Government Structure and Military Coups [*]

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Abstract

We develop a multi-period contest model to formulate the role of the power structure of government in the outbreaks and outcomes of coups. In our model, the coup plotter decides whether to carry out a coup against the central government, and the local government chooses whether to confront the military government after a successful coup. More centralized countries constitute an ample prize for the coup plotter since he can enjoy advantages in dealing with the local government. Consequently, military governments are more stable in more decentralized countries. Moreover, the players' inability to commit imposes an upper-bound on the payoff to the strong player. And a strong central government has more resources to defend himself. Thus, the relationship between decentralization and coup risk is non-monotonic. This sheds some light on the role of decentralization in political stability. Empirical evidence from cross-country data provides support for this model.

Key Words: Coup d'etat, Power structure, Decentralization, Political Stability

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1 Introduction

In the period 1950-2009, 95 countries experienced at least one coup attempt (Powell and Thyne, 2011). Coup d'etats are geographically concentrated and persistent. Only less than 5 percent of all outbreaks took place in countries where only one coup was recorded, while a few countries experienced many coups d'etat. For example, Ghana had the record of 5 coups, 6 attempts, and 13 reported plots during 1956-1986. The outcomes of a coup d'etat vary significantly. In some cases, the leader of a military coup can hold power considerably longer than the others: Muammar al-Gaddafi started his 42 years ruling over Libya from a successful coup in 1969, while for the 11 *juntas* in Bolivia after WWII, on average each was in power for less than one year. What factors can account for these substantial variations across countries? In this paper we argue, theoretically and empirically, that government structure plays a role for the onset, outcomes and consequences of military coups.

There is a large body of research on an important type of civil conflict: civil war. However, coup d'etat differs from civil war[1] in that the techniques of executing a coup are available only to a small group of elites, e.g., military forces. Therefore, general economic and institutional factors alone, e.g., poverty, inequality, ethnic polarization, political institutions, etc.,[2] are less likely to be the explanations of a coup d'etat. For instance, several non-democratic countries with high ethnic cleavages rarely experience coup d'etats[3] and resource-abundant countries also have quite a different history of coups.[4] Meanwhile, to consolidate its position after a successful coup, the military junta needs to deal with other bodies of power; thus the political power structure among elites plays a role. This paper proposes a multi-period contest model to analyze coup d'etat as a political struggle between the military force and existing governments. In particular, we investigate how the government structure (the extent of vertical decentralization) affects the risk of a coup and the duration of a military government.

There is some anecdotal evidence that decentralization may be of importance for the outbreak and outcome of a coup. Zhang Xun's coup in China in 1917 exemplifies this. In June 1917, a monarchist general, Zhang Xun, carried out a military coup in Beijing, expelled the president from office and restored emperor Puyi. However, at that moment in China, various warlords enjoyed substantial local autonomy and the deposed government soon mobilized these against Zhang Xun. After only 11 days, ex-premier Duan Qirui's forces took over Beijing and overthrew Zhang's government.

In our model, the link between decentralization and coups runs through opportunity costs and prizes for winning a coup. A potential coup plotter (army) decides whether to wage a coup against the central government in a two-layer government. If the coup plotter succeeds, he will take over the resources that are in the hands of the central government and form a junta. Because the local

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[1] See Blattman and Miguel (2010) for an excellent survey of this topic.

[2] Collier and Hoeffler (2004) and Montalvo and Reynal-Querol (2005) identify different causes for civil war.

[3] Bhutan, Kazahstan, Russia, China and Vietnam have low scores on democracy and a high ethnic fractionalization, but no recent history of coup d'etat.

[4] Since WWII, Iran has only experienced one coup, while its neighbour Iraq holds the record of 13 military coups.

government's (or the deposed national leader's) inability to commit to combat the junta, a peace negotiation will occur. Meanwhile, no one can commit not to engage violent confrontation after negotiation. We show that through the bilateral limited commitment, the peaceful agreement in the mutual interest imposes an upper bound on the payoff to the stronger player, and civil war cannot be a part of an equilibrium outcome. The more the resources in the hands of the junta, the more advantages the leader of a military government enjoys, thus the more likely that he remains in power. As a result, our model predicts a negative relationship between decentralization and the length of power after a successful coup.

The power structure will further affect the incentives of a conspirator to carry out a coup. A potential coup plotter might take two factors into account: whether he can win the coup and how long he can hold the power. At a first glance, a highly centralized government possesses more resources to fight against coups (a high opportunity cost for plotters); thus, the conspirator will rationally avoid attempting to overthrow a tough target. However, it is also much easier for the conspirator to hold power (high available rents) after overthrowing the existing government. Since the availabe rents are bounded by the limited commitment, there exists a non-monotonic relationship between decentralization and coup risk. We bring the theoretical predictions of our model to a cross-country analysis. We use subnational share of public revenues (as measured in the IMF's *Government Finance Statistics*) to measure the vertical resource distribution within government. The data suggests that a successful coup leader enjoys a longer tenure in highly centralized countries, and intermediately centralized countries had the highest risk. These are consistent with our theory.

This paper does not aim at offering a systemic study of the determinants and outcomes of a coup d'etat. Moreover, we have no ambition to claim that government structure is the cause of any individual coup. Instead, we concentrate on the structural features of coups across countries. We are interested in the implications of government structure on regime vulnerability, and suggest that it plays a role in explaining the substantial variations in the outbreaks and consequences of coups. As for policy implications, the model and empirical results suggest that conditional on the initial power structure, decentralization may affect the incentives of those potential coup plotters and entail instability. This negative consequence should be taken into account when implementing any reform on government structure.

The paper is organized as follows. We briefly review the related studies on coups from political scientists and economists in Section 2. In Section 3, we present our theoretical model and derive testable predictions. Section 4 brings the predictions to cross-sectional data. Section 5 concludes the paper with a brief discussion.

2   Related Literature

It is an important tradition in political science, sociology and peace science to look for the structural factors underlying coups. In some early works, Zolberg (1968) and Decalo (1976) deny the

role of any structural characteristics in the occurrence of military coups. However, Fossum (1967) and Hoadley (1973) connect the incidence of military coups with social complexity such as size, population, income per capita, urbanization and ethnic heterogeneity. Many authors have paid substantial attention to Africa, a continent where coups d'etat were common. Jackman (1978) uses panel data to forcibly demonstrate the role of social mobilization, cultural pluralism, party systems and turnouts in explaining military coups. Johnson, Slater, and McGowan (1984) extend Jackman's model and incorporate military motivation and economic dependency. Jenkins and Kposowa (1990) evaluate different theories of military coups and suggest that ethnic diversity, military centrality, debt dependence and political factionalism are major predictors of coup activity. These contributions significantly increase our understanding of military coups; however, they are also usually subject to many controversies on the validity and interpretation due to the lack of a formal analysis of the strategic behavior of relevant players (Jackman, Rosemary, Johnson, McGowan, and Slater 1986). The intrinsic uncertainty in staging coups is also recognized (O'Kane 1993). In a more sophisticated empirical study, Londregan and Poole (1990) estimate a system of equations to assess the influence of economic conditions, history of coups, as well as the interaction terms. They indicate that the political consequences of a successful coup are substantial, but there exists little evidence on the economic effects. Most of the above works use cross-section regressions on a large sample of countries. A few stylized facts emerge: (1) economic factors play an important role in coup activity; (2) military coups tend to be persistent in that the occurrence of frequent coups increases the probability of additional coups. This paper would like to highlight the geographic concentration of coups, which is closely related to the second fact.

The interaction between the military and the civilian government activity is explored as early as in Huntington (1957), Luttwak (1979), and Hettne (1980). Belkin and Schofer (2003) provide a thorough review of existing studies along this line. An emerging body of economics and political science literature formally models the civilian-military relationship in various ways. Collier and Hoeffler (2007) and Leon (2009) establish the non-monotonic relationship between military spending and the risk of coups. Acemoglu, Ticchi, and Vindigni (2009) and Besley and Robinson (2010) analyze the government's trade-off in downsizing the army, where the risk of coups is explicitly taken into account. Bhave and Kingston (2010) examine the role of army in an elite-popular relationship. De Mesquita, Smith, Siverson, and Morrow (2005) emphasize the effects of coalition size on the incidence of coups.

In contrast to existing studies, our paper analyzes the effects of power structure on coups d'etat. In particular, we focus on centralization versus decentralization. The idea to use decentralization to defend a regime can be traced back to Niccolo Machiavelli who argues that it plays an important role in determining the difficulties in holding a newly acquired state. However, this famous view of the relationship between power structure and war receives surprisingly little attention.[5] Most studies on decentralization address the effects on the accountability of the local government and

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[5] Jia and Liang (2013) develop a similar idea with a different theoretical model, and discuss the possible interaction of economic shocks and decentralization on military coups. Here the analysis is significantly simplified, and empirical evidences are provided.

its beneficial consequences, e.g., local public goods provision.[6] One message from our paper is that there may exist some dark sides of decentralization for highly centralized countries when their impacts on power structure are taken into account.

3 Model

3.1 Motivating examples

Even though a coup d'etat is by nature a conspiracy and a brief event, it still involves complex political interactions between the military government and other power bodies. Sometimes the junta needs to deal with a strong local leader, sometimes it needs to bargain with the deposed national leader who may mobilize his supporters or his loyal military fraction. The experiences of the August Coup in the Soviet Union in 1991 and the Honduras coup in 2009 constitute suggestive evidence of these interactions.

On August 19, 1991, a group of hard-line members of the Communist Party of the Soviet Union attempted to take control of the country. Initially, they succeeded in detaining the President of the Soviet Union, Mikhail Gorbachev, and organizing the emergency committee. However, the coup collapsed in only two days through a short but effective campaign of civil resistance led by Boris Yeltsin, the Russian SFSR President.

On June 28, 2009, the military in Honduras ousted President Manuel Zelaya and flew him into exile. The pro-Zelaya protest began almost immediately, and Zelaya attempted to return several times to more effectively mobilize his supporters. The negotiations between the *de facto* government and Zelaya were organized by foreign politicians. Ultimately, these negotiations broke down. After the election on November 29 without the input from Zelaya, the new government gradually consolidated the position, and both sides reached a deal that Zelaya would remain in exile in the Dominican Republic.

These examples exemplify that even without the control of the central government, the local leaders or the deposed national leaders can still mobilize local-level resources to deal with the military government, e.g., negotiation, resistance, etc. A rational conspirator will be aware of these future interactions when plotting the coup d'etat.

3.2 Environment

There are three players in the state: the central government (C), the local government (L) and the army (A). The political rents (fiscal revenue) are controlled by a two-layer government consisting of C and L.[7] Let s and $1-s$ denote the share of fiscal revenues controlled by C and L, respectively. An alternative interpretation is that s measures the relative power of the central government. The total fiscal revenues are Y.

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[6]Qian and Weingast (1997) and Bardhan (2002) provide excellent surveys on research in this field.

[7]This assumption of two-layers is for simplicity and our main results hold for more layers. Besides this, we ignore the coordination problem among different governments within the same layer.

Each player is risk neutral and attempts to maximize his own payoff. The strength of A is denoted as x_A, which is enjoyed by the army and assumed to be exogenously determined by the decisions taken in past periods for the sake of external security or suppressing rebellion.[8] The coup is a sudden event, and once it occurs, it leaves little time for the government to reallocate resources. Instead, the latter will defend himself with all strength. A chooses to stage a coup d'etat targeting C, and the likelihood of a successful coup is jointly determined by the strength of A and the resources (strength) of central government, sY.[9] If A succeeds in taking control of the central government, he takes over all the resources of C, which is equal to sY.[10] Then he will bargain with L over peaceful settlement,[11] and a civil war will occur if either A or L wants to challenge the bargaining outcome. Figure 1 presents the time structure.

[Figure 1 about here]

To be more concrete, the time structure is stated below.

Timing

In stage 1, A chooses between coup and subordination. Under subordination, A retains x_A. If staging a coup, A overthrows the incumbent central government with probability $f(x_A, sY)$. If C loses, A grabs the power and gets sY. C retains power and enjoys the sum of payoff sY whenever A chooses subordination or the coup fails. The loser gets nothing. The game ends if the coup is defeated by C. Otherwise, the successful A establishes a *junta*, and stage 2 begins.

In stage 2, L and A bargain over the terms of peaceful settlement, e.g., they simultaneously propose an offer to the counterpart. The outcome is a *compromise*, i.e., the junta hands the power to the civilian government, if the terms are in accordance with L's offer. If the terms are in accordance with A's offer, we say that L *surrender*s to the junta in exchange of a transfer from A. The military government thus *consolidate*s its position. If neither of them would like to accept the offer from the other, the *status quo* resource distribution remains. However, L and A have limited commitment. If at least one side decides to engage in confrontation after the transfer being enforced, we turn to stage 3, i.e. the onset of civil war.

In stage 3, both sides simultaneously invest resources x_L and x_A' in the violent confrontation. The payoff to the winner is the total resources minus the investment in civil war. With probability $1 - f(x_A', x_L)$ L wins and restores the civilian government, otherwise A unifies the country.

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[8]Therefore we abstract from the problem on optimal military spending. If there is no demand for the military force, to eliminate the threats of coups, it is optimal for the government to entirely abolish its army, like the practice of Costa Rica.

[9]We also abstract from the central government's specified use of resources. It can include but not limited to target unproductive social spending, policemen or paramilitary forces, etc. This strength could be mobilized to fight against the plotters on the onset of a coup.

[10]Since most coups are bloodless and brief, we assume that there is no loss in fiscal revenue from coups.

[11]Alternatively, we can interpret it as that the deposed national leader may mobilize the resources at the local level to negotiate with the junta. This is exemplified by the behavior of the exiled Honduras president Manuel Zelaya in the 2009 coup d'etat. Our setting is justified as long as the politician has limited commitment over his future behavior.

For simplicity, we assume the success function for coups and wars to be a lottery success function $f(x_A, x_C) = \frac{x_A}{x_A + x_C}$,[12] similarly for $f(x'_A, x_L)$.

All information about type and revenue is public. We solve the model by working backwards to derive the Sub-game Perfect Nash Equilibrium. We can get results for the duration of power by solving stage 2 and stage 3, and results for the risk of coups by solving stage 1.

3.3 Length of Power

3.3.1 Stage 3. Civil war

If a civil war occurs in stage 3, the prize for the winner is the total fiscal revenues Y minus the unproductive war investment $x'_A + x_L$. A would choose x'_A to maximize:

$$\frac{x'_A}{x'_A + x_L} \left[Y - x'_A - x_L \right] \tag{1}$$

L selects x_L to maximize:

$$\frac{x_L}{x'_A + x_L} \left[Y - x'_A - x_L \right] \tag{2}$$

The first-order conditions are:

$$x'_A = \sqrt{x_L Y} - x_L \tag{3}$$

$$x_L = \sqrt{x'_A Y} - x'_A \tag{4}$$

First, we look at the interior solutions, i.e., both players have sufficient resources to invest in the war. Because the success function $f(x_A, x_L)$ is symmetric, in equilibrium both players equalize the investment in civil war, the winning probability, and the expected payoff as follows,

$$x'_A = x_L = \frac{Y}{4} \tag{5}$$

$$E\pi_i = \frac{Y}{4} \tag{6}$$

To make this feasible, the optimal investment in the war cannot exceed the resources in the hands of each party at that moment. We get the following constraint:[13]

$$\frac{Y}{4} \leq \min\{(1-s)Y, sY\} \tag{7}$$

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[12] This is the standard contest success function with the decisiveness parameter being one.

[13] This means that though fiscal revenue doesn't lose in a coup, the military strength is only valid for one stage. This may be justified by that military spending is temporarily, and takes a small portion of total resources for most countries (On average military expenditure takes about 3.4% of GDP, Leon (2009)).

which is equivalent to

$$\frac{1}{4} \leq s \leq \frac{3}{4} \tag{8}$$

If $s \leq \frac{1}{4}$, which indicates that the country is very decentralized, the military government will be resource-constrained in a civil war. If $s \geq \frac{3}{4}$, i.e., in a highly centralized country, the local government will be resource-constrained in a civil war. The resource-constrained player cannot counterbalance the challenge from the other side, thus he will invest all resources in the war. The resource-abundant player is more likely to win.[14]

3.3.2 Stage 2. Bargaining

Now we turn to stage 2 where A and L negotiate over the allocation of fiscal revenues. In particular, each player can transfer resources to the other side. The outcome of civil war constitutes an outside option for each party in the case that the peace negotiation fails. A general problem in peace negotiation is that the players cannot commit not to resort to the violent confrontation after the enforcement of transfer. However, Bevia and Corchon (2010) show that when the imbalance of strength is not too severe, there always exists a self-enforceable peace agreement. In our environment, even though the players have limited commitment, self-enforceable peaceful settlement exists, regardless of the value of s, as stated in the following lemma.

Lemma 1 *There always exists a $T \geq 0$ such that after the resource transfer T from one side to the other, no player has any incentive to carry out a civil war. In particular, after the transfer, the relatively weak player should be guaranteed at least $\frac{1}{4}$ of the total resources.*
Proof. *See the appendix.* ∎

On the one hand, a transfer will increase the recipient's opportunity costs for conflict. On the other hand, it reduces the prize for the recipient if it carries out a confrontation after the enforcement of transfer. The recipient will not stage a conflict if its after-transfer payoff exceeds the expected payoff from civil war (6), even if the initial power structure is severely skewed to one side.

A sufficient condition for self-enforceable peaceful agreement is that the post-transfer resource imbalance between these two players is not too large. Because of limited commitment, the weak player can use the threat of civil war to grab some resources from the strong party and secure a minimal payoff. The further implication that civil war would never be part of an equilibrium outcome is to a large extent consistent with the real-world observation: in most developing countries after WWII, coups rarely end up with the onset of civil war. During 1970-2000, five coups sparked civil wars in the Uppsala/PRIO dataset, whereas only three did so in the Correlates of War dataset (Powell and Thyne 2011).

Now, we turn to the specific bargaining process. The structure of bargaining is as follows. Both players could propose an offer to the counterpart. If the offer t_L (resp, t_A) from L (resp, A) is

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[14]In (16) and (17) in the appendix we show the expected payoff when one side is resource-constrained.

accepted by the other side, then A (resp, L) compromises (resp, surrenders) in exchange for the promised transfer. If no offer is accepted, both sides keep their own resources and decide whether to stage a civil war.[15]

As established by Lemma 1, peaceful settlement dominates civil war for both parties. In other words, if no offer is accepted, both sides prefer the status quo (sY for A and $(1-s)Y$ for L) over the new distribution of resources or conflict. Hence, the junta automatically consolidates his position.

We say peace is feasible if A and L can be guaranteed that the post-transfer payoff exceeds the expected payoff from war. Take the offer t_L as example, we need the payoff from a compromise is higher than that from civil war for both side:

$$\frac{Y}{4} \leq (1-s)Y - t_L \tag{9}$$

$$t_L + sY \geq \frac{1}{4}Y \tag{10}$$

However, feasible doesn't translate into acceptable directly. Either L or A prefers status quo to accepting the offer whenever $\frac{1}{4} \leq s \leq \frac{3}{4}$. In this range, L neither has the incentive to challenge A, nor the willingness to offer A a compromise since buying it is not a worthy business. Therefore, the status quo maintains and the junta will consolidate and get $V = sY$.[16]

If $s < \frac{1}{4}$, i.e., when buying a surrender is not feasible and A has the incentive to stir a war if no transfer is offered, L can offer A t_L as prescribed by (10) and A will accept it. The outcome is a compromise, i.e., the army returns battalion with $V = \frac{Y}{4}$. If $s > \frac{3}{4}$, L cannot offer A a compromise and wants to stage a war due to the sharp imbalance of power, the junta can consolidate its position peacefully by promising $t_A = \frac{Y}{4}$ to L since it dominates the outcome of war for both side. The payoff to A is $V = \frac{3}{4}Y$.

We summarize the results in the proposition below and Figure 2 visualizes the main results.

Proposition 1 *If $s < \frac{1}{4}$, the outcome of the peace agreement is a compromise where the junta hands over the power to the civilian government. If $s \in \left[\frac{1}{4}, \frac{3}{4}\right]$, the status quo persists and the junta keeps the power. If $s > \frac{3}{4}$, the Local government will surrender and the junta will consolidate. Moreover, the value for the junta, i.e., payoff to A, is*

$$V = \begin{cases} \frac{Y}{4}, & \text{if } s < \frac{1}{4} \\ sY, & \text{if } s \in \left[\frac{1}{4}, \frac{3}{4}\right] \\ \frac{3}{4}Y, & \text{if } s > \frac{3}{4} \end{cases} . \tag{11}$$

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[15] In an early version of this paper, we studied a slightly different bargaining procedure where L maintains its position under surrender. This alternative assumption allows the asymmetric bargaining position between L and A, but our current results do not change qualitatively.

[16] If we assume that one side would like to sacrifice some revenues in exchange for the subordination of the other side, as long as we suppose that the advantageous player is more likely to do this, the basic results on the outcome of coups remain.

The payoff to the local government thus is $Y - V$.

[Figure 2 about here]

This proposition shows that the payoff to the junta is weakly increasing with respect to s, C's share in fiscal revenues. The intuition is as follows. Once A succeeds in the coup attempt, he takes over C's resources. Hence, s measures the junta's own power in the aftermath of a successful coup. As for the direction of the resource transfer, if s is very low ($s \leq \frac{1}{4}$), A will get a transfer from L in exchange for state power. If s is very high ($s > \frac{3}{4}$), A will buy subordination from L. However, in the range between, no transfer will ever occur and the junta consolidates automatically. Because of the threat of a wasteful confrontation, the payoff to the junta (local government) in even a very centralized (decentralized) country is still bounded from the above. In real world, we cannot observe the payoff to a junta. However, we may use the length of power to proxy the payoff, based on the presumption that a post-coup government enjoys more benefits if it sustains longer. Since $1 - s$ measures the degree of decentralization of a state, we can establish the relationship between government structure and the length of power of a junta, conditional on a successful coup.

Prediction 1: *The length of power after a successful coup is longer (shorter) in more centralized (decentralized) countries.*

This result sheds some light on the survival of a post-coup government. In more centralized countries, once the violent illegal governmental transformation occurs, this transformation has more persistent effects.

3.4   Risk of coups

In the previous subsection, we show that the duration of a junta is longer in more centralized countries since the coup plotter will have advantages when bargaining with the local government. Hence, centralization provides the conspirators with larger prizes and encourages coups attempts. However, a powerful central government is also more likely to defeat the conspirators. Thus, the conspirators meet with higher opportunity costs in a centralized country. In this subsection, we will quantify the two forces with opposing effects.

3.4.1   Stage 1. The army's decision

Now we turn to the first stage to investigate the army's decision to carry out a coup. A will stage a coup d'etat if and only if the expected payoff from the coup exceeds his current strength. The incentive constraint is as follows:

$$\frac{x_A}{sY + x_A} V \geq x_A, \tag{12}$$

where V is the expected value to a junta, the continuation value defined in (11). Since the RHS of (12) is given, the LHS of (12) represents the return to a coup which determines A's incentives to carry out a coup. Therefore, we can summarize the SPNE in the following proposition.

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Proposition 2 *In this coup game, given the distribution of revenues across the hierarchies of government (s), in equilibrium the strategies of each player is:*

1. *The army with type x_A will carry out a coup if condition (12) is satisfied, otherwise he keeps subordination. He will wins a coup with probability $\frac{x_A}{sY+x_A}$, then he will negotiate with the local government. His payoff from peaceful settlement is described by (11). After peaceful settlement, he won't engage in any violent conflict against the local government.*

2. *If a coup occurs, the central government remains in power with probability $\frac{sy}{sY+x_A}$.*

3. *If a coup succeeds, the local government negotiates with the army. The outcome of negotiation is described as Proposition 1. The local government will not challenge the army after peaceful settlement.*

3.4.2 Coup risk

We substitute (11) in Proposition 1 into the coup condition (12) and obtain the following conditions for the outbreaks of a coup d'etat.

(1) In the centralized regime ($s > \frac{3}{4}$), $V = \frac{3}{4}Y$, the coup condition (12) becomes

$$\frac{x_A}{x_A + sY}[\frac{3}{4}Y] \geq x_A. \tag{13}$$

(2) In the intermediately centralized regime ($\frac{3}{4} \geq s > \frac{1}{4}$), $V = sY$, the coup condition becomes

$$\frac{x_A}{x_A + sY}[sY] \geq x_A. \tag{14}$$

(3) In the decentralized regime ($s \leq \frac{1}{4}$), $V = \frac{Y}{4}$, the coup condition becomes

$$\frac{x_A}{x_A + sY}[\frac{Y}{4}] \geq x_A. \tag{15}$$

The probability of a successful coup $\frac{x_A}{x_A+sY}$ is decreasing with respect to s, this implies that other things equal, the coup plotter is more likely to grab the power in more decentralized countries.

By Proposition 1, the payoff from a peaceful resolution is bounded for either side. Hence, the prize for a successful coup (V) is invariant with respect to s for cases (1) and (3). Decentralization only increases the probability of overthrowing the incumbent, thus the return to coups increases and coups become more likely.

However, when the extent of decentralization is in the intermediate range ($\frac{3}{4} \geq s > \frac{1}{4}$), both the opportunity cost of plotters and the available rents to a successful coup increase with s. The following corollary shows that the latter effect dominates.

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Corollary 1 *In the intermediately centralized countries ($\frac{3}{4} \geq s > \frac{1}{4}$), the return to a coup increases with respect to s.*

Proof. *See the appendix.* ∎

To understand this corollary, we can examine (14) more carefully. A higher s raises C's defensive strength, however, the increasing opportunity cost comes in less than a one-to-one ratio. However, a higher s will increase the prize of overthrowing the government in a one-to-one ratio. In sum, in this range, the temptation from high rents outweighs the counterincentive effect from a tough incumbent, thus increasing s raises the expected payoff from a coup.[17] As a consequence, we are led to the following prediction:

Prediction 2 *In either highly centralized or highly decentralized regimes ($s \leq \frac{1}{4}$ or $s \geq \frac{3}{4}$), coups are more likely to occur in more decentralized countries. For intermediate centralized regimes, however, the coup risk is lower in more decentralized countries.*

The non-monotonic relationship between the extent of decentralization and the coup risk suggests that the effect of decentralization on political stability depends on the initial conditions. If a country is already highly centralized, the implementation of a decentralization reform may reduce the stability of the central government and increase the coup risk. This also works if a highly decentralized country moves further in the direction of decentralization. However, decentralization may improve the stability of the regime if the distribution of power within a country lies in the intermediate range. Therefore, the positive effects of decentralization are path-dependent.

4   Data and Empirical Evidence

We use a panel data between 1970 and 2000 to test Prediction 1 and Prediction 2. Due to the lack of annual decentralization data, we use country-average data as our baseline estimation, and use interpolated country-year data as a robustness check.

4.1   Data

We measure the extent of decentralization by the log of sub-national government revenue share in a country.[18] The data comes from IMF Government Finance Statistics and has been collected and used in Enikolopov and Zhuravskaya (2007).

The data on coups d'etat primarily comes from a recent dataset collected by Powell and Thyne (2011). It reports both successful and failed coups since 1950. We calculate the length of a military power after a successful coup based on the information on regime changes in the Database of Political Institutions (Keefer 2005). We calculate two measures for the length of power, by ruler and by regime. For instance, Jerry Rawlings ruled Ghana as a military dictator in 1981-1992 and

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[17]In effect, if we take into account the plotter's first-mover advantage, the result here still holds under reasonable specification of the success function. For instance, $f(x_A, sy) = \frac{x_A^\beta}{x_A^\beta + sy}$, $\beta > 1$.

[18]This may measure the *de facto* distribution of resources across hierarchies within a government. We have also used the deviation from the mean of the revenue share. The results are consistent with what are presented here.

then as the elected president in 1992-2001. In this case, the numbers for two measures of power length are 20 years and 11 years, respectively.

Table I presents the basic summary statistics for the country-average data. We briefly explain the definitions, data sources and our motivation for the control variables below.

Political institutions. They are measured by the average value of the democracy index during 1970—2000. The data comes from the Polity-IV dataset. The Democracy index is an additive eleven-point scale (0-10) taking into account the competitiveness of executive recruitment, the openness of executive recruitment, the constraints on the chief executive, and the competitiveness of political participation. We define two discrete measures, autocracy for the index below 2 and democracy for the index above 7.

Areas, populations and GDP per capita. In a large country it is difficult for a small group of conspirators to oust the incumbent and control the state in a brief coup, thus the size of countries affect the coup risk as well as the success of coups. We also include the average of GDP per capita (in constant U.S. Dollar of 2005) from 1970 to 2000 to control for the size of government and economic development. These data are extracted from the Penn World Table 7.0.

Military expenditure share. We include average military expenditure share over GDP as a control variable for military strength. The data is extracted from Correlates of War. This measure can also be thought as the outside option of coup plotters in our model.

[Table I about here]

4.2   Evidence from country-average data

Figure 3a plots the relationship between the average length of power by ruler and the extent of decentralization, e.g., the average of log subnational revenue share during this period. Similarly, Figure 3b plots the number of coups in a country between 1970 and 2000 against the extent of decentralization. As Table 1 shows, the countries in our sample are not highly decentralized. Actually, the maximal value of subnational revenue share on country level is about 55%. Thus we can highlight those highly and intermediately centralized countries. Prediction 2 suggests that there exists an inverse-U relationship between the coup risk and decentralization. We indeed observe that the relationships in the raw data are consistent with the predictions of our model.

[Figure 3a and 3b about here]

The dependent variables are count variables. Their distribution are shown in Figure 4a and 4b. Consequently, we use Poisson regression to deal with the count variables. The specifications for the average length and number of coups are as follows:

$$\overline{\text{Length}}_i = \exp\left(\beta_1 \overline{\text{Decent}}_i + \gamma \overline{X}_i + \varepsilon_{it}\right),$$

and

$$\overline{\text{Coup}}_i = \exp\left(\beta_1 \overline{\text{Decent}}_i + \beta_2 (\overline{\text{Decent}}_i)^2 + \gamma \overline{\text{X}}_i + \varepsilon_{it}\right),$$

where $\overline{\text{Decent}}_i$ is measured by the avarege of log (subnational revenues). The sqaure term serves to capture the nonlinearity predicted in our model. $\overline{\text{X}}_i$ is a vector of controls mentioned above.

[Figure 4a and 4b about here]

The results are shown in Table II. Column (1) shows the results for the average length of rulers for the full sample. Column (2) shows the regression results for non-OECD countries. We observe a negative and significant correlation between the extent of decentralization and the duration. The tiny difference between the coefficients in these two columns, to a large extent, comes from the fact that most successful coups occurred in non-OECD countries (33 out of 36). Among the control variables, only military spending is significantly correlated with the duration of post-coup government. It may suggest that the new rulers would spend more on military forces to purchase loyalty, or the countries with strong military are ruled under military government longer. Neither is explicitly incorporated into our model.

Column (3) and (4) present the regression results for the average length of regimes. Similarly, column (3) is for the full sample, while column (4) presents the results for non-OECD countries. The coefficients are still negative, though less significant than those for rulers. The magnitude of the impact of decentralization is significant in that the estimated coefficient suggests that a point decrease in the log of decentralization measure will increase the expected duration of regimes by $exp(0.29) = 1.34$ years, which is about one fourth of the average length of regimes in this period. Compare column (2) and (4), it could be shown that the impacts of decentralization on the duration of power are even greater if we look at the length of individual rulers. Besides the positive correlation between military spending and the length of power, political institutions affect the fate of post-coup regimes, democracy reduces the length of military governments, while autocracy increases it.

Column (5) and (6) present the regression results for the average number of coups, for the full sample and non-OECD countries, respectively. Consistent with Prediction 2, we can observe an inverse-U relationship between the number of coups and decentralization. The coefficients of the log of subnational revenue share and its square are around 1.2 and -0.3, respectively. Stronger military force is not correlated with the coup risk, but richer countries would have lower likelihood of coups d'etat. Both autocratic and democratic countries will have lower coup risk, which may suggest a non-monotonic relationship between institutions and the risk of coups.

[Table II about here]

4.3   Evidence from country-year data

As a roubustness check, we interpolate the decentralization measure using the information from the nearest year. Thus, we have an interpolated panel data and can examine the impact of decentralization on whether there is a coup in country i and year t, while controlling for year-fixed

effects. Due to the missing observation problem, we have to interpolate many data. Unfortunately, we cannot control for country fixed effects, since there is little variation in decentralization within a country during this period. Therefore, we will focus on the coup risk with interpolated data. The fixed-effects regression is specified as follows:

$$\text{Coup}_{it} = \alpha_t + \beta_1 \text{Decent}_{it} + \beta_2 (\text{Decent}_{it})^2 + \gamma \text{X}_{it} + \varepsilon_{it},$$

where α_t indicates year fixed effects and X_{it} is a vector of controls (in country-year level) mentioned above.

[Table III about here]

The results are presented in Table III. Similarly, Column (1) and (3) present the regression results for the full sample, while column (2) and (4) demonstrate the results only for non-OECD countries. Column (1) and (2) are the results without any controls, whereas column (3) and (4) include controls. From this table we can see that the estimated β_1 and β_2 in (1)——(3) are all significant, which are consistent with our predictions. The estimated coefficients in (4), though not significant, are consistent with the predictions in the term of the signs. Almost all controls are no longer significant, which may due to two possible reasons. First, compared with decentralization, institutions, incomes, etc, are more likely endogenous variables in long term. Second, the missing observation problem is more serious for less-developed countries, we have to interpolate a considerable portion of data, this may significantly affect our estimation.

5   Discussion

The observed geographical concentration of coups d'etat over the world resembles the Anna Karenina Principle — "Happy families are all alike; every unhappy family is unhappy in its own way". Theoretically and empirically, this paper suggests that the power structure plays a role in explaining the variations in outbreaks and outcomes of coups. We build a stylized model studying decentralization and coups, which generates predictions that are consistent with the empirical evidence. In our model, the extent of vertical decentralization is taken as given and the resources in the hands of the military force are also exogenous. Though this is largely due to the limitation of available data, this restricts our ability to investigate the dynamic interaction between the decentralization decision and the risk of coups. Nevertheless, we provide a model for understanding the strategic interaction between military forces and a civilian government, where the power structure is of importance. Moreover, in contrast to most literature on the role of decentralization in delivering growth and equality, our theory suggests that decentralization may affect the power structure; consequently the political stability. Thus, the dark side of decentralization should be taken into account when implementing the reform on government structure.

Connecting institutional features with the incentives to stage a coup is a promising research area. Future research will investigate more subtle interactions between institutions and incentives

within military forces. For instance, different types of authoritarian regimes may affect the risk of armed civil conflict (Fjelde (2010)). Integrating the organizational features of regimes into the study on coups d'etat should be the subject of future research.

A   Appendix

A.1   Proof of Lemma 1

We need to show that conflict is either worse than the status quo payoff to each player, or worse than the payoff after the transfer. In other words, we will show that $E\pi_i \leq \min\{(1-s)Y - T, sY + T\}$.

First, if both A and L are unconstrained, i.e., $\frac{1}{4} \leq s \leq \frac{3}{4}$, they will invest equally in the conflict and the expected payoff is (6). Thus, if $\frac{1}{4} \leq \min\{1-s, s\}$, i.e. status quo dominates conflict, peace is possible even with $T = 0$.

Without loss of generality, we now look at the case when $\frac{3}{4} < s$. The weak yet unconstrained L finds it to be in his interest to take the risk of war. However, the strong A can make a transfer T to L to maintain peace. Formally, peace is possible if $(1-s)Y + T \geq \frac{Y}{4}$ and $sY - T \geq \frac{Y}{4}$. This leads to $s - \frac{3}{4} \leq \frac{T}{Y} \leq s - \frac{1}{4}$. There exists a $T > 0$ that both parties will find that peace dominates war after transfer. Moreover, this implies that the weak L has no incentive to combat the junta whenever he is guaranteed at least $\frac{1}{4}$ of the total resources.

Then, we look at the case of the constrained player, which means that the resources in the hands of at least one player are smaller than the solution to (3) and (4). We divide this into two cases:

Case 1 Both players are constrained.

Without loss of generality, let us assume that L is constrained, i.e., $(1-s)Y < \frac{Y}{4}$. Then $s > \frac{3}{4}$, we cannot have two constrained players.

Case 2 One player is constrained and the other is unconstrained.

We examine the case that L is constrained but A is unconstrained.

    – We first explore whether it is possible that both prefer peace over war even without a transfer. The resources in the hands of L, $(1-s)Y$, are smaller than the unconstrained interior solution (5), and the best response of A to $(1-s)Y$ is smaller than sY. Equilibrium occurs at $x_L = (1-s)Y$ and $x'_A = \left[\sqrt{1-s} - (1-s)\right]Y$. Their payoffs are as follows:

$$E\pi_A = Y\left[1 - \sqrt{(1-s)}\right]^2 \tag{16}$$

and

$$E\pi_L = Y\sqrt{(1-s)}\left(1 - \sqrt{(1-s)}\right) \tag{17}$$

Peace will be in the interest of both parties if $E\pi_A \leq sY$ and $E\pi_L \leq (1-s)Y$, and the

second inequality turns out to be

$$s \leq \frac{1}{4}$$

It is in contrast with the premise that $1 - s < \frac{1}{4}$, so there exists no possibility that peace is obtained without any transfer.

– If $1 - s < \frac{1}{4}$, the constrained L has the incentive to start a conflict without transfer. We need to look at whether there exists a positive transfer T from A to L to make both better off than the onset of civil war. Since the risk of conflict is acceptable for a constrained L, the peaceful outcome needs to transfer to L. Because no unconstrained player would like to enter confrontation, to make the peace agreement self-enforcing, the post-transfer resource for L, $(1 - s) Y + T$, must exceed $\frac{Y}{4}$.

Therefore, A can transfer a minimum amount $T = [\frac{1}{4} - (1 - s)]Y$ to L to ensure that the latter is indifferent between peace and war. The cake left for himself is $\frac{3}{4}Y$. Since whenever $s > \frac{3}{4}$, $E\pi_A$ in (16) is smaller than $\frac{3}{4}Y$, and $E\pi_L$ in (17) is smaller than $\frac{Y}{4}$, both side would prefer peace over war.

– Therefore, peace with transfer is possible if $E\pi_L \leq (1 - s) Y + T$ and $E\pi_A \leq sY - T$. Both hold with transfer of wealth.

Hence, there always exists a $T \geq 0$ to make both prefer a peace outcome over war when there is a constrained player. We reach our conclusion that the peace agreement is always possible.

A.2   Proof of Corollary 1

The risk of coups can be measured by the net return to a coup, i.e., the LHS of 12. Taking the derivative of this formula, we have

$$\frac{d}{ds}\{\frac{x_A}{x_A + sY}[sY]\} = \frac{Y}{(x_A + sY)^2}x_A^2 > 0$$

We see that the derivative is positive, thus the return to a coup is monotonically increasing in s.

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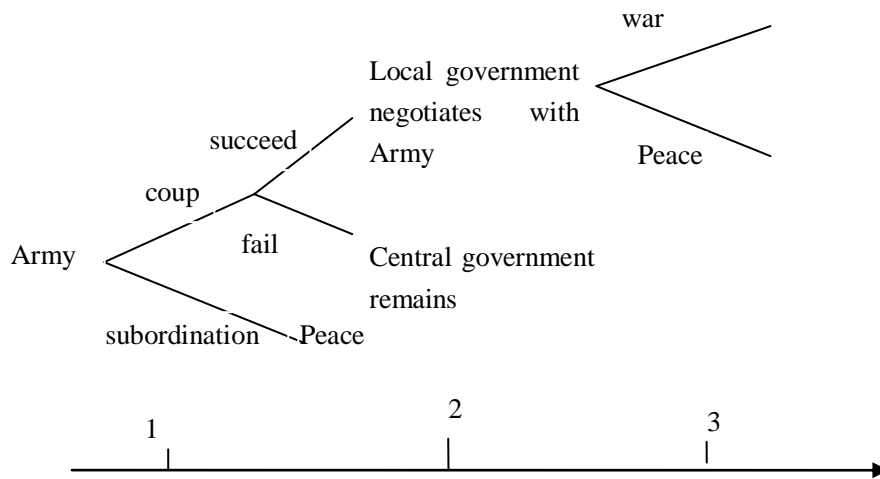
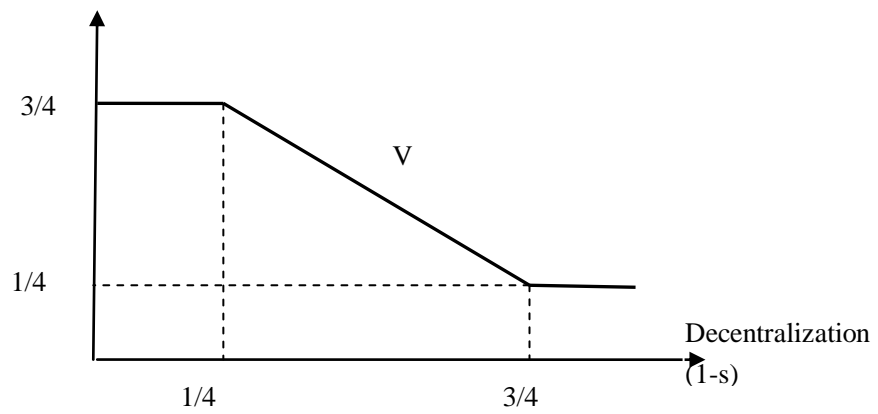Figure 1: Timing of the game

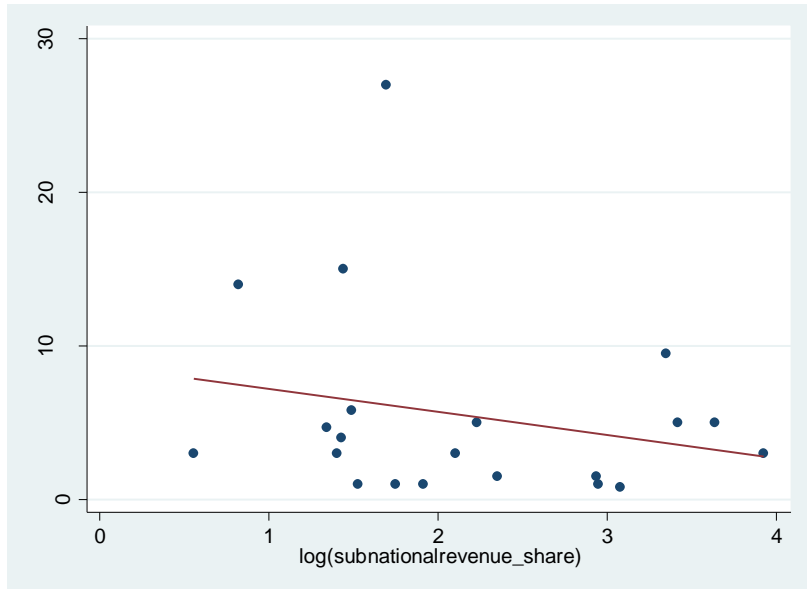Figure 2: Continuation value of a successful coup

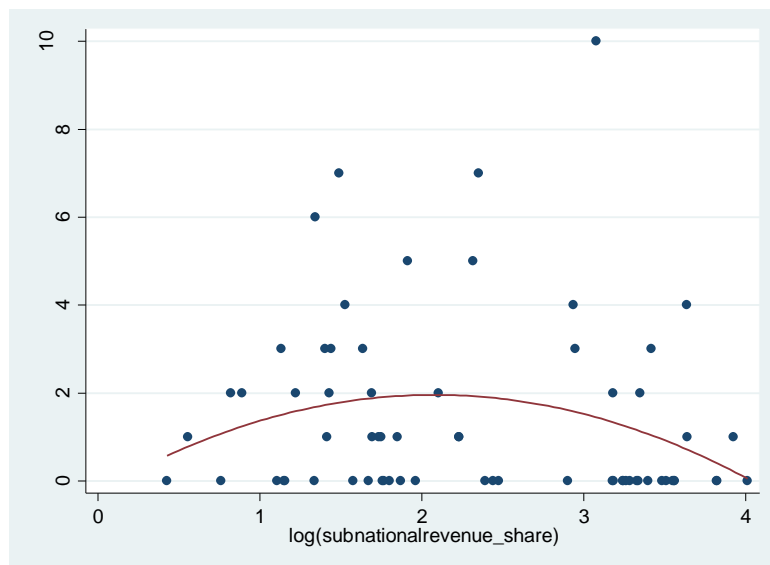Figure 3a: Average length of power by ruler after successful coups
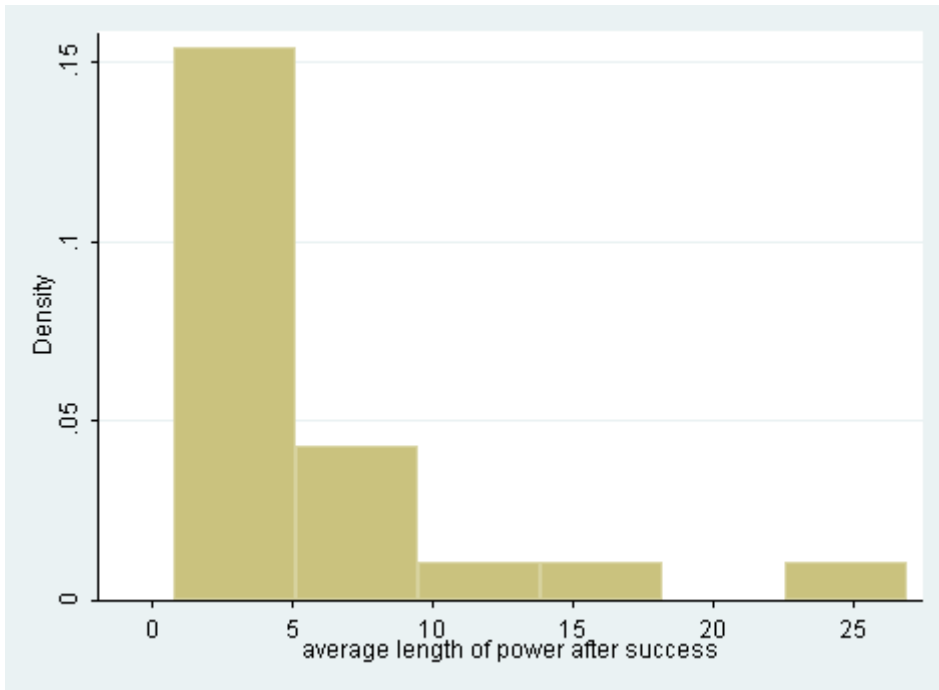

Figure 3b: Total number of coups

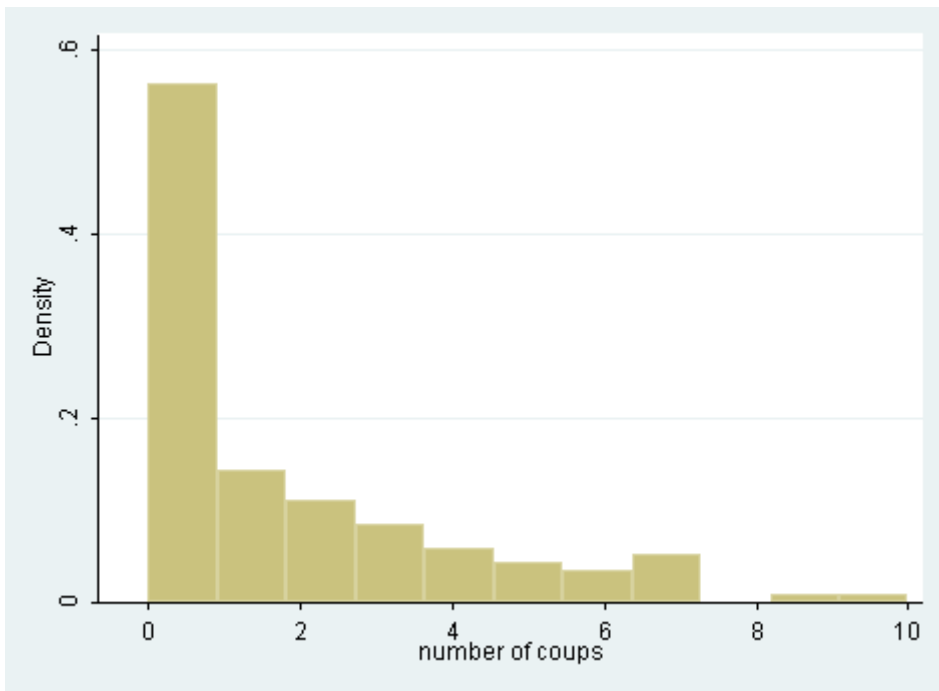Figure 4a: Distribution of the average of length of power after successful coups

Figure 4b: Distribution of average coups in a country

Table I. Summary statistics (1970—2010)

	Mean	Standard dev.	Min	Max
Dependent Variables				
Average coups in a country	1.61	2.28	0	10
Average length by leader after successful coups	3.97	5.85	0	31
Average length by regime after successful coups	4.02	6.08	0	31
Decentralization				
Log(subnational revenue share)	2.30	1.02	0.43	4.18
Controls				
Political institutions	1.87	2.70	0	10
Population sizes (1,000000)	6.614	8.773	0.621	61.704
Area (1,000 Square Kilometers)	757	1935	0.316	17075
GDP per capita (in constant USD of 2005)	5527	5395	416	21531
Military expenditure Share (% of GDP)	1.64	4.72	0	47.5

Table II. Results using average data

Dependent Variable	(1) Full sample	(2) Non-OECD	(3) Full sample	(4) Non-OECD	(5) Full sample	(6) Non-OECD
	Average length by ruler		Average length by regime		Average number of coup	
Log (subnational revenue share)	-0.615***	-0.584***	-0.298*	-0.286*	1.251**	1.125*
	(0.169)	(0.169)	(0.158)	(0.159)	(0.581)	(0.593)
Log (subnational revenue share)_Square					-0.306**	-0.267*
					(0.137)	(0.139)
Democracy	-0.557	-0.429	-1.507**	-1.467**	-0.734*	-1.005**
	(0.526)	(0.514)	(0.665)	(0.734)	(0.436)	(0.488)
Autocracy	0.422	0.460	0.741**	0.754**	-0.639***	-0.649***
	(0.291)	(0.293)	(0.293)	(0.294)	(0.220)	(0.223)
Area	-0.047	-0.058	-0.098	-0.099	0.072	0.086
	(0.223)	(0.221)	(0.211)	(0.210)	(0.091)	(0.092)
Population	-1.181*	-1.014	-1.360*	-1.287	-0.181	-0.146
	(0.709)	(0.700)	(0.773)	(0.787)	(0.241)	(0.254)
GDP per capita	-0.086	-0.039	-0.031	-0.022	-0.217***	-0.226***
	(0.070)	(0.076)	(0.072)	(0.078)	(0.057)	(0.069)
Military Expenditure Share	0.390***	0.366***	0.424***	0.414***	-0.016	-0.034
	(0.140)	(0.136)	(0.151)	(0.155)	(0.068)	(0.073)
Observations	36	33	36	33	102	79

The results are from Poisson regressions, standard errors are included in the bracket. ***p<0.01, **p<0.05, *p<0.1.

Table III. Results using interpolated country-year data

	(1) Full sample	(2) Non-OECD	(3) Full sample	(4) Non-OECD
Log (subnational revenue share)	0.027***	0.026***	0.015**	0.015
	(0.007)	(0.008)	(0.007)	(0.009)
Log (subnational revenue share)_Square	-0.009***	-0.008***	-0.004**	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)
Democracy			-0.014	-0.007
			(0.011)	(0.014)
Autocracy			-0.000	-0.005
			(0.012)	(0.014)
Area			-0.001	-0.004
			(0.002)	(0.004)
Population			0.001	0.001
			(0.005)	(0.007)
GDP per capita			-0.001	-0.004*
			(0.001)	(0.002)
Military Expenditure Share			-0.001	-0.001
			(0.002)	(0.002)
Including Year Fixed Effects	Y	Y	Y	Y
Observations	2,700	2,044	2,015	1,469
R-squared	0.028	0.025	0.035	0.033

The results are from country-year fixed effects model. Standard errors are included in the bracket. ***$p<0.01$, **$p<0.05$, *$p<0.1$.