.9491	20,871	44,079
Political Stability and Absence of Violence	-0.0037	0.0014	76.46	0.9473	20,685	14,683
Political terror scale	0.0022	0.0006	83.38	0.9223	20,871	35,021
Log-Population	-0.0068	0.0036	65.64	0.9176	20,871	44,079
Share of democratic countries in the same region, t-1	-0.0076	0.0048	68.42	0.9136	20,871	43,363
Riots	0.0006	0.0002	74.48	0.9101	20,871	43,845
Regime Durability, t-1	0.0001	4.6E-05	57.86	0.9096	20,871	41,875

Note: See note on Table 1. All regressions include country- rather than region-fixed effects.

Appendix A: Table of all variables employed in the EBA

Variable (Group)	Used by	Definition / Operationalization	Data Source
Democracy-Dummy	Bell (2016), Bell and Sudduth (2015), Böhmelt and Pilster (2015), Casper (2015), Casper and Tyson (2014), Girod (2015), Henderson (1997), Hiroi and Omori (2013, 2014), Houle (2016), Johnson and Thyne (2016), Kim (2016), Miller et al. (2016), Piplani and Talmadge (2015), Powell (2012), Powell et al. (2016), Thyne (2010), Tusalem (2010), Wobig (2015)	Cheibub et al.-classification, recoded monthly for coup years, 1=democracy	Cheibub et al. (2010), Bormann and Golder (2013) and own codings
Economic Growth	Bell (2016), Böhmelt and Pilster (2015), Bove and Rivera (2015), Casper (2015), Casper and Tyson (2014), Hiroi and Omori (2013), Houle (2016), Jackman et al. (1986), Johnson et al. (1984), Kim (2016), Lehoucq and Pérez-Liñán (2014), Londregan and Poole (1990), Miller et al. (2016), Piplani and Talmadge (2015), Powell (2012), Powell et al. (2016), Slater et al. (2014), Thyne (2010), Wells (1974), Wig and Rod (2016), Wobig (2015)	Annual growth rate of real GDP per capita in the previous year	Own calculation based on Feenstra et al. (2015)
Income per capita	Arbatli and Arbatli (2016), Belkin and Schofer (2003), Bell (2016), Bell and Sudduth (2015), Böhmelt and Pilster (2015), Bove and Rivera (2015), Casper (2015), Casper and Tyson (2014), Galetovic and Sanhueza (2000), Girod (2015), Harkness (2016), Henderson (1997), Hiroi and Omori (2013, 2014), Houle (2016), Johnson and Thyne (2016), Kim (2016), Lehoucq and Pérez-Liñán (2014), Londregan and Poole (1990), Malul and Shoham (2006), Marcum and Brown (2016), Miller et al. (2016), O'Kane (1981, 1993), Piplani and Talmadge (2015), Powell (2012), Powell et al. (2016), Slater et al. (2014), Thyne (2010), Tusalem (2010), Wells (1974), Wig and Rod (2016), Wobig (2015)	Log-real GDP per capita	Feenstra et al. (2015)
Previous Coup-Dummy	Arbatli and Arbatli (2016), Bove and Rivera (2015), Galetovic and Sanhueza (2000), Henderson (1997), Kim (2016), Londregan and Poole (1990), Lunde (1991), O'Kane (1981, 1993), Rowe (1974), Tusalem (2010), Wang (1998)	Previous coup in this country since 1950 or independence, monthly data	Own calculation based on Powell and Thyne (2011)
Time Since Coup	Bell and Sudduth (2015), Casper (2015), Casper and Tyson (2014), Houle (2016), Johnson and Thyne (2016), Kim (2016), Lehoucq and Pérez-Liñán (2014), Londregan and Poole (1990), Lunde (1991), Powell (2012), Powell et al. (2016), Slater et al. (2014), Wig and Rod (2016), Wobig (2015)	Linear, quadratic and cubic time trend measured in years, monthly data	Own calculation based on Powell and Thyne (2011)

Absolute Latitude	Arbatli and Arbatli (2016)	The absolute value of the latitude of the capital city, divided by 90	La Porta et al. (1999)
Age Dependency Ratio	Slater et al. (2014)	Ratio of the population older than 64 to the working age population	World Bank (2016)
Aid	Girod (2015), Hiroi and Omori (2014), Rowe (1974), Thyne (2010), Wells (1974)	Net ODA received (share of GNI)	World Bank (2016)
Chief Executive Military Officer-Dummy	Arbatli and Arbatli (2016), Belkin and Schofer (2003), Bell (2016), Böhmelt and Pilster (2015), Bove and Rivera (2015), Johnson and Thyne (2016), Hiroi and Omori (2013, 2014), Miller et al. (2016), Powell (2012), Thyne (2010), Wobig (2015)	Chief executive is a military officer, 1=yes	Beck et al. (2001)
Colonial History	Tusalem (2010), Wang (1998)	Dummies for British, French, and no colonial origin	Hadenius and Teorell (2007) via Teorell et al. (2016)
Coup Spillover	Lehoucq and Pérez-Liñán (2014), Miller et al. (2016)	Number of coups per country in the same region in the previous year (regions: Eastern Europe and post-Soviet Union, Latin America, MENA, SSA, Western Europe and North America, Asia, and other regions)	Own calculation based on Hadenius and Teorell (2007), Powell and Thyne (2011)
Coup-Proofing	Bell and Sudduth (2015), Böhmelt and Pilster (2015), Houle (2016), Powell (2012)	Effective number of military organizations	Pilster and Böhmelt (2012)
Democracy Spillover	Lehoucq and Pérez-Liñán (2014), Miller et al. (2016), Powell et al. (2016), Slater et al. (2014), Wobig (2015)	Share of democratic countries in the same region at the end of the previous year (regions: Eastern Europe and post-Soviet Union, Latin America, MENA, SSA, Western Europe and North America, Asia, and others)	Own calculation based on Hadenius and Teorell (2007), Cheibub et al. (2010)
Economic Reform	Casper (2015)	Average level of reform in six economic sectors	Giuliano et al. (2013)
Education	Wells (1974)	Average years of secondary schooling among the population aged 15 and older	Barro and Lee (2013)
Fractionalization	Arbatli and Arbatli (2016), Bell (2016), Girod (2015), Harkness (2016), Henderson (1997), Houle (2016), Jackman (1978), Johnson et al. (1984), Jenkins and Kposowa (1992), Kposowa and Jenkins (1993), Lunde (1991), Piplani and Talmadge (2015), Tusalem (2010)	Ethnic, linguistic, and religious fractionalization	Alesina et al. (2003)
Government Consumption	Slater et al. (2014)	Share of government consumption at current PPPs	Feenstra et al. (2015)
IMF Program	Casper (2015)	Dummies for IMF program, and World Bank adjustment-project (respectively in effect for over four months)	Dreher (2006), Boockmann and Dreher (2003)
Income Inequality	Hiroi and Omori (2014), Miller et al. (2016)	Gini index	Solt (2009)
Inflation	Casper (2015)	Inflation as measured by the annual growth rate of the GDP implicit deflator	World Bank (2016)

Island-Dummy	Arbatli and Arbatli (2016)	Country is a small island	Spolaore and Wacziarg (2013)
Military Expenditure	Kim (2016), Powell et al. (2016), Wang (1998), Wells (1974)	Log-military expenditure	Singer (1988)
Military Expenditure Growth	Böhmelt and Pilster (2015), Bove and Rivera (2015), Powell (2012)	Annual growth rate of military expenditure in the previous year	Own calculation based on Singer (1988)
Military Expenditure per Personnel	Bell (2016), Bell and Sudduth (2015), Böhmelt and Pilster (2015), Bove and Rivera (2015), Marcum and Brown (2016), and Powell (2012)	Military expenditure per personnel	Own calculation based on Singer (1988)
Military Personnel	Bell and Sudduth (2015), Böhmelt and Pilster (2015), Bove and Rivera (2015), Kim (2016), Marcum and Brown (2016), Miller et al. (2016), Piplani and Talmadge (2015), Powell (2012), Wells (1974)	Log-military personnel	Singer (1988)
Mineral Rents	Slater et al. (2014)	Mineral rents (share of GDP)	World Bank (2016)
Natural Resources	Girod (2015), Slater et al. (2014)	Total natural resource rents (share of GDP)	World Bank (2016)
Negative Growth-Dummy	Galetovic and Sanhueza (2000), and Marcum and Brown (2016)	Negative annual growth rate of real GDP per capita	Own calculation based on Feenstra et al. (2015)
Oil Exports	Harkness (2016)	Net oil exports value per capita, constant prices	Ross and Mahdavi (2015)
Oil Production	Houle (2016), Miller et al. (2016)	Oil production value, constant prices	Ross and Mahdavi (2015)
Political Stability (various indicators)	Arbatli and Arbatli (2016), Bove and Rivera (2015), Casper (2015), Galetovic and Sanhueza (2000), Kim (2016), Maniruzzaman (1992)	Indicators for assassinations, anti-government demonstrations, government crises, guerrilla warfare, purges, riots, and general strikes	Banks (2012)
Political Stability and Absence of Violence	Belkin and Schofer (2003), Böhmelt and Pilster (2015), Hiroi and Omori (2013), Houle (2016), Maniruzzaman (1992), Powell (2012), and Thyne (2010)	Worldwide Governance Indicator: Perceptions of the likelihood of political instability and politically-motivated violence	Kaufmann et al. (2011)
Repression	Bove and Rivera (2015)	Political Terror Scale based on US State Department reports	Gibney et al. (2015)
Population Density	Girod (2015), and Malul and Shoham (2006)	Population divided by land area	World Bank (2016)
Population Growth	Wells (1974)	Annual growth rate of the population size	Own calculation based on Feenstra et al. (2015)
Population Size	Arbatli and Arbatli (2016), Casper (2015), Casper and Tyson (2014), Piplani and Talmadge (2015), Slater et al. (2014), Wells (1974)	Log-population size	Feenstra et al. (2015)
Recent Independence	O'Kane (1981)	Country became independent in this or one of the previous five years	Own calculation based on Gleditsch and Ward (1999)
Recent War	Belkin and Schofer (2003)	No war in this year or the previous ten years	Own calculation based on Marshall (2015)
Regime Duration	Piplani and Talmadge (2015)	Number of years since the most recent regime change	Marshall et al. (2014)

Security of Property Rights	Tusalem (2010)	Index of legal structure and security of property rights	Gwartney et al. (2015)
Size of Government	Slater et al. (2014)	Index of size of government (expenditures, taxes and enterprises)	Gwartney et al. (2015)
Trade	Houle (2016), Slater et al. (2014)	Sum of exports and imports of goods and services (share of GDP)	World Bank (2016)
Urbanization	Hendersson (1997), Hiroi and Omori (2013), Wells (1974)	Urban population (share of total population)	World Bank (2016)
Violence, Conflict, and War	Arbatli and Arbatli (2016), Bell and Sudduth (2015), Casper (2015), Casper and Tyson (2014), Girod (2015), Johnson and Thyne (2016), Kim (2016), Piplani and Talmadge (2015), Thyne (2010), and Wobig (2015)	Magnitude scores for civil violence, civil warfare, ethnic violence, ethnic warfare, international violence, and international warfare; number of interstate armed conflicts, internal armed conflicts, and internationalized internal armed conflict	Marshall (2015), Themnér and Wallensteen (2013)
War spillover	Belkin and Schofer (2003), Miller et al. (2016)	Avg. magnitude of civil, ethnic, and international warfare in the same region in the previous year (regions: Eastern Europe and post-Soviet Union, Latin America, MENA, SSA, Western Europe and North America, Asia, and others)	Own calculation based on Hadenius and Teorell (2007), Marshall (2015)

Appendix B: Detailed description of all studies considered

Author(s)	Period	Countries	Obs.	Coup Measure	Explanatory Variables	Effect	Sign.	Empirical Method
Arbatli and Arbatli (2016)	1960-2000	n/a	4,766	MM	MID, by home	-	+	Logit
					MID, not by home	-	~	SUR bivariate probit
					Past coups	+	+	FE Logit
					MID, favorable home	+	~	Region FE
					MID, unfavorable home	+	~	Year FE
					MID, other	+	+	
					Civil conflict	+	+	
					Post-Cold War	-	~	
					Coup risk	+	++	
					Income	-	+	
					Population	-	~	
					Small island	+	~	
					Latitude	+	~	
					MID participation	-	+	
					Number of allies	+	~	
					MID, home joiner	-	++	
					Military exp. p.c.	-	~	
					Military pers. p.c.	+	~	
					Civilian regime	+	~	
					Military regime	+	~	
					Mili-Civ regime	+	~	
					Autocracy	+	~	
					Anocracy	+	+	
					Demonstrations	+	~	
					Riots	+	+	
					Strikes	+	+	
					Common law	+	~	
					French legal origin	+	~	
					Socialist legal origin	+	~	
					Ethnic fractionalization	+	~	
					Religious fractionalization	-	~	
					Leader deposed foreign	+	~	
					MID-related fatalities	+	+	

Belkin and Schofer (2003)	1960-2000	144	4,250	Own coding	Coup risk Recent coup Income Domestic instability Military regime Regional conflict Recent war	+ + - + + - +	++ ~ + ++ ++ ~ ~	RE Logit Region FE
Bell (2016)	1945-2011	n/a	68,878	MM, PT, own coding	Democracy Executive constraints Military regime Interim regime Income Income growth Military exp. p. personnel Peace years Ethnic fractionalization Leader tenure	- - + + - - - - + -	~ ++ + ~ + ~ ++ ~ + +	Complementary log-log
Bell and Sudduth (2015)	1950-2011	193	7,325	PT	Civil war Income Military exp. p. personnel Military personnel Paramilitary Coup-proofing Democracy Military dictatorship Time since coup	+ - - - - - ~ + n.l.	+ ~ ~ + + + ~ ++ +	Probit
Böhmelt and Pilster (2015)	1975-1999	n/a	3,060	PT	Income growth Income Instability Democracy Authoritarian Military exp. growth Military exp. p. personnel Military personnel Military regime Coup-proofing	- - + - - - - - + n.l.	~ ~ ++ ~ ~ ~ ~ + ++ +	Probit Splines

Bove and Rivera (2015)	1950-2004	n/a	3,333	Goemans et al. (2009)	Elected legislature Purges Income Income growth Dissent Military exp. growth Military personnel Military exp. p. personnel Past coups Single-party regime Military regime Personalist regime Civil liberties Repression	- + ~ - + ~ - ~ + + + + - +	++ + ~ + ++ ~ ~ ~ ++ ~ ~ ~ ~ ~	Probit
Casper (2015)	1975-2004	n/a	2,635	PT	IMF program Population Income Military capabilities International reserves External debt Winning coalition size Inflation Strikes Income growth Protests Riots Regime type International conflict Civil war Government crisis Time since coup Economic reform	+ + - - + - - n.l. + n.l. - + + + + + n.l. +	+ ~ ~ + ~ ~ ~ ~ ++ + ~ ~ ++ ++ ++ ++ ~ ++	Probit Region FE

Casper and Tyson (2014)	1989-2010	n/a	3,045	MM	Protests Speech limits Income growth Population Income Military capabilities Civil war Democracy International conflict New regime Time since coup	n.l. n.l. - ~ - - + - + + n.l.	~ ~ + ~ + + ++ + ~ ~ +	SUR bivariate probit Region FE
Galetovic and Sanhueza (2000)	1950-1982	89	2,243	Own coding	Recession Popular unrest Income Past coups	+ + - +	++ ++ ++ ++	Probit Region FE
Girod (2015)	1970-2009	n/a	1,260	PT	Windfall income Nonstrategic aid Development Global development Baseline development Income Democracy War deaths War duration Incumbent tenure Irregular entry Population density Ethnic fractionalization	n.l. n.l. n.l. + - - + - + - n.l. - +	~ ~ ~ ~ ~ ~ ~ + ~ ~ ~ ~ ~	Logit Time polynomial Region FE Decade FE
Harkness (2016)	1952-2012	43	43	Own coding	Ethnic & unmatched Ethnic & matched Inclusive & unmatched Prior ethnic violence Income Mineral exporter Ethnic fractionalization	+ + + + - - +	++ ~ ~ ~ ~ ~ ~	Negative binomial regression

Henderson (1997)	1960-1997	n/a	100	Own coding	Past coups Regime Income Concentration Linguistic fractionalization Urbanization Militarization Arms transfers	+ - - + n.l. - - +	+ ~ ~ ~ + + ~ ~	Logit
Hiroi and Omori (2013)	1962-2007	152	5,152	MM	Income Urbanization Party fractionalization Full democracy Full autocracy Income growth Social instability Transitional regimes Cold war Military leader	- - - - - - n.l. + n.l. +	++ + ~ + + ~ ++ + ++ +	Stratified Cox model Region FE
Hiroi and Omori (2014)	1960-2007	146	4,233	MM	Ch. in cabinet size Ch. to left Ch. in capital openness Society type Income Military leader Democracy Cold war World coups Foreign aid	n.l. n.l. n.l. n.l. n.l. + + + + +	~ ~ ~ ~ ~ ~ ~ ++ ~ ~	Stratified Cox model

Houle (2016)	1960-2008	128	5,004		Capital share of value added in manufacturing Top percentile share of income Net income Gini index Income Income growth Income from oil and gas Instability Openness Ethnic fractionalization Democracy Cold war Time since coup Coup-proofing	+ + + - - + + - - n.l. + - -	++ ++ ++ ++ ++ + ~ ~ ~ + + ++ ~	Logit Splines
Jackman (1978)	1960-1975	30	30	Own coding	Social mobilization Size largest ethnic group Winning party size Electoral turnout	n.l. n.l. n.l. n.l.	~ ~ ~ ~	OLS
Jackman et al. (1986)	1960-1984	35	35	Own coding	Military cohesion Military political centrality Political pluralism Turnout pre-independence Population in agriculture Ch. population in capital city Ch. industrial jobs Income growth Exports-imports/GDP Ch. in export commodity concentration	+ + - - - + - - - +	+ + + + + + ~ + ~ +	OLS
Jenkins and Kposowa (1992)	1957-1984	33	33	Johnson et al. (1984)	Social mobilization Political factionalism Military centrality Ethnic antagonism Political competition Export dependence	+ + + + + -	~ ~ ++ ++ + ~	OLS

Johnson and Thyne (2016)	1952-2005	150	79,404	PT	Protests Protests near capital Protests away from capital Violent protests Peaceful protests Income Democracy Authoritarian Military regime Civil conflict Time since coup	+ + + + + - - - + + n.l.	+ + + + + + + + + + n/a	Logit Country FE Year FE Matching
Johnson et al. (1984)	1960-1982	35	35	Own coding	Social mobilization Size largest ethnic group Winning party size Electoral turnout Military cohesion Military political centrality Political pluralism Turnout pre-independence Population in agriculture Ch. population in capital city Ch. industrial jobs Income growth Exports-imports/GDP Ch. in export commodity concentration	+ n.l. n.l. n.l. + + - - - + - - - +	+ ~ ~ ~ + ~ + ~ + + + + + +	OLS
Kim (2016)	1960-2005	148	4,604	PT	Income growth Income Democracy Military dictatorship Civil war Interstate war Past coups Protests Military exp./GDP Military personnel Time since coup	- - + ~ + - + + - + n.l.	++ ++ ~ ~ ~ + + ++ ~ + n/a	2SLS Country FE Year FE

Kposowa and Jenkins (1993)	1957-1984	33	33	Johnson et al. (1984)	Ethnic dominance Ethnic plurality Ethnic competition Structural capacity Political awareness Political factionalism Military centrality Ethnic antagonism Cabinet competition Export dependence Debt dependence Investment dependence	- + + - - + + + - + - -	~ ~ + ~ + ++ ++ ++ ~ ~ ++ ~	OLS
Lehoucq and Pérez-Liñán (2014)	1900-2006	18	1,878	Own coding	Time since coup Political competition Income Income growth Family farms Presidential powers Regional coups Diffusion of democracy Liberal era ISI era	n.l. - - - - - - - - +	~ ~ ~ ~ ~ ~ + + ~ ~	RE logit Conditional FE logit
Londregan and Poole (1990)	1950-1982	121	3,036	World Handbook of Political and Social Indicators	Recent coup Past coups Income Income growth Time since independence	+ + - - n.l.	+ ~ + ~ ~	Probit Simultaneous equations Region FE
Lunde (1991)	1955-1985	92	92	Own coding	Time since independence Social mobilization Size largest ethnic group Winning party size Electoral turnout Number of coups Past coups Past successful coups	+ + + - - - + +	++ + + + ~ + ++ +	Log-logistic

Malul and Shoham (2006)	n/a	59	59	n/a	Income Individualism Uncertainty avoidance Population density Infrastructure density	- - + + -	+ + + ~ +	Poisson
Maniruzzaman (1992)	1963-1980	80	80	Own coding	Arms transfers Killings Riots Strikes	+ + + +	++ + ~ ~	Logit
Marcum and Brown (2016)	1950-1999	167	5,513	MM, PT	Winning coalition size W/S ratio Personalist regime Non-dynastic monarchy Single-party regime Income Negative growth Military personnel Military exp. p. personnel Conflict outcome Last coup	+ + ~ - - - + - - + -	++ ++ ~ + + + ~ ~ ~ + +	Probit
Miller et al. (2016)	1950-2010	174	7,899	PT	Regional coups Recent successful coup Recent coup Regional failed coups Income Democracy Military regime Party-based regime Income growth Civil violence International violence Regional democracy Fuel dependence Income inequality Military personnel	- ~ + ~ - n.l. + - - - - ~ ~ + +	~ ~ + ~ ++ + ~ + ~ ~ ~ ~ ~ ~ ~	Logit EBA Region FE Year FE

O'Kane (1981)	1950-1971	125	125	Own coding	Income Export concentration Main export/GDP Past coups Recent independence Foreign troops	- + n.l. + - -	+ + ~ + + +	Discriminant analysis
O'Kane (1993)	1950-1990	42	42	Own coding	Income Export concentration Main export/GDP Past coups Foreign troops	- + n.l. + -	+ + ~ + +	Discriminant analysis
Piplani and Talmadge (2015)	1950-2010	154	5,024	PT	Interstate conflict Conflict duration Civil conflict Fatalities Revisionist state Democracy Regime duration Income growth Income Military exp. Military personnel Population Ethnic fractionalization	+ - + + - - - - - + + - -	~ ++ + ++ ~ ++ + ~ ++ ~ ~ ++ ~	Cox model Region FE
Powell (2012)	1961-2000	n/a	4,695	PT	Military exp. growth Military exp. p. personnel Military personnel Coup-proofing Income growth Income Instability Democracy Authoritarian Military regime Time since coup	~ - - ~ - - + - - + -	~ ~ ++ ~ ~ ~ ++ ~ ~ ++ +	Probit

Powell et al. (2016)	1950-2014	54	2,732	PT	African Union member Cold War Income Democracy Income growth Regional democracy Military exp./GDP Time since coup	- + - ~ - ~ - n.l.	+ ~ + ~ ~ ~ ~ ~	Probit
Rowe (1974)	1953-1972	47	47	Own coding	Past coups US military aid US military training	~ ~ ~	~ ~ ~	OLS
Slater et al. (2014)	1972-2007	139	3,186	MM	Taxes Income growth Income Government expenditure Manufacturing value added Resource rents Population Age dependency ratio Openness Regional democracy Time since coup	- - - + + + + - - + -	++ + + ~ ~ ~ ~ + ~ ~ ~	Negative binomial regression
Thyne (2010)	1960-1999	19	7,125	MM, PT	US signals US signals (positive) US signals (negative) US aid US MID Democracy Military regime Instability Civil war Income Income growth	- - - - + - + + - - -	+ ~ ++ + + ~ ++ + ~ ~ ~	Logit

Tusalem (2010)	1970-1990	88	1,659	Banks	Contract-intensive money Primary commodity exporter Democracy Past coups Income British colony Government capital expenditure Ethnic fractionalization	- + + + - - + +	++ + + + ~ ~ ~ ~	OLS
Wang (1998)	1960-1990	35	35	Own coding	Arms transfers Lagged arms transfers Military centrality Domestic economy Social mobilization Ethnic dominance Length of military rule French colony Past coups	+ - + - - ~ + - +	~ ++ ++ ~ ~ ~ ~ + ~	Poisson regression
Wells (1974)	1960-1969	31	31	Own coding	Population Population growth Urbanization Centrality Literacy Mass media Income Income growth Military personnel p. population Military personnel Police personnel Military exp. Military exp./budget Military exp./GDP US aid	+ + + + + - - - + + + - + + -	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	OLS

Wig and Rod (2016)	1950-2008	117	958	PT	Opposition gained votes in election Postelection riots or protests Income Income growth Regime age Time since coup First competitive election	+ + - - ~ - +	+ ++ ~ ~ ~ + ~	RE Logit
Wobig (2015)	1991-2008	n/a	2,653	MM, PT	Democracy clause Income Income growth Democracy Military regime Regional democracy Domestic conflict Time since coup	- - - n.l. + ~ + -	~ + ~ + + ~ ~ +	Logit

Note: "Obs." is the number of observations. "Sign." is the statistical significance of each variable: ++ is significant at the 1%-level, + at the 10%-level, ~ not (or not consistently) at the 10%-level. Analogously, the estimated effect is reported as positive (+), negative (-), nonlinear (n.l.) or unstable (~). MM=Marshall (2015) & Marshall et al. (2014), PT=Powell and Thyne (2011).

Appendix C

Non-robust results, LPM with region-fixed effects

Variable	Avg. β	Avg. SE	% Sign.	CDF	Combi	Avg. N
Anti-Government Demonstrations	0.0004	0.0003	50.19	0.8739	32564	47440
Civil Warfare	0.0008	0.0006	36.13	0.8687	32564	46317
Interstate armed conflict	-0.0021	0.0017	17.59	0.8639	32510	13605
Is Chief Executive a Military Officer?	0.0017	0.0015	62.70	0.8634	32564	39344
Riots	0.0005	0.0003	36.65	0.8569	32564	47438
Income Inequality	-0.0001	0.0001	7.38	0.8534	32564	30524
Internationalized Internal Armed Conflict	-0.0012	0.0009	40.25	0.8424	32510	13605
Size of Government	-0.0005	0.0005	1.30	0.8401	32564	15546
Population Size	-0.0004	0.0003	37.27	0.8374	32564	47721
Assassinations	0.0005	0.0004	42.50	0.8342	32564	47446
Economic Reform	0.0100	0.0095	13.59	0.8110	32564	37017
Inflation	-0.0002	0.0006	34.69	0.8077	32564	43799
Guerrilla Warfare	0.0009	0.0009	53.21	0.7874	32564	47446
Ethnic Warfare	0.0004	0.0004	48.86	0.7685	32564	46317
Religion Fractionalization	-0.0012	0.0016	4.30	0.7663	32564	47399
Negative Economic Growth	0.0009	0.0012	9.30	0.7647	32564	47721
Mineral Rents	0.0001	0.0001	14.42	0.7608	32564	41497
Oil Exports	0.0001	0.0001	10.90	0.7488	32564	29714
Population Density	0.0004	0.0006	9.28	0.7474	32564	45829
Military Personnel	-0.0003	0.0003	30.13	0.7405	32564	44479
Trade	-0.0054	0.0076	29.40	0.7349	32564	43919
No War Previous 10 Years	-0.0007	0.0011	19.33	0.7348	32564	46320
Military Expenditure per Personnel	2.31E-06	3.17E-06	5.13	0.7324	32564	42354
Coup Spillover	0.0081	0.0103	38.41	0.7058	32563	47722
Age Dependency Ratio	-4.6E-05	8.6E-05	10.16	0.7056	32564	46387
World Bank Project	0.0010	0.0013	9.60	0.7023	32564	30346
Natural Resource Rents	1.6E-05	2.7E-05	0.18	0.7020	32564	39833
Oil Production	-5.1E-12	9.5E-12	6.47	0.6972	32564	46708
French Colony	0.0005	0.0012	11.29	0.6929	32564	47721
Never Colony	-0.0006	0.0011	13.36	0.6901	32564	47721
Internal armed conflict	0.0005	0.0008	9.88	0.6817	32510	13605
Military Expenditure	-0.0003	0.0002	27.58	0.6744	32564	43547
Independence in Previous Five Years	0.0037	0.0043	2.46	0.6706	32276	48010
Language Fractionalization	-0.0006	0.0016	3.16	0.6564	32564	46257
Urbanization	-0.0082	2.6E-05	3.05	0.6503	32564	46504
War Spillover	0.0012	0.0029	4.72	0.6486	32563	47722
Ethnic Fractionalization	0.0006	0.0019	1.33	0.6470	32564	47236
Aid	3.6E-05	0.0001	5.97	0.6299	32564	33353
International Warfare	-0.0001	0.0004	15.20	0.6281	32559	46324
Military Expenditure Growth	0.0004	0.0011	0.07	0.6096	32564	42352
IMF Program	-0.0001	0.0009	2.10	0.6048	32564	42996
International Violence	0.0010	0.0024	6.54	0.5986	32564	46317
British Colony	-0.0001	0.0010	5.91	0.5986	32564	47721
Civil Violence	-0.0002	0.0008	7.87	0.5837	32564	46317
Latitude	-0.0003	0.0040	0.19	0.5816	32564	43523
Government Consumption	0.0001	0.0033	0.84	0.5615	32564	47721
Ethnic Violence	-0.0001	0.0007	4.73	0.5597	32564	46317
Regime Durability	-0.0011	0.0000	1.30	0.5372	32564	45191
Education	3.16E-05	0.0006	0.54	0.5135	32399	9160
Small Island	0.0045	0.0025	17.07	0.5093	32537	47437
Coup-Proofing	1.43E-05	0.0007	1.11	0.5064	32564	39847

Appendix D

Non-robust results, LPM with country-fixed effects

Variable	Avg. β	Avg. SE	% Sign.	CDF	Combi	Avg. N
Urbanization	-0.0002	0.0001	60.45	0.8924	20871	43189
General Strikes	0.0011	0.0007	48.16	0.8805	20871	43852
Anti-Government Demonstrations	0.0005	0.0002	70.26	0.8705	20871	43846
Assassinations	0.0005	0.0003	67.28	0.8685	20871	43852
Ethnic Warfare	0.0009	0.0005	74.27	0.8634	20871	42931
Size of Government	-0.0008	0.0006	46.51	0.8631	20871	14852
Civil Violence	0.0015	0.0012	41.10	0.8601	20871	42931
Guerrilla Warfare	0.0011	0.0007	58.00	0.8531	20871	43852
Internal armed conflict	0.0029	0.0015	72.96	0.8531	20826	13021
Interstate armed conflict	-0.0031	0.0027	51.88	0.8444	20826	13021
No War Previous 10 Years	-0.0019	0.0015	54.08	0.8401	20871	42935
Economic Reform	0.0096	0.0091	23.72	0.8199	20871	34417
Trade	-2.0E-05	2.5E-05	15.09	0.7895	20871	40959
Is Chief Executive a Military Officer?	0.0019	0.0017	55.99	0.7807	20871	37024
Internationalized Internal Armed Conflict	-0.0013	0.0015	17.55	0.7684	20826	13021
Inflation	-0.0008	0.0012	2.65	0.7551	20871	40859
International Violence	0.0016	0.0020	18.94	0.7431	20871	42931
Negative Economic Growth	0.0007	0.0011	9.71	0.7311	20871	44079
Coup Spillovers	0.0081	0.0088	34.79	0.7213	20871	44079
Education	0.0021	0.0028	14.91	0.7003	20685	8663
Mineral Rents	0.0001	0.0002	14.74	0.6997	20871	38976
Military Expenditure	0.0002	0.0006	39.92	0.6800	20871	40329
Aid	-0.0001	0.0001	18.71	0.6770	20871	31188
IMF Program	-0.0003	0.0010	7.47	0.6745	20871	40274
War Spillover	0.0011	0.0035	9.21	0.6551	20871	44079
World Bank Project	0.0012	0.0014	13.57	0.6547	20826	28541
Oil Exports	-0.0005	0.0009	5.06	0.6396	20871	28168
Military Expenditure per Personnel	5.0E-06	1.1E-05	5.66	0.6394	20871	39333
Coup-Proofing	0.0001	0.0010	25.52	0.6242	20871	37496
Income Inequality	0.0001	0.0001	12.73	0.6232	20871	28833
Oil Production	-1.4E-11	0.1932	0.00	0.6230	20872	43334
Ethnic Violence	-0.0004	0.0010	6.17	0.6192	20871	42931
Population Density	-1.4E-05	0.0081	19.81	0.6184	20871	42611
Natural Resource Rents	2.5E-05	0.0001	9.31	0.5954	20871	37430
Military Expenditure Growth	0.0003	0.0009	4.57	0.5721	20871	39308
International Warfare	-0.0002	0.0008	6.64	0.5718	20866	42940
Government Consumption	-0.0005	0.0051	0.45	0.5239	20871	44079
Age Dependency Ratio	1.5E-05	0.0004	1.76	0.5232	20871	43097
Independence in Previous Five Years	0.0034	0.0032	24.62	0.5171	20722	44332
Military Personnel	-0.0001	0.0011	2.00	0.5046	20871	41128