

Coup risk, coup-proofing and leader survival

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Abstract

Under what conditions do political leaders enact ‘coup-proofing’ strategies? There is a broad consensus in the literature that political leaders who face a higher risk of a coup will employ coup-proofing strategies that reduce the military’s capabilities to organize a coup. A closer look at the theory and empirical analyses of earlier studies, however, suggests that the presumed relationship between coup risk and coup-proofing should be re-examined. Drawing on insights from formal studies of authoritarian power-sharing, this article proposes that political leaders become less likely to initiate coup-proofing efforts as the coup risk increases. The reason is that leaders’ coup-proofing actions in themselves could prompt the military to launch a coup and thus political leaders will hesitate to offend officers when they face a high risk of a coup. The statistical models in this article estimate a latent coup risk by aggregating multiple indicators that capture the military’s willingness and ability to organize a coup. The empirical results strongly support the proposition that coup-proofing efforts taken by leaders decrease as coup risk increases.

Keywords

civil-military relation, coups, coup-proofing, leader survival

Introduction

Though a political leader faces multiple threats from both within and outside the political system, the threat of replacement in a coup by the military or other elites is considered to be the most crucial for a leader’s survival, especially in authoritarian and newly democratized countries. An overwhelming majority of leaders in such countries lose power as a result of a coup d’état rather than popular uprisings or civil wars (Galetovic & Sanhueza, 2000). Moreover, the consequence of coup replacement is severe. Unconstitutional removals by coups often result in the exile, imprisonment, or death of the former leader (Goemans, 2008). Therefore, developing a strategy to prevent the military and other elites from attempting a coup is a critical task for a leader whose priority is to remain in power.

Existing studies point out that there are so-called ‘coup-proofing’ strategies that a political leader can rely on to diminish the military’s ability to successfully coordinate the replacement of the leader by a coup (e.g. Quinlivan, 1999). These strategies include the establishment of paramilitary organizations that have a different command structure from the regular armed forces,

frequent rotation of commanders, and division of the military into many rival branches. When do political leaders undertake these coup-proofing efforts to reduce the military’s ability to stage a successful coup? A large number of scholars have argued or implicitly assumed that political leaders who face a high risk of a coup tend to undertake these coup-proofing strategies. That is, as the likelihood that the military and other elites will attempt a coup d’état increases, the leader will undertake a greater level of coup-proofing (e.g. Biddle & Zirkle, 1996; Quinlivan, 1999; Belkin & Schofer, 2003; Roessler, 2011).

At first glance, the conclusion that an increased coup risk will increase coup-proofing efforts seems obvious. A closer look at the theoretical logic and empirical analyses, however, casts doubt on this presumed relationship between coup risk and coup-proofing. Theoretically, these studies do not take into account the possibility that a political leader’s attempt to weaken the military might actually prompt a coup. Moreover, empirically, in

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measuring a *Coup risk* variable, the literature has relied on an ad hoc assumption about how to aggregate multiple coup-related indicators into the measure of coup risk.

Drawing on insights from formal studies on power struggles between a political leader and the ruling elite developed in the comparative literature on authoritarianism (Svolik, 2009; Sudduth, forthcoming), this article re-examines the relationships between coup risks and coup-proofing efforts by highlighting when the military might *deter* a leader from diminishing its coup-making capabilities by threatening to stage a coup. Contrary to conventional wisdom, theoretical logics derived from the aforementioned formal studies lead to the proposition that leaders' coup-proofing efforts *decrease* as coup risk increases. Political leaders are *less* likely to take actions to reduce the military's coup-making capabilities when they already face a high risk of a coup, because such actions in themselves are likely to spark a coup.

This proposition is tested using a Bayesian analysis. In assessing the relationship between coup risk and coup-proofing, the existing literature uses a composite measure of coup risk that aggregates multiple coup-related indicators (Belkin & Schofer, 2003, 2005). Their aggregation procedure, however, seems to be arbitrary and lacks a formal justification. Unlike these studies, the empirical approach in this article estimates the posterior distribution of *latent* coup risk by deriving a proper rule as to how to aggregate multiple indicators of the military's willingness and ability in a single measure of coup risk. The results strongly support the proposition that increasing coup risk actually reduces the coup-proofing efforts a leader should make.

The article proceeds as follows. In the next section, I define the term 'coup-proofing strategies' and argue that decreasing the military's *capabilities* to successfully organize a coup is the key to coup-proofing the regime. The third section overviews existing studies and details why their claim should be re-examined. The fourth section provides theoretical frameworks. The fifth section describes the data and the modelling, while the sixth provides the empirical results. I conclude with the implications of this article.

Coup-proofing strategies

In this article, I will use the term 'coup-proofing strategies' to indicate political leaders' efforts or actions that will reduce the military's *ability* to organize a successful coup. Coup-proofing strategies involve the creation of structural obstacles for military officers who seek to

coordinate action against political leaders (Belkin & Schofer, 2003; Powell, 2012). These strategies include dividing the military into multiple rival forces, the creation of parallel forces as a counterweight to the regular armed forces, frequent rotation of command positions and the purging of rival military officers (Quinlivan, 1999; Biddle & Zirkle, 1996). As a consequence of repeated coup-proofing efforts taken by political leaders, military officers will eventually find themselves too weak to challenge political leaders and thus political leaders are considered to become less vulnerable to the threat of a coup d'état.

Though the literature on coup-proofing typically focuses on strategies that will diminish the military's ability to coordinate action to stage a coup (e.g. Belkin & Schofer, 2003; Sudduth, 2016), some authors have focused on leaders' attempts to decrease the military's *willingness* to launch a coup through what has been termed 'spoiling' – the granting of more material, financial and political resources (Huntington, 1991). Spoiling, however, is considered to increase the ability of the military to organize a successful coup (Feaver, 1999), as officers with more material and political resources will be better equipped to stage a coup (Powell, 2012; Acemoglu, Ticchi & Vindigni, 2010). Some empirical research has confirmed this argument by showing that higher military expenditure increases the probability of successful coups (Wang, 1998). Moreover, spoiling could also increase future coup risk. If military officers suspect that political leaders will not maintain their high levels of resources, they might pre-empt any downsizing by resorting to a coup (Acemoglu, Ticchi & Vindigni, 2010). Thus, once political leaders empower officers with increased resources, they face a higher probability of coup attempts from a stronger military. The argument is, then, that spoiling will *not* coup-proof a regime. For this reason, this article uses the term 'coup-proofing strategies' to indicate only those strategies that reduce the military's *ability* to overthrow a leader in a coup.¹

Coup risk and coup-proofing strategies

Under what conditions do political leaders enact coup-proofing strategies? There is a broad consensus in existing studies that political leaders who face a high risk of a coup d'état tend to intervene in the military to coup-proof the regime (e.g. Biddle & Zirkle, 1996; Quinlivan, 1999; Belkin & Schofer, 2003; Pilster & Böhmelt,

¹ In the Online appendix, I explore in great detail the relationships between coup risk and spoiling.

2012; Roessler, 2011). As the likelihood that the military will resort to a coup d'état increases, political leaders are more likely to adopt strategies that allow them to diminish the military's capabilities to organize a coup. For example, Belkin & Schofer (2005: 144) argue that 'when the risk of a coup d'état is high, leaders almost always divide their armed forces into multiple organizations that check and balance each other' and that 'high coup risk usually is sufficient to cause leaders to' take these coup-proofing efforts. Pilster & Böhmelt (2012) expect that autocracies are more likely to adopt coup-proofing strategies, mainly because autocratic leaders are more vulnerable to a coup d'état.

However, while this logic is intuitive, it overlooks the possibility that political leaders' coup-proofing efforts might prompt the military to resort to a coup immediately. The literature on civil-military relations has long argued that political intervention in the military's internal affairs or autonomy strongly motivates military officers to attempt a coup (Thompson, 1973; Finer, 1988). Leaders' actions such as dividing the military into multiple forces or creating paramilitary forces to counterbalance the regular army will hurt officers' corporate interests and thus might prompt a coup. Furthermore, if political leaders are taking actions that will reduce the military's ability to organize a coup, it is rational for the officers to launch a coup and replace those leaders immediately, before they lose their coup-making capabilities. Removal via a coup is the ultimate threat that the military can use to make political leaders accountable to them, and to commit resources for their benefit (e.g. Geddes, 1999). Once leaders have reduced military capabilities to the extent that the forces are too weak to credibly threaten a coup, officers will lose influence over the political leader (Weeks, 2012). It is, therefore, crucial for the military to stop leaders' coup-proofing actions by removing the leaders.

There are indeed many examples where political leaders' acts to weaken the military have prompted an immediate coup. For example, in 1999 the Prime Minister of Pakistan, Nawaz Sharif, dismissed a powerful army chief, General Pervaiz Musharraf, while Musharraf was on a visit to Sri Lanka. The military high command, however, refused to follow the orders of newly appointed General Ziauddin Butt and, just hours later, the troops surrounded the Prime Minister's home and replaced Sharif in a bloodless coup. Sharif's action to dismiss Musharraf triggered a coup from the officers who were not satisfied with Sharif's performance. Another example is the 1965 Algerian coup. Colonel Boumedinne, the army chief of staff, conducted a coup when it became clear that

President Ben Bella intended to oppose the expansion of the regular army and expand the political rights and size of the people's militia as a counterweight to the regular army (Zartman, 1970). In Niger, President Diori steadily undermined the army's position during the early 1970s. In addition to putting troops to work on non-military tasks, Diori offended officers by gradually replacing the army with a militia organized within his single-party regime. Diori's actions to weaken the army's position hurt the officers' corporate interest and eventually led to the 1974 coup which ousted Diori (Higgott & Fuglestad, 1975: 393–395). Considering these examples, one might wonder why a political leader would risk causing a coup by making coup-proofing efforts if the risk of a coup is already *high*.

A theory of coup-proofing

Dividing the military into multiple forces or creating paramilitary forces is considered to reduce a military's coup-making abilities. Precisely because of this coup-proofing effect, officers have an incentive to overthrow the leader who has moved against them before they lose their ability to do so. Thus, to fully explain when a political leader can undermine the military, a valid theory needs to take into account (i) how officers, as strategic actors, would respond to a leader's actions to diminish their capabilities and (ii) what decisions on coup-proofing actions a leader should make, given the possibility that these actions might in themselves prompt a coup. To build a framework for understanding coup-proofing, I will draw on the formal work on power struggles between a leader and the ruling elite developed in the comparative literature on authoritarianism (Svolik, 2009; Sudduth, forthcoming; Boix & Svolik, 2013). Though these studies do not frame their work in terms of 'coup-proofing', the dynamics formalized in these studies well capture the key features of a strategic environment that leads to coup-proofing. In the following, I will first lay out the strategic settings and the logic formalized by these studies and illuminate how we can understand the fundamental strategic problems facing a leader and the military in the context of coup-proofing.

The central problem confronting a leader and the military in the aforementioned studies is that, on one hand, the leader tries to increase his share of power at the expense of the military, while the military wants to *deter* such opportunistic behaviors by threatening to stage a coup. A leader must first decide whether to take any action that would shift the balance of power in favor of the leader. The military in turn then decides whether

to launch a coup to oust the leader. The leader's actions will be effective in reducing the military's power if it decides *not* to stage a coup in response to the leader's opportunism. Crucially, the balance of power between the leader and the military in turn defines the likely outcome of a coup such that an increase in the leader's share of power relative to the power of the military will decrease the likelihood of a successful coup. In other words, a leader's opportunistic actions will diminish the military's ability to successfully organize a coup (i.e. coup-proofing effect). More fundamentally, the balance of power between the leader and the military determines the relative share of the benefits or resources the leader and the military would enjoy, as it determines their bargaining power. A decrease in the likelihood of a successful coup resulting from an increase in the leader's relative power will increase the benefits that the leader can exclusively enjoy, while it will reduce the share of the benefits for the military. It is, therefore, crucial for the military to stop the leader from diminishing their power by threatening to launch a coup and keep their status quo share of the benefits, while the leader always has incentives to increase his share of the benefits.

The leader, however, would also prefer to avoid sparking coup reactions. As a coup is costly, leaders hesitate to engage in opportunistic behaviors when the perceived likelihood that the military will stage a coup in response is sufficiently high. On the other hand, when they anticipate that the military will not stage a coup even if they take opportunistic actions, leaders will move against the military to shift the power balance in their favor. Therefore, leaders' decisions on whether to shift the distribution of power in their favor (and if so, by how much) ultimately depend on the ability of the military to credibly threaten to stage a coup should leaders move against them. The higher the likelihood that the military stages a coup in response to a leader's opportunism, the less likely it will be that the leader will choose to engage in opportunistic behaviors.

Building on these insights, I posit that political leaders will engage in a lower level of coup-proofing efforts as the coup risk they face increases. How likely military officers are to stage a coup (i.e. coup risk) is a function of (i) how likely that coup attempt is to succeed and (ii) the amount of grievance that those officers have toward the incumbent leaders (Powell, 2012). Because a failed coup is costly, officers will hesitate to launch a coup when they perceive that there is a high chance it will fail, while they will be increasingly likely to launch a coup when they expect a higher chance of success. Dissatisfaction with the leader in the status quo also leaves potential plotters

more favorably disposed toward coup activity because the consequences of inaction are less favorable. Thus, an increase in officers' dissatisfaction with a leader and/or their ability to stage a successful coup will *deter* the leader's opportunism and consequently reduce the probability that the leader will weaken the military's coup-making capabilities. In high coup risk circumstances – that is, where military officers are already unsatisfied with a political leader's performance and/or the probability is high that an attempted coup will succeed – the leader's attempts to reduce the military's capabilities are more likely to prompt officers to launch a coup. Political leaders' efforts to coup-proof will provide only more grievances and discontent for the already dissatisfied officers and, thus, a larger number will be willing to participate in a plot against the leader. Knowing that the likelihood that the military will launch a coup in response is high, the leader facing a high coup risk will prefer to avoid offending the military.

On the other hand, political leaders' actions to weaken the military will be less likely to cause coups when leaders face a lower coup risk. If officers expect a low chance of success, they will be more likely to hesitate to stage a coup. In addition, a low coup risk environment reflects the fact that many officers and citizens are largely happy with the leader's policies and performance. Thus, those officers who are sensitive to and concerned about the leader's attempts to weaken the military might find it very difficult to collect a sufficient number of other officers to join them in challenging the leader. As a consequence, political leaders are able to undertake a *greater* level of coup-proofing efforts without fear of a coup.

Political leaders who enjoy a low risk of a coup are motivated to weaken the military so that they can maximize their own share of the benefits by minimizing the military's bargaining power. Furthermore, they *need* to take advantage of the current low risk of coup to address the future coup risk (Sudduth, forthcoming). Factors found to affect the likelihood of coups are often time-variant. For example, a good economy increases elites' and citizens' satisfaction with the incumbent leader, boosts the legitimacy of the regime, and thus reduces plotters' dispositions toward coups. The chance of a successful coup is also low in this case, because it would require most of the population to at least implicitly support the plotters (Welch, 1970; Luttwak, 1968; Galetovic & Sanhueza, 2000). Leaders thus can weaken the military's coup-making capabilities without prompting coups. Economic performance as well as other factors that can have an impact on how citizens and the military feel about a leader, however, vary over time. Many

developing countries in particular suffer from large economic fluctuations. A currently popular leader with the advantage of a good economy might lose the support of the public and the military due to an economic downturn.

Similarly, individuals and security organizations that were once considered loyal to a political leader often later loom as threats to the leader's political survival. To secure his power, a political leader often appoints his friends, relatives and cronies to key positions, and also creates security organizations that carry out purges of his enemies. Though these hand-picked individuals and organizations are expected to remain loyal to and uncritical of the leader (Bratton & van de Walle, 1994), they will often find that their interests diverge from the leader's and thus later become threats to his survival. Recognizing this possibility, the leader needs to remove these hand-picked individuals or security organizations *before* they become real threats (Haber, 2006). Research also points out that the military's ability to organize a coup tends to increase over time if leaders take no action (Farcau, 1994). Thus, to prevent officers from building up their own support bases and loyalty among soldiers and troops over time, leaders such as Iraq's Hussein and Libya's Gaddafi repeatedly rotated their commanders (Quinlivan, 1999). In sum, leaders who currently enjoy a low risk of a coup have good reason to suspect that they might face higher risk of a coup in the future. They will thus want to diminish the military's ability to stage a coup whenever the risk is low enough for them not to fear sparking a coup. The discussion above leads to the following hypothesis:

Hypothesis 1: Coup-proofing efforts made by political leaders decrease as coup risk increases.

While the above discussion highlights that leaders who currently face a low coup risk would benefit from intervening and reducing the military's capabilities, this benefit might not exceed the costs that coup-proofing would have on a country's military effectiveness. Coup-proofing strategies are considered to lower a country's military effectiveness in international war by deteriorating soldiers' leadership and coordination ability (Reiter & Stam, 2002). Do the benefits of addressing future coup risk and maximizing the share of benefits outweigh the cost of lowering military effectiveness in low coup risk cases? Theoretically we can think of two conflicting scenarios. First, lowering a country's military effectiveness might not be too costly for leaders in low coup risk environments because losing an international war does

not lead to their removal from power in such cases (Bueno de Mesquita et al., 2003; Weeks, 2008). Specifically, when leaders lack strong elites who are willing and able to punish leaders via a coup, those leaders can expect few domestic consequences for military defeat or for starting conflicts unwisely (Weeks, 2008, 2012). As leaders won't be punished even in cases of military defeat, as long as they keep the military's coup-making abilities low, leaders will increasingly coup-proof when coup risk is low. This reasoning thus supports Hypothesis 1.

Alternatively, the costs of reducing military effectiveness might outweigh the benefits of coup-proofing when leaders do not face an immediate threat of a coup. Even when a reliable threat of internal punishment via a coup is absent, foreign adversaries can punish leaders of losing countries by executing, imprisoning or exiling them, or imposing new regimes. Having competent military forces is important in deterring foreign and domestic opponents from challenging the regime. Thus, improving the military's fighting capabilities on the battlefield might be more essential for leaders if the likelihood of a coup is currently low. This argument predicts non-monotonic relationships between coup risk and coup-proofing, since leaders who face a high or a low risk of a coup will make less coup-proofing effort than will leaders who face a moderate level of coup risk. This is because the benefits of coup-proofing will not exceed the potential costs of lowering military effectiveness when leaders face low coup risks, while the risk of prompting pre-emptive coups is too high in a high-risk coup environment. This leads to an inverted U-shaped relationship between coup risk and coup-proofing, captured by Hypothesis 2.

Hypothesis 2: Coup-proofing efforts taken by political leaders will be greatest in moderate levels of coup risk.

Data and model

The data are in time-series cross-sectional format and the unit of analysis is the country-year. The data include 200 countries for the period 1968–2003. The dependent variable is the size of the coup-proofing effort taken by political leaders. To capture political leaders' efforts to coup-proof the regime, I use a country's 'counterbalancing' and the size of paramilitary organizations that act as a counterweight to the regular armed forces.² First,

² Another plausible coup-proofing measure found in the literature is ethnic exclusion, created by Roessler (2011). In the Online appendix, I test the arguments using the ethnic exclusion data and the results are

counterbalancing is a leader's effort to reduce coup risk by dividing the military and pitting rival armed organizations against one another. Counterbalancing involves 'the creation of additional military branches that prevent any one part of the military from controlling too many resources, for example, creating several distinct armies' (Belkin & Schofer, 2003: 613), and is considered to be the central element of coup-proofing tactics (Pilster & Böhmelt, 2012). To capture leaders' counterbalancing efforts, Belkin & Schofer (2003, 2005) propose a two-dimensional measure that incorporates both the number of military and paramilitary organizations and the size of the paramilitary relative to the regular military.

Their operationalization, however, was recently criticized for incorporating *all* military and paramilitary organizations, including navy and air force units, whose weapon systems are 'only of limited suitability in the tactical activities entailed by the conduct or prevention of a coup' (Pilster & Böhmelt, 2012: 360). Pilster & Böhmelt (2012) instead suggest that measures of coup-proofing should focus on 'ground-based forces', which are more relevant to the act of conducting or preventing a coup. I therefore created Belkin and Schofer's counterbalancing measure based only on ground-based forces. Specifically, I first collected data on military and paramilitary forces from *The Military Balance*, published yearly by the International Institute for Strategic Studies for the period 1968–2003 (IISS, 1968–2003). This gives us a dataset that covers a longer time period than those used in previous studies of coup-proofing. I then identified all ground-combat compatible military and paramilitary organizations following Pilster & Böhmelt (2011, 2012).³ I recalculate both the number of military and paramilitary organizations and the relative size of the paramilitary, compute z-scores for each dimension, and then sum these scores into the final *Counterbalancing* variable (Belkin & Schofer, 2005: 155–156). A higher value of *Counterbalancing* indicates that a country engages in a higher counterbalancing effort in that year.

Second, the *Paramilitary* variable captures the size of paramilitary organizations relative to the size of the regular army. Paramilitary organizations that have a different command structure from the regular armed forces are considered to act as a counterweight to the regular armed forces and prevent them from attempting a coup

(Quinlivan, 1999; Powell, 2012). In line with the literature, the relative strength of paramilitary forces is calculated as the proportion of the size of the paramilitary organization to the total size of the regular army (i.e. non-paramilitary) and the paramilitary $\frac{\text{paramilitary}}{\text{paramilitary} + \text{army}}$ (Belkin & Schofer, 2005: 156). I use the logit transformation of this as the dependent variable.⁴

Measuring coup risk

My key independent variable is coup risk. Following the literature, I define coup risk as the likelihood of a coup attempt (e.g. Belkin & Schofer, 2003; Casper & Tyson, 2014). The likelihood of a coup is considered to increase as the military's dissatisfaction with the incumbent leader increases, and as their ability to organize a successful coup increases (e.g. Powell, 2014; Bell & Sudduth, forthcoming). That is, coup risk is a positive function of the military's *willingness* and *ability* to organize a coup.⁵ Operationalization of the coup risk concept, therefore, requires us to properly aggregate various indicators of plotters' willingness and capability into the coup risk measure.

Previous studies that have assessed the effect of coup risk on coup-proofing rely on a composite measure of coup risk which combines several coup-related indicators. Specifically, Belkin & Schofer (2003) aggregate three coup-related indicators (civil-society strength, political legitimacy and recent coups) into the coup risk measure by computing z-scores for each indicator and then adding these z-scores of three indicators together (Belkin & Schofer, 2003: 608). Their measure of coup risk has recently been used, for example, by Powell (2014) who examines the impact of coup risk on diversionary war behaviors. The procedure they used to combine multiple indicators into the coup risk measure, however, seems to be arbitrary and lacks a formal justification. For instance, they compute z-scores for each coup-related indicator to ensure that their three indicators contribute *equally* to the final coup risk index (Belkin & Schofer, 2003: 608). But why should we believe that all three items – civil-society strength, political legitimacy and recent coups – tap the coup risk equally well? It is perfectly reasonable to expect that one

very similar to the results using *Paramilitary* and *Counterbalancing* variables.

³ The author thanks Tobias Böhmelt for his detailed instruction on how to identify ground-based forces using the *Military Balance* statistics.

⁴ Note that $\frac{\text{paramilitary}}{\text{paramilitary} + \text{army}}$ ranges from 0 to 1 and its actual distribution is not restricted to the middle range. Thus we need to use its logit transformation as the dependent variable in a linear model.

⁵ What I call 'plotter willingness' has also been called plotter disposition or motives elsewhere in the literature.

indicator contributes more than the others to the coup risk, or the level of contribution is different among multiple indicators. They do not provide a formal justification with regard to why one should put specific weight on specific items when one calculates a coup risk score. It is not clear whether and to what extent their aggregation rule is supported by the data.

Rather than combining various indicators in an ad hoc manner, I use a statistical model to derive a rule for properly aggregating the willingness and capability indicators to produce a coup risk measure. In the Bayesian statistical model presented below, the probability that a coup attempt will occur for each country-year (q) is modeled as functions of several indicators that capture the military's willingness and capability. The model also incorporates the idea that coup risk is an unobservable *latent* variable and that the observable data on coup occurrence are manifestations of the latent coup risk quantity (Treier & Jackman, 2008). The model then estimates a latent coup risk parameter, q , for each country-year by using information available from the observed coup attempts and informing us of the proper aggregation rule regarding how much each indicator should contribute to the coup risk measure.

Measurement model

To make these ideas more rigorous, consider the following model.

$$\begin{aligned} y_{it} &\sim \text{Bernoulli}(q_{it}) \\ \text{logit}(q_{it}) &= dz_{it} \end{aligned} \quad (1)$$

Let $i = 1, \dots, n$ index countries and $t = 1, \dots, m$ index years. y_{it} is an *Observed coup* variable for each country-year. This is a binary variable which takes 1 if a country experiences at least one coup attempt in that year and 0 otherwise. The model assumes that the binary coup variable has a Bernoulli distribution with a latent coup risk q_{it} . That is, I assume that we observe a coup attempt with the probability q_{it} for each country-year (i.e. $\Pr(y_{it} = 1) = q_{it}$). The binary coup variable comes from Powell & Thyne (2011: 252) and it is defined as 'attempts by the military or other elites within the state apparatus to unseat the sitting head of government using unconstitutional means'.

I then modeled the logit of a latent coup risk, $\text{logit}(q_{it})$, as a linear function of several willingness and capability indicators (z_{it}). Specifically, z_{it} is a vector of country-year characteristics that impact the military's willingness and capability to organize a coup and thus are plausible sources of variation in the probability of

coups. Estimated parameters d will tell us how much each indicator will contribute to the coup risk measure and how we should aggregate these indicators into the measure of coup risk. z_{it} includes the following variables: *Log(GDP/capita)*, *Democracy*, *Military regime* and *Years after last coup*.⁶

Economic performance is considered to impact potential plotters' willingness and ability to organize a coup. A poor economy makes military officers and other elites less satisfied with the incumbent leader and more favorably disposed toward a coup attempt (Collier & Hoeffler, 2005). Plotters are inclined to hold leaders accountable for failed economic policies and to punish them (Aksoy, Carter & Wright, 2015). Economic performance also affects plotters' abilities to succeed in their attempt, because poor economic performance can increase the public's discontent with the incumbent and willingness to condone or support a coup attempt. The public's perception is crucial for coups to succeed because tactically successful coups can be overturned by widespread disapproval among the general public (e.g. Galetovic & Sanhueza, 2000). Coup risk thus increases as a state's wealth or economic performance declines (e.g. Londregan & Poole, 1990). The *Log(GDP/capita)* variable captures a country's general level of economic performance and is obtained from Gleditsch (2002).

Regime type is another indicator to capture coup plotters' abilities and willingness. Citizens in stable democratic societies want to protect their electoral systems and will not support extraconstitutional measures such as coups. Given a lower chance of a successful coup, potential plotters are less likely to attempt a coup in democratic societies (Lindberg & Clark, 2008). There is also a consensus in the literature that military regimes have a higher risk of coups than other types of regimes because they lack legitimacy and popular support (Thyne, 2010). They are more susceptible to internal divisions (Geddes, 1999). The *Democracy* variable is a binary variable which takes 1 if a country-year is a democracy and 0 otherwise. The *Military* variable takes a value of 1 if a country-year's regime type is a military dictatorship and 0 otherwise. A base category is a civilian/royal dictatorship. The data are obtained from Cheibub, Gandhi & Vreeland (2010).

⁶ In the Online appendix, I have estimated alternative versions of the coup risk measure using different willingness and capability variables. The results produced by these alternative coup risk measure are consistent with the results presented below.

Finally, some researchers indicate that countries that have experienced a coup in the recent past are more likely to experience a coup in the present (e.g. Belkin & Schofer, 2003). In a country with recent coup experiences, coups have become viewed as an acceptable and even legitimate tactic to challenge the incumbent and military officers are thus more willing to employ such tactics (Roessler, 2011). Potential plotters are also more optimistic about their chances of success when their own coup attempts might be legitimized by a history of coups in the country. To capture 'the coup trap' phenomenon (Londregan & Poole, 1990), I include the *Years after last coup* variable, which measures how many years have passed since the last coup attempt in the same country.

Coup-proofing model

I then analyze the effect of latent coup risk (q) estimated by the above measurement model on coup-proofing efforts by using the following models.

$$\begin{aligned} p_{it} &\sim \text{Normal}(\mu_{it}, \sigma^2) \\ \mu_{it} &= \alpha q_{it-1} + \beta x_{it} \end{aligned} \quad (2)$$

p_{it} is the coup-proofing effort dependent variable and I use both the *Paramilitary* and *Counterbalancing* variables. In the linear model for μ_{it} , I include the lagged latent coup risk variable q_{it-1} and other sources of variation in the dependent variable (x_{it}). α is a coefficient on latent coup risk and shows the impact of a previous year's coup risk on a political leader's coup-proofing efforts. Hypothesis 1 expects that α should be *negative*.

To examine Hypothesis 2, which expects an inverted U-shaped relationship between coup risk and coup-proofing efforts, I include a quadratic term for coup risk, q_{it-1}^2 in the model.

$$\mu_{it} = \alpha_1 q_{it-1} + \alpha_2 q_{it-1}^2 + \beta x_{it} \quad (3)$$

Hypothesis 2 expects that α_1 should be *positive* and α_2 should be *negative*. This is because it expects that the marginal impact of coup risk on coup-proofing efforts $\frac{\partial \text{Coupproofing}}{\partial \text{Couprisk}} = \alpha_1 + 2\alpha_2 \times \text{Couprisk}$ is positive when coup risk is small and then becomes negative when coup risk is high.

x_{it} is a vector of country-year characteristics that are plausible sources of variation in the coup-proofing dependent variable. β is a vector of parameters that tap country-year characteristics in x_{it} to the coup-proofing dependent variable. Specifically, x_{it} includes the variables *Interstate war*, *Civil war*, *Democracy* and *Lag of DV*. The *Interstate war* variable is a binary variable and takes 1 if a country engaged in an interstate war in the previous year

and 0 otherwise. The variable is taken from version 4.0 of the War Data Collection compiled by the Correlates of War Project (Sarkees & Wayman, 2010). The *Civil war* variable is a dichotomous variable indicating whether a country engaged in a civil war in the previous year and is obtained from Fearon & Laitin (2003). These war variables capture and test competing claims provided by the literature. On one hand, war (either international or civil war) might reduce coup-proofing efforts because leaders are concerned that coup-proofing efforts will undermine the military's performance on the battlefield. On the other hand, some leaders might see a war as an opportunity to intervene and weaken the military (Huntington, 1968; Belkin & Schofer, 2005), because war can justify a leader's action in sending potential plotters to the war front or to create elite loyal paramilitaries.

The *Democracy* variable takes 1 if a country is a democracy in that year and 0 otherwise, and is taken from Cheibub, Gandhi & Vreeland (2010). This variable captures the intuition that a large number of veto players and checks and balances in democratic governments may make it difficult for their leaders to divide the military and increase the size of paramilitary organizations loyal to the leaders themselves (Pilster & Böhmelt, 2012). Note, though, that *Democracy* could also influence the coup-proofing level indirectly via coup risk. By controlling *Democracy* in both the outcome and measurement models, I explicitly model that *Democracy* might influence coup-proofing effort both directly and indirectly (via coup risk). Finally, I include *Lag of DV* as coup-proofing efforts in the previous year are likely to influence coup-proofing efforts in a current year. I assign normal *prior* distributions for the parameters α , α_1 , α_2 , β and d . These distributions have a mean of 0 and a variance of 100. I employ diffuse, independent inverse-Gamma priors on the σ^2 parameters.

Results

I implemented the Markov chain Monte Carlo (MCMC) algorithm using the Bayesian software *WinBUGS*. Approximate mixing of three parallel simulated chains was achieved after 3,000 iterations for the measurement model and 1,000 for each outcome (coup-proofing) model. I first discuss the validity of our estimated coup risk measure (i.e. q_{it}) by evaluating the aggregation rule derived by the measurement model. The summary of the posterior distributions of the measurement model is shown in Table I. Estimated parameters d tell us how one should put specific weights on specific capability and willingness indicators when we

Table I. Posterior summaries of measurement model

<i>Dependent variable:</i>	<i>Coup attempt</i>
Log(GDP/capita)	-0.404 [-0.584, -0.229]
Democracy	0.071 [-0.275, 0.430]
Military	0.382 [0.083, 0.680]
Years after last coup	-0.078 [-0.097, -0.061]
Constant	0.833 [-0.429, 2.165]
N	6,057
DIC	1,929.6

Table entries are posterior means; 95% Bayesian credible intervals are shown in square brackets.

construct the measure of coup risk. As I discussed above, various factors such as economic performance and regime type are considered to determine the military's willingness and ability to organize a coup.

The results in Table I show that the estimated coup risk measure is a positive function of plotters' willingness and capability captured by various indicators. For example, the posterior means of the coefficients on *Log(GDP/capita)* are negative and their 95% Bayesian credible intervals are below zero. Negative coefficients on the *Log(GDP/capita)* variable indicate that better economic performance will decrease the probability that a country experiences a coup. This is thus consistent with the idea that poor economic performance increases plotters' dissatisfaction with the incumbent leader and that a good economy reduces plotters' capability as it increases the public support for the leader. I also find that military regimes are more likely to experience a coup attempt than other types of regime. The posterior mean of the coefficients on the *Military* is positive and its 95% Bayesian credible interval is above zero. This confirms the idea that military regimes have a higher risk of coups as they are more susceptible to internal divisions (high disposition) and tend to lack legitimacy and popular support (high ability). Finally, the posterior mean of the coefficients on *Years after last coup* is negative and the 95% Bayesian credible interval is below zero, suggesting that the more time that has passed since the last coup attempt, the less likely it is that a country will experience a coup. This is consistent with the previous studies' understanding that coup risk is higher in a country with recent coup experiences because recent coups boost both the willingness and the ability to attempt a coup.

The results in Table I also indicate that the existing approach used by Belkin and Schofer to aggregate coup-related indicators into coup risk is problematic. Although Belkin and Schofer assume that each coup-related indicator equally contributes to the measure of coup risk, the results of my measurement model clearly show that different indicators have different levels of contribution to the coup risk measure. For example, the *Military* indicator has a larger level of contribution than the *Democracy* indicator. The posterior means of the coefficients on the *Military* variable are around 0.38, while the posterior means of the coefficients on the *Democracy* variable are 0.07. The result itself is not surprising. Nonetheless, it implies that the existing measure of coup risk, which relies on an ad hoc assumption that each indicator equally contributes to the final coup risk measure, is not precise enough and that the empirical results based on the existing coup risk measure should be reconsidered.

I now analyze the impacts of latent coup risk (q_{it-1}) on coup-proofing efforts. The summary of the posterior distributions from eight slightly different outcome models are shown in Table II. Models 1, 2, 3 and 4 use a logit of *Paramilitary* as the dependent variable while Models 5, 6, 7 and 8 use the *Counterbalancing* variable as the dependent variable. In Hypotheses 1 and 2, I made two conflicting predictions and decided to let the data adjudicate between them. Hypothesis 1 states that an increase in coup risk will decrease leaders' coup-proofing efforts, suggesting that there is a negative linear relationship between coup risk and coup-proofing efforts. Meanwhile, Hypothesis 2 argues that coup-proofing efforts first increase and then decrease in coup risk, predicting a non-monotonic relationship between coup risk and coup-proofing efforts. In Models 1 and 5, I test a linear relationship between coup risk and coup-proofing. The posterior summaries of both Models 1 and 5 provide us with strong evidence for Hypothesis 1. The posterior means of the coefficient on coup risk are negative and their 95% Bayesian credible intervals are below zero. This indicates that an increase in coup risk in the previous year will *decrease* a political leader's coup-proofing efforts measured by the relative size of paramilitary organizations and the degree of counterbalancing.

I then test Hypothesis 2 in Models 2 and 6, which include quadratic terms of *Coup risk*. The results of Models 2 and 6 do *not* support an inverted U-shaped relationship suggested by Hypothesis 2. First, the 95% Bayesian credible intervals of the coefficient associated

Table II. Posterior summaries of coup-proofing model

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>
<i>Dependent variable:</i>	<i>Paramilitary</i>				<i>Counterbalancing</i>			
Coup risk _{<i>t</i>-1}	-0.816 [-1.441, -0.230]	-0.772 [-2.204, 0.652]	-0.864 [-1.454, -0.259]	-0.873 [-1.503, -0.260]	-0.748 [-1.459, -0.075]	-0.859 [-2.467, 0.732]	-0.805 [-1.483, -0.124]	-0.856 [-1.586, -0.156]
Coup risk ²		-0.415 [-10.421, 9.409]				0.675 [-10.360, 11.59]		
Coup attempt _{<i>t</i>-1}			0.048 [-0.077, 0.176]				0.0567 [-0.087, 0.204]	
Democracy	-0.091 [-0.145, -0.041]	-0.092 [-0.142, -0.041]	-0.091 [-0.144, -0.038]	-0.094 [-0.144, -0.041]	-0.097 [-0.158, -0.039]	-0.097 [-0.154, -0.039]	-0.096 [-0.157, -0.035]	-0.095 [-0.153, -0.034]
Interstate war	-0.050 [-0.162, 0.061]	-0.052 [-0.171, 0.069]	-0.051 [-0.169, 0.069]	-0.056 [-0.170, 0.055]	0.048 [-0.081, 0.178]	0.047 [-0.091, 0.186]	0.048 [-0.089, 0.187]	0.039 [-0.093, 0.168]
Civil war	0.026 [-0.034, 0.084]	0.027 [-0.032, 0.086]	0.023 [-0.036, 0.083]	0.011 [-0.053, 0.076]	0.093 [0.024, 0.159]	0.095 [0.027, 0.162]	0.090 [0.022, 0.159]	0.078 [0.005, 0.154]
Lag DV	0.847 [0.828, 0.866]	0.847 [0.829, 0.867]	0.847 [0.827, 0.866]	0.848 [0.830, 0.867]	0.893 [0.876, 0.911]	0.894 [0.877, 0.911]	0.893 [0.876, 0.911]	0.896 [0.88, 0.912]
Constant	-0.021 [-0.061, 0.021]	-0.020 [-0.065, 0.028]	-0.019 [-0.060, 0.020]	-0.015 [-0.056, 0.026]	0.068 [0.022, 0.117]	0.071 [0.020, 0.127]	0.069 [0.023, 0.117]	0.073 [0.027, 0.122]
Sample	All	All	All	No coups at <i>t</i> -1	All	All	All	No coups at <i>t</i> -1
N	2,918	2,918	2,918	2,800	2,918	2,918	2,918	2,800
DIC	5,553.6	5,555.2	5,555.2	5,310.3	6,333.2	6,334.7	6,334.8	6,047.8

Table entries are posterior means; 95% Bayesian credible intervals are shown in square brackets. Models 1, 2, 3 and 4 use the logit of *Paramilitary* variable as the dependent variable, while Models 5, 6, 7 and 8 use the *Counterbalancing* variable as the dependent variable.

with the quadratic term (*Coup risk*²) include zero.⁷ Thus we do not find evidence that the marginal impact of coup risk on coup-proofing depends on coup risk (i.e. non-linear relationships). In addition, the coefficients are not in the direction indicated by Hypothesis 2. Though Hypothesis 2 expects that the coefficient on the linear term *Coup risk* is positive and the coefficient associated with the quadratic term *Coup risk*² is negative, the results show that the coefficient on *Coup risk* is negative and the coefficient on *Coup risk*² is negative in Model 2 and positive in Model 6. Furthermore, including the quadratic term for coup risk does *not* improve the model fits.

⁷ I confirmed that the 90% credible intervals for the coefficient on *Coup risk*² still include zero, while the 90% credible intervals for the coefficient on *Coup risk* are below zero.

The Deviance information criteria (DIC) value in Models 2 and 6 is slightly larger than that in Models 1 and 5. In sum, we do not find support for an inverted U-shaped relationship between coup risk and coup-proofing predicted by Hypothesis 2.

Though the results of Models 1 and 5 support Hypothesis 1, one potential concern might be that the estimated negative effect of latent coup risk on coup-proofing might pick up the effect of *observed* coup attempts on coup-proofing because we use information on observed coups to estimate latent coup risk in the measurement model. The issue here is that observed coup attempts might affect not only my key independent variable – *Coup risk* – but also the coup-proofing dependent variable negatively, as, for example, leaders who experience coups might hesitate to provoke the military and therefore reduce coup-proofing measures

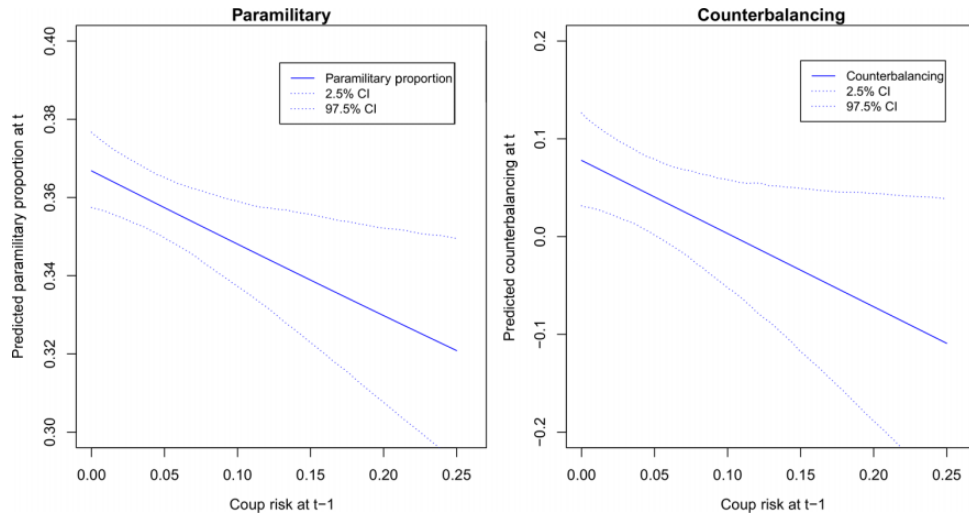


Figure 1. Effect of latent coup risk on coup-proofing effort

accordingly. To address the potential problem of omitted variable biases, I control $Coup\ attempt_{t-1}$ in Models 3 and 7 in Table II. The results still hold and the posterior summary of Models 3 and 7 provides strong evidence consistent with Hypothesis 1. The posterior means of the coefficient on coup risk are negative and their 95% Bayesian credible intervals are below zero. On the other hand, the coefficients on $Coup\ attempt_{t-1}$ are not significant. In addition, Models 4 and 8 analyze the impacts of coup risk on coup-proofing efforts by using only the sample of country-year observations that have no coup attempts in the previous year (i.e. $Coup\ attempt_{t-1}$ takes a value of zero). The posterior means of the coefficient on $Coup\ Risk_{t-1}$ are negative and their 95% Bayesian credible intervals are below zero. As Models 4 and 8 only use the observations that do not experience observed coups, the reductive effects of $Coup\ risk$ on coup-proofing cannot be explained by variations in observed coups. Variations in latent coup risk do matter for country-years where actual coups do not occur and latent coup risk has negative impacts on leaders' coup-proofing efforts, as predicted by Hypothesis 1.

Overall, the results in Table II support the argument that an increase in coup risk in the previous year will *decrease* a political leader's coup-proofing efforts measured by the relative size of paramilitary organizations and the counterbalancing level. To visualize the impact of coup risk on coup-proofing efforts, Figure 1 plots how the *Paramilitary* and *Counterbalancing* dependent variables change as the latent coup risk changes. On the x-axis is latent coup risk. On the y-axis, I have the predicted value of the *Paramilitary* and *Counterbalancing*

variables with the 95% credible interval lines around the predicted lines. The predicted values of the coup-proofing variables are calculated by holding other variables at their medians or means. Figure 1 shows, for example, that when coup risk changes from 0 to 0.1 in the previous year, the proportion of the size of paramilitary organization will decrease from 0.37 to 0.35. Similarly, a counterbalancing score decreases from 0.08 to 0.01 when coup risk increases from 0 to 0.1.

In terms of control variables, the posterior means of the coefficients on the *Lag DV* variable are positive and their 95% Bayesian credible intervals are above zero in all eight models, which is consistent with previous findings (Pilster & Böhmelt, 2012). There is also evidence that civil war increases a leader's counterbalancing efforts, which supports a claim that leaders see ongoing war as opportunities to coup-proof by creating and exacerbating rivalries among branches of their forces (Belkin & Schofer, 2005). Negative coefficients on *Democracy* indicate that democracies see a lower level of coup-proofing efforts. Note, though, that the literature argues that democracies are less likely to undertake coup-proofing efforts partly because they face a lower risk of a coup (Pilster & Böhmelt, 2012); however, the empirical results reported here suggest that this is not exactly the case. The results of the measurement model in Table I show that democracy does not have significant effect on coup risk. The negative coefficients on *Democracy* in the outcome model thus indicate that democracies reduce coup-proofing efforts for reasons not related to their coup risk, such as a larger number of veto players and the system of checks and balances.

Conclusion

The findings in this article naturally lead to the following question: If political leaders can enact coup-proofing strategies only when coup risk is low, what can political leaders do when they face a high risk of a coup? Previous studies have pointed out that political leaders can prevent a coup attempt not only by reducing the military's ability to stage a successful coup, but also by diminishing officers' grievances toward the incumbent leader (Powell, 2012). Political leaders facing a high risk of a coup can avoid an immediate threat of coup attempts by providing the military with increased financial and political resources (Huntington, 1991). Yet, political leaders need to be very cautious in using the 'spoiling' strategy. Although it might reduce the immediate risk of a coup, it increases the military's capabilities to stage a successful coup and thus increases the future probability of a coup (Acemoglu, Ticchi & Vindigni, 2010). Expecting a higher chance of a successful coup, a stronger military with larger resources will be more likely to attempt a coup (Acemoglu, Ticchi & Vindigni, 2010; Svulik, 2013). Thus, the strategy of spoiling will eventually increase the coup risk facing political leaders and, therefore, will worsen their situations. The findings in this article also speak to and partly explain the 'coup trap' phenomenon. Since leaders facing a high coup risk cannot rely on coup-proofing strategies to protect them from future coup threats, high coup risk countries find it difficult to escape from a perpetual cycle of recurring coups. This indeed highlights a difficult situation that political leaders with a high risk of a coup face.

Replication data

The data and the Online appendix can be found at <http://www.prio.org/jpr/datasets>. All analyses were conducted using WinBUGS.

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