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Regime Spoiler or Regime Pawn: The Military and Distributional Conflict in Non-Democracies*

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Abstract

I consider a model in which an autocrat can be removed from power either through a military coup or a revolution by the citizens. In the event of a revolt by the citizens, the military may choose to support the autocrat to crush the revolt or play a passive role. The autocrat determines the distribution of the country's wealth among himself, the military, and the citizens. I find that, under certain conditions, there exists a unique Markov perfect equilibrium in which there are no coups, the citizens revolt in each period, and the military fights on behalf of the autocrat. Under a different set of conditions, there is another Markov perfect equilibrium in which there are no coups, the citizens always revolt, but the military does not fight the revolt. However, peace (no revolts) is also an equilibrium of the model. The model is consistent with the persistence of social unrest or civil wars in certain countries and the different roles played by the military in different countries. Surprisingly, I find that if the citizens' outside option (i.e., payoff in a democracy) improves, this is likely to make them worse off. Furthermore, an increase in natural resources is likely to make the citizens worse off because it reduces the probability of a transition to democracy or the prospect of good governance in autocracy. I discuss other implications of the model and relate it to real-world events.

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1. Introduction

In a recent article, Besley and Robinson (2010, p. 656) observed that "[T]he influence of the military has been greatly ignored by economists. Most work on democracy and dictatorship … has abstracted from the role of the military." In contrast, the study of the military in the affairs of the state has a long tradition in political science (e.g., Finer, 1976; Luckham, 1974; Nordlinger, 1977; Rouquie, 1987; and Stepan, 1974).

History is, of course, replete with examples of the role of the military or the army in supporting autocrats like Robert Mugabe of Zimbabwe, Mobutu Sese Seko of Zaire, Kim Jun-il of North Korea, Bashar al-Assad of Syria, and Gnassingbe Eyadema of Togo. While there are several instances of military coups, there are also instances in which the military had no interest in removing autocrats from power. This may be due to the fact that the military's payoff crucially depends or depended on these autocrats being in power. For example, removing the autocrat may lead to a chaotic and unpredictable succession process.[1] Also, the military may extract a surplus from the autocrat which may be impossible if the autocrat is not in power.

It may also be the case that because the citizens can revolt, the military has no incentive to remove the autocrat from power because if it did, it will simply accelerate the transition to democracy by energizing the citizens to revolt. This may be the case if the autocrat and his heirs (family), perhaps because of tradition or a long period of

[1] In a related context, a recent article in the New York Times reported that "As Zimbabwe hurtles into another violent political season, President Robert Mugabe's party is fiercely pushing for a quick election this year because of fears that the president's health and vigor are rapidly ebbing, senior party officials said. With no credible successor to unite the quarrelsome factions that threaten to splinter the party, its officials say they need Mr. Mugabe, who at 87 has been in power for 31 years, to campaign for yet another five-year term while he still has the strength for a rematch against his established rival, Prime Minister Morgan Tsvangirai, 59. ... Mr. Tsvangirai said of his still dominant partner, "He left the succession way too late, and now there is a scramble between the two main factions of ZANU-PF." (The New York Times, April 11, 2011).

indoctrination, have an aura around them which carries a relatively bigger weight than the aura around the military.[2] Hence, the probability that the citizens will revolt is lower when the autocrat is in power than when the military is in power. Or it may be pointless to remove the autocrat from power because the citizens will agitate for democracy regardless of who is in power.[3] In this case, it is in the interest of the military and the autocrat to present a united front in order to fight the citizens. Hence, the military and the autocrat are the ruling class facing a common enemy.

Of course, the military may be secured enough to feel that it can get rid of an autocrat, hold on to power, and be better off. For example, Acemoglu, Ticchi, and Vindigni (2010a) correctly argue that this is a risk to a ruling class of building a strong military and refer to this risk as *political moral hazard*. Acemoglu, Ticchi, and Vindigni (2010a, 2010b) and Besley and Robinson (2010) note that while a strong military can entrench an autocrat in power, the political moral hazard mentioned above implies that this is only possible if the autocrat compensates the military appropriately through the payment of an efficiency wage. Therefore, a stronger military can extract a bigger surplus than a weaker military. [4]

In this paper, I consider a model in which an autocrat can be removed from power either through a military coup or through a revolution by the citizens. In equilibrium, the military rationally chooses to keep the autocrat in power because it is given enough

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[2] For example, this aura may be the reason why the North Korean military allowed twenty-eight year old, Kim Jun-on, to be the head of state and commander of the armed forces after his father, Kim Jun-il, passed away.
[3] This is consistent with Gallego and Pitchik (2004) who found that an increase in the probability that a coup-maker loses access to power after a coup implies a decrease in the equilibrium probability of a coup.
[4] In Acemoglu et al. (2010b), the autocrat builds a small army and thereby allows a "citizens" rebellion to persist. In Besley and Robinson's (2010) two-period model, the autocrat pays an efficiency wage if he can commit to such a wage in period 2. If he cannot commit to such a wage, then he builds a small military in order to prevent a coup.

transfer to satisfy the *no-coup constraint*. There is also a *loyalty constraint* which is associated with the military's decision to support the autocrat in the event of a revolt by the citizens of the country. This support is costly to the military.

I find that, under certain conditions, there exists a unique Markov perfect equilibrium in which there are no coups, the citizens revolt in each period, [5] and the military fights on behalf of the autocrat (the loyalty constraint is satisfied). Under a different set of conditions, there is another equilibrium in which the autocrat satisfies the no-coup constraint, the citizens always revolt, but the military does not fight the revolt (the autocrat rationally violates the loyalty constraint). Under certain conditions, there is no equilibrium in which the autocrat is willing to give the citizens enough transfers to prevent a revolt. Therefore, the citizens revolt so long as the autocrat is in power. This may explain the persistence of social unrest and civil wars in certain countries. The result that the loyalty constraint is satisfied in some equilibria but is violated in others is consistent with fact that the military plays different roles in different societies.

I also find that an increase in natural resources is likely to make the citizens worse off because it makes it more likely that the equilibrium in which the military supports the autocrat to fight revolts by the citizens will be the outcome of the game. Therefore, natural resources reduce the probability of a transition to democracy. Surprisingly, an increase in the value of the citizens' outside option (i.e., payoff in a democracy) is likely to make the citizens worse off. This is because an increase in the value of the citizens' outside option worsens the military's outside option (i.e., payoff in a democracy). This makes it relatively cheaper to buy the military's loyalty.

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[5] As in, for example, Acemoglu et al. (2010b), this may be understood as a persistent civil war, although there is a positive (exogenous) probability in each period that the civil war may end. This occurs when the citizens overthrow the autocrat.

In contrast to the aforementioned result in Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010), I also find that there exists an equilibrium in which the autocrat *increases (decreases)* transfers to the military when the military is *weaker (stronger)* although the military has become *less (more)* important to the autocrat's political survival. If the autocrat can choose the strength of military, he chooses a strong military. I also argue that the composition of military spending may be as important as aggregate military spending.

Regarding the result that a weaker (stronger) military can extract a bigger (smaller) surplus from an autocrat, a key assumption is the presence of a *rebellious citizenry* or *a high threat of rebellion*,[6] and the need to incentivize the military to support the autocrat. This *does not* mean that a stronger military is not paid well. In this equilibrium, the military is paid an efficiency wage to incentivize it to support the autocrat during a citizens' revolt. Because of a rebellious citizenry, the results of this paper differ from Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010). In Acemoglu et al. (2010a), the military can choose not to repress citizens in which case, with an exogenous probability, there is a movement to transitional democracy. However, the citizens in their model are passive because their behavior is not explicitly modeled (i.e., they do not revolt). In Acemoglu et al. (2010b), the initial state in the model is one in which a revolt (rebellion) is already under way (i.e., it is exogenous) and revolts cannot occur more than once.[7] And in Besley and Robinson (2010), there is only an army and a civilian government. There are no citizens who can revolt. In my model, the citizens can

[6] In the equilibria of this paper, the citizens rebel in every period until they successfully overthrow the autocrat.

[7] As they write in footnote 4 "The rebels and the citizens do not play an active role because of our simplifying assumptions ..."

revolt and their behavior is explicitly modeled.[8] Unlike this paper, the focus of these papers is not the military's loyalty in terms of defending an autocrat's against a revolt by citizens.

As the equilibria of the paper show, it is possible to satisfy the no-coup constraint but violate the loyalty constraint. An example was the military's response to the revolution in Egypt in 2011. It was not likely that the military would have actively and independently removed Hosni Mubarak from power.[9] However, when the millions of Egyptian citizens rose up in a revolution, the military chose not to use force to deal with the situation. Eventually, Mubarak had to step down when the country became practically ungovernable. It is possible that the Egyptian military chose not to act in order to protect its rents[10] but there are also instances where the military may be worse off when the autocrat is no longer in power. [11]

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[8]Svolik (2013) is an interesting model that examines the role of the military in politics. In his model, the citizens (i.e., the group excluded from power) is not modeled. The incumbent faces an exogenous threat drawn from a known distribution. He obtains an equilibrium in which the military mounts a coup with positive probability to oust the leader if the magnitude of the threat is sufficiently high. In contrast, I consider equilibria in which the military does not mount a coup because I am interested in examining the conditions under which the military will support a leader to fight a citizens' revolt or stay out of the fight.

[9] One may argue that the military did not actively remove Mubarak from power because it was getting a very high surplus from Mubarak. This is not inconsistent with my argument. In fact, as noted above, in the equilibrium of this paper, the military is paid an efficiency wage and so it is better off when the autocrat is in power. I only use Mubarak's example to underscore the point that a military may choose not to support an autocrat in the event of a revolution by the citizens and such apathy may lead to the autocrat's removal from power.

[10] A high anticipated cost of fighting the citizens and bringing the situation under control may also have informed the military's decision not to support Mubarak. For example, keeping Mubarak in power was increasingly making the country ungovernable; the cost of maintaining law and order while Mubarak held onto power became too high. This cost may have, among others, included the loss of the huge transfers of aid by the USA to Egypt and the threat of international sanctions. In the formal model, I include a cost to the military of fighting a rebellious citizenry.

[11] Besley and Kudamatsu (2009) document instances of the extent to which the power of a *selectorate* is dependent on an autocrat remaining in office (see also footnote 1). The *selectorate* is a term due to de Mesquita et al. (2003). It refers to the group that a ruler depends on to hold on to power. In a democracy, the selectorate is the electorate. In an autocracy, the selectorate may be the military, party cadres, a group of allies, or the autocrat's ethnic group.

According to a New York Times article on the 2004 Ukrainian "Orange Revolution":

"... senior intelligence officials ... issued warnings, saying that using force against peaceful rallies was illegal and could lead to prosecution and that if ministry troops came to Kiev, the army and security services would defend civilians ... Throughout the crisis an inside battle was waged by a clique of Ukraine's top intelligence officers, who chose not to follow the plan by President Leonid D. Kuchma's administration to pass power to Prime Minister Viktor F. Yanukovich, the president's chosen successor." (New York Times, January 17, 2005).[12]

Even in democracies where the opposition does not question the legitimacy of a leader's rise to power, the action of the military is instructive. For example, since November 2013, the military in Thailand has chosen not to intervene in the on-going protest of the opposition against the legitimately-elected government of Yingluck Shinawatra.

The paper clarifies the conditions under which an autocrat will buy the loyalty of the military in order to get the military to fight on his behalf when the citizens rebel. Using Indonesia as an example, Laksmana (2008) puts the political behavior of the military into four distinct categories: regime spoiler; critical regime partner; uncritical regime partner; and regime pawn. The military is a regime spoiler if it fails to take direct orders from the ruling class or uses force against the ruling class. In my model, using force is tantamount to a coup and refusing to take direct orders is consistent with *not* fighting a revolt on behalf of the autocrat. However, in equilibrium, no direct orders will be refused because the autocrat will not issue orders that he knows will be refused. A

[12]This citizens' revolution in Ukraine was triggered by allegations of fraud by the incumbent party in favor of its candidate in the presidential elections. The nationwide protests succeeded when the results of the original run-off were annulled, and a revote was ordered by Ukraine's Supreme Court. Under intense scrutiny by domestic and international observers, the revote was declared to be "fair and free". The final results showed a clear victory for the opposition candidate, Viktor Yushchenko. He was declared the official winner and assumed office on January 23, 2005.

regime pawn is consistent with the case where the military does not mount a coup and always supports the autocrat when there is a citizens' revolt. My model is not rich enough to distinguish the role of the military as a "critical regime partner" from its role as a "regime spoiler" because I do not give the military or its leader a direct policy-making role nor do I allow it to issue verbal dissents.[13] The same is true of the category of "uncritical regime partner."

The paper is organized as follows. The next section presents a model to demonstrate the result that a weaker military can extract a bigger surplus; a sub-section discusses the results. Section 3 extends the model and a subsection discusses how the model may be applicable to pseudo-democracies. Section 4 concludes the paper.

2. The military as a 'regime pawn' or a 'regime spoiler'

Consider an infinitely-lived and discrete-time economy made of three risk-neutral groups: a civilian ruling class (represented by an autocrat), the military, and the rest of the population (hereafter, citizens).[14] A period is indexed by $t = 0, 1, 2, \ldots, \infty$. Each group has a discount factor, $\delta \in (0, 1)$. In each period, the economy is endowed with $R > 0$ resources which can be distributed among the three groups. The distribution of this resource is determined by the autocrat.

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[13] Drawing on a distinction between oligarchic (civilian) regimes and military dictatorships in the political science literature, Acemoglu et a. (2010a, p. 4) observed that the regimes of President's Alberto Fujimori of Peru and Ferdinand Marcos of the Phillipines " ... were backed by the army, but the military establishment did not have important decision-making powers."

[14] There are some autocrats who came to power through a military coup but later morphed into civilian rulers or remained as military men but their interests diverged from the interests of the military. An example of the latter case is the former military leader of Ghana, General Kutu Acheampong. According to Hansen and Collins (1980, p. 11), certain elements in the Ghanaian army "... began to look with alarm as he (i.e., Acheampong) started to build what looked like a civilian base of support independent from the army." Parenthesis mine.

If the autocrat is in power, the military has the option of mounting a coup to remove the autocrat from power. The citizens of the country also have the option *in each period* to revolt and try to remove him from power. If they revolt but fail to remove him from power, they can try again in the next period. Hence the citizens can revolt a multiple number of times. If the citizens revolt, the military (if it did not remove the autocrat from power) has two options: (i) support the autocrat (i.e., fight the citizens) or (ii) do not support the autocrat (i.e., do not fight the citizens).[15]

Let $\mu > 0$ be the per-period cost to the military of fighting a revolution. Without loss of generality, assume that the cost to the citizens of a revolt is zero.[16] Also, the cost of a coup by the military is zero. Without loss of generality, I assume that in the event of a successful coup or a successful revolution, the country becomes a democracy.[17] In this case, the autocrat's payoff is zero in the current period and in each subsequent period; the military and citizens get $B \geq 0$ and $R - B > 0$ (respectively) in the current period and in each subsequent period.[18] A military coup succeeds with certainty (i.e., probability of success is equal to 1) while a revolution by the citizens may fail. Therefore, a coup leads to a democracy. A coup and a revolution cannot occur at the same time. The military's decision to mount a coup precedes the citizens' decision to revolt. Because a coup leads

[15]As in Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010), I assume that each group (i.e., the citizens, military, and autocrat) has solved the collective-action problem. This assumption has also been made in other papers (e.g., Esteban and Ray, 1999).

[16]Nothing hinges on this assumption. The cost of a revolt to the citizens can be positive and higher than the cost to the military of fighting a revolt. This will not change the results. What matters is that the cost to the citizen is not too high. If the citizens' cost of revolt is too high, the solution of the game will be trivial because the citizens will play a passive role. The assumption that the citizens' cost of a revolt is zero (or generally, sufficiently small) makes the analysis meaningful because it does not make the citizens passive.

[17]I relax this assumption in section 3. The results still hold if we assume that in the event of a military coup, the country becomes a military dictatorship with a positive probability which is less than 1.

[18] As will be obvious, the result of this paper holds for $B \geq 0$. The military may still receive some payments in a democracy because it has to defend the nation and help to maintain law and order.

to a democracy,[19] there is no need for a revolt when the military mounts a coup. Hence a citizens' revolt implies that there was no coup.

Conditional on the military supporting the autocrat, let $\theta_L \in (0,1)$ be the probability that if the citizens revolt, they will successfully remove the autocrat from power.[20,21] Then $1 - \theta_L$ is the probability that the revolution will fail given that the military supported the autocrat. If the military does not support the autocrat, let $\theta_H \in (0,1)$ be the probability that the revolution will be successful and $1 - \theta_H$ be the probability that the revolution fails, where $\theta_H > \theta_L$. Note that even if the military does not support the autocrat, the revolution may not be successful because the citizens may not be well-organized or the autocrat may have other means (e.g., using the police) to fight the rebellion.[22]

If the citizens rebel in period t, denote this by $r_t = 1$ and if they do not rebel, denote this by $r_t = 0$. If the military supports the autocrat, denote this by $s_t = 1$ and if it does not support the autocrat, denote this by $s_t = 0$. Denote a military coup by $mc_t = 1$ and no military coup by $mc_t = 0$.

Denote the autocrat, the military, and the citizens by e, m, and c respectively. All groups have the same risk-neutral preferences given by:

$$\mathbf{E}\sum_{t=0}^{\infty}\delta^t U_{it}\,, \tag{1}$$

[19]In Acemoglu et al. (2010a), when a coup fails, the country immediately becomes a democracy.
[20]I do not endogenize the nature of the contest over power between the citizens and the autocrat/military.
[21]Of course, θ_L depends on the capability or competence of the military. This will be a function of some inherent ability of military personnel, the resources available for training, the quality of their weapons and intelligence information, and the size of the military.
[22]During the 2011 revolt in Egypt, the millions of demonstrators in Tahir square were not armed.

where U_{it} represents the consumption of group i in period t, **E** is the expectations operator, and $i \in \{e, m, c\}$.

Let $X_{s,t}$ be the autocrat's transfer to the military in period t if the military chose to fight a revolt in period t and let $X_{ns,t}$ be the corresponding transfer if the military chose not to fight a revolt in period t. Let $G_{r,t}$ be the transfer to the citizens in period t if the citizens revolted in period t. Let $G_{nr,t}$ be similarly defined for period t if the citizens did not revolt in period t.

Note that autocrat cannot announce transfers to the military conditional on there being a coup because a coup leads to his removal from office.[23] The transfers $X_{s,t}$ and $X_{ns,t}$ which are conditional on whether the military fought a revolt are only relevant if there was no coup because a revolt cannot occur when there is a coup. The announced transfer, $G_{r,t}$, is only relevant if a revolt fails because a successful revolt removes the autocrat from office.

It is important to note that the military plays a special role in this setting: it is the only player that can passively or actively decide to either be on the side of the autocrat or the side of the citizens by fighting or not fighting a revolt. The other players cannot stand on the side of one party against a third party. Note also that from the standpoint of revolutions by the citizens, $\theta_H - \theta_L > 0$ captures the degree to which the autocrat's grip on power depends on the military. It measures the *relative importance* of the military to the survival of the autocrat. The smaller is $\theta_H - \theta_L$, the less important is the military to the autocrat's political survival.

Given that the autocrat is power, the timing of actions in period t is as follows:

[23]However, we shall make use of the fact that he must give the military a transfer of size B in order to prevent a coup. This means that $X_{ns,t}$ captures the transfer required to prevent a coup where, in this case, the military does not mount a coup but does not support the autocrat when there is a revolt.

1. The autocrat announces the conditional transfers $X_{s,t}$, $X_{ns,t}$, $G_{r,t}$, and $G_{nr,t}$.
2. The military decides to mount a coup ($mc_t = 1$) or not ($mc_t = 0$). If they mount a coup, the country becomes democracy forever. In the current period and in each subsequent period, the military gets B while the citizens get R − B. Therefore, the autocrat gets a zero payoff in the current period and in all subsequent periods.
3. If the military does not mount a coup, then the citizens decide whether to revolt ($r_t = 1$) or not ($r_t = 0$). If the citizens do not revolt, the game ends in the given period and the autocrat disburses the relevant transfers announced in stage 1. The game then restarts by going back to stage 1 of period t+1 (i.e., the next period).
4. If the citizens revolt, the military decides whether to support the autocrat ($s_t = 1$) or not ($s_t = 0$). If the revolt is successful, then in the current period and every subsequent period the autocrat gets zero, the military gets B, and the citizens get R – B. If the revolt fails, the autocrat disburses the relevant transfers announced in stage 1. Then we go back to stage 1 of period t+1.

For the sake of emphasis, a remark is in order. In the case of a coup, I assume that the military receives the same payoff that it will receive in a democracy. As explained in section 1, this is because the military is unable to hold on to power after a successful coup. This assumption is relaxed in section 3.2. The results remain unchanged. However, this assumption is not unreasonable. In some cases -- as discussed in section 1 -- the fortunes of a *selectorate* (i.e., the military in this case) are inextricably tied to an autocrat being in power. There were indeed autocrats like Gnassingbé Eyadema of Togo, Sekou Toure of Guinea, Omar Bongo of Gabon, and Houphouët-Boigny of Cote D'ivoire, who solidified their power and died in office. They were not removed from power by the military[24] and in some cases, such as Houphouët-Boigny's, their deaths led to very chaotic succession processes. One may even argue that the military's dependence on these autocrats is evident in the cases of Gnassingbé Eyadema and Omar Bongo where, after their deaths, the military ensured that their sons, Faure Eyadema and Ali Bongo, became the leaders of their countries. [25]

2.1 Equilibrium analysis

I characterize the pure-strategy Markov perfect equilibria (MPE) of this game. In this type of equilibrium, strategies can only be contingent on the payoff-relevant state of the world and the prior actions taken within the same period (stage game). [26] So in period t, the autocrat does not condition transfers to the citizens on whether they revolted in period t-1 or in previous periods. Also, when a revolution fails in period t-1, the transfer that the military gets in period t from the autocrat does not depend on whether the military supported the autocrat in period t-1 or in previous periods.[27]

Note that the only payoff-relevant states at the beginning of the stage game in period t are (a) the autocrat is in power (ND), and (b) the autocrat is not in power (D), where D denotes democracy and ND denotes non-democracy. Non-democracy (ND) corresponds to a history of no revolution, no coup, *or* failed revolution(s), and democracy (D) corresponds to a history of a military coup or a successful revolution.

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[24] Initially, some attempted coups were foiled. But after a while in power, no further coups were attempted.
[25] On paper, these countries are democracies. But they are actually pseudo-democracies or *de facto* autocracies.
[26] Unlike subgame perfection, strategies are not based on the entire history of the game. However, an MPE is subgame perfect because it is a profile of Markov strategies that yields a Nash equilibrium in every proper subgame.
[27] I discuss non-Markovian strategies in section 3.3 and show this does not affect the results of this paper.

Let $P_{r,t}$ be the probability that the citizens will revolt in period t conditional on the autocrat being in power in period t. Let $P_{s,t}$ be the probability that the military will fight a citizens' revolt in period t and $P_{nc,t}$ be the probability that it will *not* mount a coup in period t.

I look for a Markov perfect equilibrium via backward induction within the stage game in some arbitrary period. I formulate the problem recursively and so drop time subscripts.[28] If the autocrat is not in power, the game ends and all players get their payoffs, as stated, in a democracy. This case is trivial.

Accordingly, start from a subgame in which the autocrat is in power.
Consider a *candidate* equilibrium in which the citizens revolt in each period; there are no coups; and the military fights a revolt in every period. In particular,

$X_s^* = B + \mu/(1-\theta_L), X_{ns}^* = B, G_r^* = 0,\ G_{nr}^* = 0,\ P_r^* = P_s^* = P_{nc}^* = 1$. I shall show that this is indeed a Markov perfect equilibrium.

A useful observation is that, holding the transfer to one group fixed, the autocrat's payoff is strictly decreasing in the transfer to the other group (i.e., military or the citizens). Hence the autocrat maximizes his payoff by giving each group the minimum transfer required to prevent a revolt by the citizens or obtain the support of the military if these are his desired objectives.

Another useful observation is that autocrat will always satisfy the no-coup constraint because $(1 - \theta_H)(R - B)/(1 - \delta(1 - \theta_H)) > 0$. The left-hand side of this

[28] Given that time is infinite, the only state variable is the resource rent R, and this is constant over time, it follows that players will follow stationary strategies in equilibrium. So when the autocrat is in power, he will choose the same set of equilibrium transfers in every period, while the military will either always support him or never support him and the citizens will always revolt or never revolt.

expression is the autocrat's payoff if he gives B to the military in every period (i.e., satisfies the no-coup constraint) but gives nothing to the citizens.[29] The right-hand side of this expression is the autocrat's payoff (i.e., zero) if he does not satisfy the no-coup constraint because a coup leads to his removal from power.[30]

Starting from stage 4, consider the military's problem when there is a revolt by the citizens and, of course, the autocrat is in power. If the military supports the autocrat, the value of this action can be written recursively as

$$V_m(ND|s=1) = \frac{\theta_L B}{1-\delta} + (1-\theta_L)\big(X_s + \delta V_m(ND|s=1)\big) - \mu \,, \tag{2}$$[31]

Solve $V_m(ND|s=1)$ from equation (2) to get

$$V_m(ND|s=1) = \frac{1}{1-\delta(1-\theta_L)}\left(\frac{\theta_L B}{1-\delta} + (1-\theta_L)X_s - \mu\right). \tag{3}$$

If the military does not support the autocrat, the value of this action is

$$V_m(ND|s=0) = \frac{\theta_H B}{1-\delta} + (1-\theta_H)\big(X_{ns} + \delta V_m(ND|s=0)\big). \tag{4}$$

Solve $V_m(ND|s=0)$ from equation (4) to get

$$V_m(ND|s=0) = \frac{1}{1-\delta(1-\theta_H)}\left(\frac{\theta_H B}{1-\delta} + (1-\theta_H)X_{ns}\right). \tag{5}$$

The military will support the autocrat if

$$V_m(ND|s=1) \geq V_m(ND|s=0)\,. \tag{6}$$

[29] To see this, notice if the autocrat gives the military B in each period, he prevents a coup but the military will *not* support him when the citizens revolt. If he gives nothing to the citizens, then the citizens will revolt in each period and will be successful with probability, θ_H. The autocrat's payoff can be written recursively as $\Omega = \theta_H(0) + (1 - \theta_H)(R - B + \delta\Omega)$. Then solving for Ω gives the autocrat an expected discounted payoff of $\Omega = (1 - \theta_H)(R - B)/(1 - \delta(1 - \theta_H))$.

[30] Assuming, without loss of generality, that his payoff is zero if he runs away from office, this also means that he will not voluntarily run away from office.

[31] Since the military supports the autocrat only when there is a revolt, it is redundant to write $s = 1$ and $r = 1$.

Otherwise, it will not support the autocrat. I refer to the inequality in (6) as the *loyalty constraint*. Given that the no-coup constraint is satisfied, we get $X_{ns}^{*} = B$. Since the LHS of (6) is strictly increasing in X_s and the autocrat's payoff is strictly decreasing in X_s, the autocrat chooses X_s to satisfy (6) with strict equality. This gives $X_s^{*} = B + \mu/(1-\theta_L)$.

Working backwards, now consider the citizens' problem in stage 3. Given that the loyalty constraint is satisfied in the candidate equilibrium, if the citizens revolt, the value to the citizens can be written recursively as:

$$V_c(ND|r=1) = \frac{\theta_L(R-B)}{1-\delta} + (1-\theta_L)\big(G_r + \delta V_c(ND|r=1)\big). \tag{7}$$

The autocrat sets $G_r^{*} = 0$ because he gains nothing by making transfers to citizens who revolt. Putting this into (7) and solving gives

$$V_c(ND|r=1) = \frac{\theta_L(R-B)}{(1-\delta)(1-\delta(1-\theta_L))}. \tag{8}$$

If the citizens do not revolt, their discounted payoff is:

$$V_c(ND|r=0) = \frac{G_{nr}}{1-\delta}. \tag{9}$$

Then the citizens will not revolt if $V_c(ND|r=0) \geq V_c(ND|r=1)$. This is the no-revolt constraint. In the candidate equilibrium, the autocrat violates this constraint, so he chooses $G_{nr}^{*} = 0$ and of, course, $G_r^{*} = 0$.

The problem in stage 2 is trivial since the autocrat satisfies the no-coup constraint by choosing $X_{ns}^{*} = B$. Hence the military does not mount a coup.

In stage 1, the autocrat's value function, given $P_r^* = P_s^* = P_{nc}^* = 1$ and $G_r^* = 0$ in the candidate equilibrium, can be written recursively as

$\Omega = \theta_L(0) + (1-\theta_L)(R - X_s + \delta\Omega)$. Solving this recursion, his payoff is[32]

$$\Omega = (1-\theta_L)(R - X_s)/(1-\delta(1-\theta_L)). \quad (10)$$

Since (10) is decreasing in X_s, it is obvious that the autocrat will choose X_s to satisfy the loyalty constraint with strict equality as previously claimed. Therefore, in the candidate equilibrium, the autocrat's expected payoff is

$$\Omega^*_{r,s} = (1 - \theta_L)(R - X^*_s)/(1 - \delta(1 - \theta_L)). \quad (11)$$

It remains to consider possible deviations by the autocrat from the candidate equilibrium. Since the autocrat necessarily satisfies the no-coup constraint, we only have to consider deviations from the loyalty and no-revolt constraints.

Suppose the autocrat deviates from the candidate equilibrium by violating the loyalty constraint in *every period* but satisfies the no revolt constraint in *every*[33] period. In this case, the autocrat only gives a transfer of B to the military. Then the military will not fight a citizens' revolt since fighting a revolt is costly and it will get B even if the citizens are successful. To find the transfer to the citizens that is required to satisfy the no-revolt constraint, we need to know the citizens' payoff when they revolt conditional on the military *not* putting up a fight. If the citizens revolt while the loyalty constraint is violated, the value to the citizens can be written recursively as:

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[32]Obviously, this is the same as the autocrat choosing X_s to maximize $(1 - \theta_L)(R - X_s + \delta\Omega)$ where Ω is given by the expression in equation (10).

[33]Given Markovian strategies, the autocrat faces a stationary problem each time he contemplates a deviation. Hence, considering the deviations above is valid and straightforward. It turns out if there is no profitable deviation when such deviations are considered, then the equilibrium also satisfies the *one-stage deviation principle* (e.g., see Fudenberg and Tirole, 1991). This is to be expected. That is, there is no profitable deviation wherein the autocrat deviates in only one period and then reverts to the equilibrium play in subsequent periods. Then by the one-stage deviation principle, we have an equilibrium.

$$V_c(ND|r=1) = \frac{\theta_H(R-B)}{1-\delta} + (1-\theta_H)\big(G_r + \delta V_c(ND|r=1)\big). \tag{12}$$

It is still optimal for the autocrat to set $G_r^* = 0$. Putting this into (12) and solving gives

$$V_c(ND|r=1) = \frac{\theta_H(R-B)}{(1-\delta)(1-\delta(1-\theta_H))}. \tag{13}$$

Recall that if the citizens do not revolt, their discounted payoff is $V_c(ND|r=0) = \frac{G_{nr}}{1-\delta}$.

Then the citizens will *not* revolt if $V_c(ND|r=0) \geq V_c(ND|r=1)$. The autocrat maximizes his payoff by choosing G_{nr} such that this constraint holds with strict equality. This gives

$$\hat{G}_{nr} = \frac{\theta_H(R-B)}{1-\delta(1-\theta_H)} \, . \tag{14}$$

Note that $\hat{G}_{nr} < R - B$ since $\theta_H < 1$. The autocrat's discounted payoff -- when he gives B to the military, $\hat{G}_{nr}$ to the citizens in each period, and thereby satisfies the no-revolt but violates the loyalty constraint -- is

$$\Omega^*_{nr,ns} = \frac{R-B-\hat{G}_{nr}}{1-\delta} = \frac{(1-\theta_H)(R-B)}{1-\delta(1-\theta_H)}. \tag{15a}$$

I assume that $\Omega^*_{r,s} \geq \Omega^*_{nr,ns}$.

There is another deviation to consider. Suppose, in each period, the autocrat violates the loyalty constraint and the no-revolt constraint. Then he will give the military a transfer of B and nothing to the citizens. Then the autocrat's expected discounted payoff when he does not prevent a revolt and does not satisfy the loyalty constraint is

$$\Omega^*_{r,ns} = (1-\theta_H)(R-B)/(1-\delta(1-\theta_H)). \tag{15b}$$

Again, I assume that $\Omega^*_{r,s} \geq \Omega^*_{r,ns}$. Notice that $\Omega^*_{r,ns} = \Omega^*_{nr,ns}$.[34]

A final deviation for the autocrat is to satisfy both the loyalty and no-revolt constraints. In this case, he will give $X^*_s = B + \mu/(1-\theta_L)$ to the military. Noting that, in this case, if the citizens revolt their success probability in each period is θ_L, it is easy to show that the citizens will not revolt if the autocrat gives them a minimum transfer of $\tilde{G}_{nr} = \dfrac{\theta_L(R-B)}{1-\delta(1-\theta_L)}$. In this case, the autocrat's payoff is $\tilde{\Omega}_{nr,s} = \dfrac{R - X^*_s - \tilde{G}_{nr}}{1-\delta}$. It can be shown that $\Omega^*_{r,s} - \tilde{\Omega}_{nr,s} = \mu\theta_L/(1-\delta+\delta\theta_L)(1-\delta)(1-\theta_L) > 0$. So this deviation is not profitable.

If $\Omega^*_{r,s} > \Omega^*_{nr,ns} = \Omega^*_{r,ns}$, then $X^*_s = B + \mu/(1-\theta_L), X^*_{ns} = B, G^*_r = 0, G^*_{nr} = 0$,[35] $P^*_r = P^*_s = P^*_{nc} = 1$ is a Markov perfect equilibrium of the game. This equilibrium is unique. To see this, note that $G^*_r = 0$ is unique because it makes no sense to make any transfers to citizens who have revolted. Similarly, given that there is no point in giving the military more than B if it does not fight a revolt, $X^*_{ns} = B$ is unique. In this sequential game, the citizens and military have unique best responses to the actions of previous movers in a given period. Since the autocrat, if he is in power, is the first mover in each

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[34]As shown and explained in section 3.1, $\Omega^*_{r,ns} = \Omega^*_{nr,ns}$ is not a robust result.

[35] Note that G^*_{nr} was not used in computing the transfers that satisfy the no-coup and loyalty constraints with strict equality. Setting $G^*_{nr} = 0$ ensures that the no-revolt constraint is violated. It is important to note that any $G^*_{nr} < \hat{G}_{nr}$ will support this equilibrium, so the choice of G^*_{nr} is not unique. In general, all the equilibria stated in this paper are such that the announced transfers associated with *out-of-equilibrium actions* by the military and citizens are not unique. For a given equilibrium, the autocrat's announced transfers associated with *equilibrium actions* are unique and indeed maximize his payoff. Hence the actual transfers are unique. Also, equilibrium actions by the military and citizens are unique.

period and X_s^* is the unique maximizer of (10), it follows that if $\Omega_{r,s}^* > \Omega_{nr,ns}^* = \Omega_{r,ns}^*$, then $X_s^* = B + \mu/(1-\theta_L), X_{ns}^* = B, G_r^* = 0, G_{nr}^* = 0$ is the unique set of optimal values for the autocrat's problem. Therefore, the equilibrium is unique. Accordingly, I state the following proposition:

Proposition 1: *Suppose that* $\Omega_{r,s}^* > \Omega_{nr,ns}^* = \Omega_{r,ns}^*$. *Then there exists a unique Markov perfect equilibrium in which, conditional on being in power, the autocrat announces the transfers,* $X_s^* = B + \mu/(1-\theta_L), X_{ns}^* = B, G_r^* = 0, G_{nr}^* = 0$ *in each period. In each period that the autocrat is in power, there are no military coups; the citizens revolt; and the military supports the autocrat (fights the revolt). The autocrat gives the transfer of* $X_s^* = B + \mu/(1-\theta_L)$ *to the military and* G_r^* *= 0 to the citizens in each period.*

Other equilibria exist. To see this, recall that the no-coup constraint is satisfied in every equilibrium. Then given that we have shown above that satisfying both the loyalty and no-revolt constraints is a dominated strategy, there are only three possibilities to consider as equilibria: (1) only the loyalty constraint is satisfied; (2) neither the loyalty constraint nor the no-revolt constraint is satisfied, and (3) only the no-revolt constraint is satisfied. The autocrat's payoff in the first equilibrium is $\Omega_{r,s}^*$. His payoff in the second equilibrium is $\Omega_{r,ns}^*$, and his payoff in the third is $\Omega_{nr,ns}^*$. Therefore, the following proposition holds:

Proposition 2: *Suppose that* $\Omega_{r,ns}^* = \Omega_{nr,ns}^* > \Omega_{r,s}^*$. *Then there exists two Markov perfect equilibria in which, conditional on being in power, (i) the autocrat announces the transfers,* $X_s^* = B, X_{ns}^* = B, G_r^* = G_{nr}^* = 0$ *in each period. In each period that the autocrat* *is in power, there are no coups; the citizens revolt but the military never tries to crush these revolts. The autocrat transfers* $X^*_{ns} = B$ *to the military and* $G^*_r = 0$ *to the citizens in each period,* ***or*** *(ii) the autocrat announces the transfers,*

$G^*_{nr} = \frac{\theta_H(R-B)}{1-\delta(1-\theta_H)}, G^*_r = 0, X^*_s = B \;\; X^*_{ns} = B$ *in each period. There are no coups and no revolts. The autocrat transfers* $X^*_{ns} = B$ *to the military and* $G^*_{nr} = \frac{\theta_H(R-B)}{1-\delta(1-\theta_H)}$ *to the citizens in each period.*

2.3 Some comparative statics results: (a) natural resources, (b) the strength of the military, and (c) the citizens' outside option

Suppose that there is an increase in R. This is equivalent to an increase in the country's wealth (e.g., a discovery of natural resources). We obtain the following derivatives $\frac{\partial\Omega^*_{r,s}}{\partial R} = \frac{1-\theta_L}{1-\delta(1-\theta_L)}$ and $\frac{\partial\Omega^*_{r,ns}}{\partial R} = \frac{\partial\Omega^*_{nr,ns}}{\partial R} = \frac{1-\theta_H}{1-\delta(1-\theta_H)}$.[36] Then given $\theta_H > \theta_L$, it follows that $\frac{\partial\Omega^*_{r,s}}{\partial R} > \frac{\partial\Omega^*_{r,ns}}{\partial R} = \frac{\partial\Omega^*_{nr,ns}}{\partial R}$. Hence, an increase in natural resources or generally an increase in the country's wealth implies that the condition, $\Omega^*_{r,s} > \Omega^*_{r,ns} = \Omega^*_{nr,ns}$, in proposition 1 is more likely to hold. Note also that the citizens worst payoff is in the equilibrium in proposition 1. In both propositions 1 and 2(i), the citizens get no transfers from the autocrat but the probability that in a given period their revolt will be successful is θ_L in proposition 1 while in proposition 2(i), this probability is

[36] These derivatives assume that a change in R has no effect on B. Relaxing this assumption does not affect the results. For example, the result will not change if R and B move in the same direction and the proportionate changes are the same.

$\theta_H > \theta_L$. Their expected payoff in the equilibrium in proposition 2(ii) is also higher than it is in proposition 1 because in proposition 2(ii) because the autocrat gives the citizens a transfer, $G^*_{nr} > 0$. In proposition 2(ii), the probability of a transition to a democracy is zero because there are no coups or revolts. But from the citizen's standpoint, governance in this autocracy is better because they get a transfer from the autocrat. This leads to the following proposition:

Proposition 3: *An increase in natural resources makes the citizens worse off because it makes it more likely that the equilibrium in which the military supports the autocrat to fight revolts by the citizens will be the outcome of the game. It therefore reduces the probability of a transition to democracy or reduces the prospects of good governance in autocracy.*

The result that natural-resource wealth reduces the probability of a transition to democracy is confirmed empirically in Ross (2001), Jensen and Wantchekon (2004), Ulfelder (2007), Collier and Hoeffler (2009), Alexeev and Conrad (2009) and Tsui (2011). This result is theoretically obtained by Acemoglu et al. (2010a), although the intuition is different. In their paper, an increase in natural resource wealth increases the military's payoff from mounting a coup and so it is more difficult to satisfy the no-coup constraint. In my case, an increase in natural resource wealth increases the marginal value of the military's loyalty because, from the autocrat's standpoint, the military defends a more valuable resource and the cost of buying the military's loyalty is independent of R.[37] This implies that the equilibrium in proposition 1 is more likely.

[37]The result still goes through even if $B = \beta R$ and so $R - B = (1 - \beta)R$, where $0 < \beta < 1$. Then the derivatives above will each be multiplied by $(1 - \beta)$.

Now note that $\frac{\partial\Omega^*_{r,s}}{\partial B} = -\frac{1-\theta_L}{1-\delta(1-\theta_L)} < 0$ and

$\frac{\partial\Omega^*_{r,ns}}{\partial B} = \frac{\partial\Omega^*_{nr,ns}}{\partial B} = -\frac{1-\theta_H}{1-\delta(1-\theta_H)} < 0$. In terms of *absolute values*, $\frac{\partial\Omega^*_{r,s}}{\partial B} > \frac{\partial\Omega^*_{r,ns}}{\partial B} =$

$\frac{\partial\Omega^*_{nr,ns}}{\partial B}$. Therefore, a decrease in B increases $\Omega^*_{r,s}$ by a bigger amount than it increases $\Omega^*_{r,ns}$ and $\Omega^*_{nr,ns}$. Noting that a decrease in B implies a decrease in the military's payoff in a democracy and an increase in the citizens' payoff, R – B, in a democracy, we get the following proposition:

Proposition 4: *An increase in the citizens' outside option, R − B, makes them worse off because it makes it more likely that the equilibrium in which the military supports the autocrat to fight revolts by the citizens will be the outcome of the game.*

Proposition 4 is counter-intuitive. Typically, an increase in a player's outside option should make him better off *not* worse off. This is what one expects in two-player bargaining or ultimatum games. In this three-player surplus-distribution game, the intuition for this paradoxical result is as follows: when R − B increases, this increases the value of the citizens' outside option and, from the autocrat's standpoint, makes it more expensive to prevent a revolt. It also means that the value of the military's outside option, B, falls. Given that it takes a transfer of $X^*_s = B + \mu/(1-\theta_L)$ to satisfy the loyalty constraint, the fall in B makes it cheaper for the autocrat to buy the military's loyalty and this makes the citizens worse off.

Now consider the effect of an increase in the strength of the military. *Ceteris paribus*, when the citizens' capability to mount a successful revolution increases, this will increase both θ_L and θ_H. That is, all things being equal, an increase in the citizen's capability should increase their probability of success in any state of the world (i.e., military intervention or no military intervention). Therefore, if θ_H is fixed but θ_L increases, this cannot stem from an increase in the citizens' capability. A higher value of θ_L, when θ_H is fixed, indicates that the military is weaker since there is a higher probability of a successful revolt when the military supports the autocrat but there is no change in the citizens' success probability when the military does not support the autocrat. In addition, this implies that the military is less important to the autocrat's political survival (i.e., $\theta_H - \theta_L$ decreases).

It is reasonable to argue that the weaker is the military, the higher is the cost to the military of fighting a revolt. Therefore, $\partial\mu/\partial\theta_L > 0$. Then holding θ_H fixed, gives

$$\frac{\partial X_s^*}{\partial\theta_L} = \frac{1}{1-\theta_L}\left(X_s^* + \frac{\partial\mu}{\partial\theta_L}\right) > 0 \tag{16}$$

This gives the following proposition:

Proposition 5: *Suppose that proposition 1 holds. Then the autocrat increases (decreases) the transfer,* $X_s^* = B + \mu/(1-\theta_L)$*, to the military if the military gets weaker (stronger) even though the military has become less (more) important to the autocrat's political survival.*

Suppose there is a stage preceding stage 1 (say stage 0) in which the autocrat chooses the strength of the military (e.g., size, equipment, training, etc). And suppose that proposition 1 holds. Then the autocrat's problem is:

$$\underset{\theta_L}{\text{maximize}}\ \Omega_{r,s}^* = (1-\theta_L)(R - X_s^*(\theta_L))/(1-\delta(1-\theta_L)), \tag{17}$$

subject to $\theta_L \in [\underline{\theta}, \theta_H)$, where $\underline{\theta} > 0$ is the maximum capability (strength) that the military can have (e.g., it cannot crush a revolt with certainty). Then given the derivative in (16), we get

$$\frac{\partial \Omega^*_{r,s}}{\partial \theta_L} = -\frac{1}{1-\delta(1-\theta_L)}\left(\frac{R - X^*_s}{1-\delta(1-\theta_L)} + (1-\theta_L)\frac{\partial X^*_s}{\partial \theta_L}\right) < 0. \qquad (18)$$

Then $\theta^*_L = \underline{\theta}$. This leads to the following proposition:

Proposition 6*: Suppose proposition 1 holds. Then the autocrat chooses the most effective military and pays it well enough so that it does not mount a coup and supports him when the citizens revolt.*

According to proposition 6, if the autocrat can choose the size or strength of the military, then he will choose a very strong military. This is optimal because (i) a stronger military requires a smaller transfer, (ii) a stronger military, conditional on being paid more than enough to induce it not to mount a coup, will focus its attention on the threat of revolts by the citizens, (iii) the military cannot hold onto power after mounting a successful coup, and (iv) a stronger military increases the probability that the autocrat will stay in power.

Of course, other than the cost of direct transfers to the military, the optimization problem in (17) does not take into account the cost of military equipment, training, etc. This intended to simplify the analysis. Relaxing this assumption will not necessarily change the result that the autocrat may prefer to build a stronger military if the equilibrium in proposition 1 holds.[38]

[38] Note also that in Acemoglu et al. (2010a, 2010b) and Besley (2010), military expenditure takes the form of only monetary transfers (wages) to the military. The cost of military equipment, training, etc is not considered.

While the autocrat in Acemoglu et al. (2010b) and Besley and Robinson (2010) may build a weak military and thereby allow a rebellion to persist, the autocrat in my model could build a strong military and yet a rebellion will persist because the citizens are not sufficiently compensated (i.e., $G_r^* = 0$).[39]

2.4 Further Discussion

Recall that $X_s^* > B$ in proposition 1. In fact, given that $0 < \theta_L < 1$, it follows that $X_s^* - \mu > B$ in proposition 1. Hence, in proposition 1, the net transfer to the military in a non-democracy (when the autocrat is in power) is higher than the corresponding transfer in a democracy (when the autocrat is not in power). Therefore, the military receives an efficiency wage. But in this paper, the military is paid an efficiency to induce it to fight a revolt by the citizens while in Acemoglu, Ticchi, and Vindigni (2010a, 2010b) and Besley and Robinson (2010), the military is paid an efficiency wage so that it does not mount a coup. The military's payoff is at its highest level in the equilibrium in proposition 1 while the citizens' payoff is at its lowest level in this equilibrium.

Intuitively, the autocrat satisfies the loyalty constraint (proposition 1) when θ_H is very high or θ_L is small, so that $\Omega_{r,s}^* > \Omega_{r,ns}^*$ holds. This also makes the relative importance of the military, $\theta_H - \theta_L$, high. When θ_H is low, then the risk of losing power

[39]Of course, $G_r^* = 0$ does not literally mean that citizens get nothing. We could say that the country has a resource W in each period and the citizens must be guaranteed a minimum transfer of $G_{min} > 0$, where $R = W - G_{min} > 0$. G_{min} may be a minimum investment in public goods or the component of the resource that the citizens can control. Then the analysis goes through by setting $G_r^* = G_{min} > 0$, so long as this triggers a revolution.

through a citizens' revolt is low and hence the autocrat does not incentivize the military to fight revolts, so proposition 2 is likely to hold.

Assuming that revolts lead to the destruction of property and lives, one may argue that a peaceful equilibrium in which both the no-coup constraint and no-revolt constraints are satisfied is more likely. But the historical evidence suggests that in many autocracies in Africa, Asia, and Latin America such peaceful equilibria are not that common. A peaceful autocracy is likely if the size of the pie in a peaceful autocracy is sufficiently bigger than the pie in a democracy or in a non-peaceful autocracy.

To figure out the intuition for the result in proposition 5, we note that X_s^* is the solution to $\Delta_1 \equiv V_m(ND|s=1) - V_m(ND|s=0) = 0$. We can differentiate this equation at X_s^* to get

$$\frac{\partial X_s^*}{\partial \theta_L} = -\frac{\partial V_m(ND|s=1)/\partial \theta_L}{\partial \Delta_1 / \partial X_s}. \tag{24}$$

Then given $\partial X_s^* / \partial \theta_L > 0$ in (16) and $\partial \Delta_1 / \partial X_s > 0$, it follows from (24) that $\partial V_m(ND|s=1)/\partial \theta_L < 0$. Since $\partial V_m(ND|s=0)/\partial \theta_L = 0$, it follows that -- holding θ_H fixed -- when the military is weaker (i.e., θ_L rises), its payoff from supporting the autocrat falls while its payoff from not supporting the autocrat remains unchanged. This means that if θ_L increases and X_s^* does not adjust, then $\Delta_1 < 0$. Then the military will not support the autocrat when the citizens revolt. To incentivize the military to support him, the autocrat must increase X_s^* when θ_L rises. Therefore, increasing X_s^* is necessary because when the military gets weaker, this reduces its expected payoff from supporting the autocrat. Similarly, it reduces the expected payoff of *not* mounting a coup.

When the loyalty constraint is violated as in proposition 2, then the transfer to the military is independent of its strength, even if the no-coup constraint binds: $\partial X_{ns}^{*} / \partial\theta_L = 0$. So, in this case, proposition 5 does not hold.

The analysis suggests that the composition of military spending may be as important, if not more important, as aggregate military spending. That is, what percentage of military spending goes directly to the welfare of the military (i.e., wages, accommodation, allowances, clothing, etc) and what percentage goes into training, equipment, etc? It is possible for a utility-maximizing autocrat to preserve incentives by increasing the first component of military expenditure and reducing the second; these two components of military expenditure may be substitutes for achieving an incentive-compatible outcome. The military may overlook other reasons (e.g., lower quality equipment) to stage a coup when it is being paid enough.

On the preceding point, Nordlinger (1977, p. 70) cites the example of President Romulo Betancourt in Venezuela, who "... managed to serve out his entire constitutional term of office -- the first time this had occurred in that country's military-dominated history -- by providing the officers with the best salaries, rapid promotions, and a generous allotment of fringe benefits." Yet between 1912 and 1964 in Peru, "... every civilian government that reduced the proportion of the national budget assigned to the Peruvian military was overthrown, and this *despite the continual increases in the absolute size of military expenditures.*" (Nordlinger, p. 67). This suggests that in addition to the proportion of the budget assigned to the Peruvian military, it perhaps cared about the composition of military expenditures. And increase in the absolute size was not enough.

Besley and Robinson (2010, p. 662) argue that "... institutions which make some kinds of promises to the military credible, would allow the possibility of a larger military supported by an efficiency wage. This is more likely, all else equal, when there is a strong demand for an army due to an external threat." Proposition 6 shows that external threat is not the only reason why a larger military may be built. An internal threat (by citizens) to the autocrat's rule and the inability of the military to hold on to power after a successful may also lead to a large military.

3. Extensions

3.1 Changing the autocrat's payoff when he is out of power

Recall that the autocrat will always satisfy the no-coup constraint. In the previous section, I assumed that when there is a successful citizens' revolt, the autocrat got zero in the current period and in all subsequent periods. Unlike the previous section, suppose that the autocrat gets R – B in the current period and zero thereafter, regardless of whether a citizen's revolt was successful. This is equivalent to an increase in autocrat's payoff when he is overthrown by the citizens after satisfying the no-coup constraint. Then it can be shown that:

$$\hat{\Omega}_{r,ns} = \Omega^*_{r,ns} + \frac{\theta_H R}{1-\delta(1-\theta_H)}, \text{ and } \hat{\Omega}_{nr,ns} = \Omega^*_{nr,ns} + \frac{\theta_H (R-B)}{1-\delta(1-\theta_H)}.$$

Given that $\Omega^*_{r,ns} = \Omega^*_{nr,ns}$ and making the reasonable assumption that B > 0, it follows that $\hat{\Omega}_{r,ns} > \hat{\Omega}_{nr,ns}$ in this case. This gives the following proposition:

Proposition 7: *Suppose that when the autocrat is overthrown, he has a better outside option (in this case, a one-time access to the country's resource). Then there is no* *equilibrium in which the autocrat gives transfers to the citizens in order to prevent a revolt.*

It is obvious that we can easily construct the analogue of the equilibrium in proposition 2. In this case, the equilibrium outcome is unique because, given proposition 7, the equilibrium in proposition 2(ii) will not exist. Proposition 7 may explain the persistence of social unrest or civil wars in certain countries. A utility-maximizing autocrat may allow this state of affairs by choosing not to appease dissenting groups. However, the important point the autocrat has a weaker incentive to appease the citizens because his payoff when he is overthrown by the citizens is now higher (i.e., the autocrat has immediate access to the country's resources for one period when he is overthrown).

As stated earlier, the previous result that $\Omega^*_{r,ns} = \Omega^*_{nr,ns}$ is not robust. To see why $\Omega^*_{r,ns} = \Omega^*_{nr,ns}$, not that in both equilibria in proposition 2, the military does not fight a revolt, if it occurs. In the (r,ns) equilibrium, there is always a revolt if the autocrat is in power and the autocrat gives no transfers to the citizens. In the (nr,ns) equilibrium, the autocrat gives a transfer to the citizens and there is no revolt. So in the (r, ns) equilibrium, the autocrat gives a smaller (zero) transfer and faces a higher probability of being overthrown whereas in the (nr, ns) equilibrium, the autocrat gives a bigger transfer and faces smaller (zero) probability of being overthrown. It turns out that these tradeoffs exactly offset each other, which makes the autocrat's payoffs in proposition 2 equal. In this section, the model was extended to increase the autocrat's payoff when he is overthrown. This increased his payoff in the (r,ns) equilibrium leading to the result that the payoff in the (r, ns) equilibrium is bigger than the payoff in the (nr,nr) equilibrium: $\hat{\Omega}_{r,ns} > \hat{\Omega}_{nr,ns}$.

3.2 The coup effect in Acemoglu et al. (2010a, 201b) and Besley and Robinson (2010)

In this section assume, as in section 2, that when the autocrat is overthrown, he gets a payoff of zero in the current period and in all subsequent periods.

In the model, the strength of the military affects its ability to crush a revolt but not its ability to remove the autocrat from power. The probability that a coup will be successful is 1, regardless of the military's strength. This explains why in proposition 2 where only the no-coup constraint is satisfied, the strength of the military has no effect on the transfers that it receives from the autocrat (i.e., $\partial X_{ns}^{*} / \partial\theta_L = 0$).

Suppose instead that a military coup is successful with probability $p = p(\theta_L)$, where $\partial p/\partial\theta_L < 0$ and $0 < p < 1$. So the weaker is the military, the lower is the probability that a coup will be successful.[40] This is consistent with the formulation in Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010).[41]

In Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010), when a coup is successful, the military can hold on to power and so its payoff will be higher than it will be in a democracy. To introduce this effect in the present model, suppose that when a coup is successful, the military can hold onto power forever and that this occurs with probability $\alpha \in (0,1)$. In this case, suppose the military gets $T \in (B, R)$ in every period when a coup is successful. With probability $1 - \alpha$, the country becomes a permanent democracy after a successful coup and the military gets B in every period. The military's ability to hold on to power after a successful coup should be higher if it is stronger. So

[40]Recall that a higher θ_L means that the military is weaker.

[41] Note that in Besley and Robinson (2010), the cost of mounting a coup is smaller when the military is stronger (i.e., has a bigger size). In Acemoglu et al. (2010a, 2010b), a weak military (i.e., of small size) cannot mount a coup, so has zero probability of success while a strong military (i.e., large size) can mount a coup and is successful with positive probability. These assumptions are analytically equivalent to the assumption that the probability of a successful coup is higher when the military is stronger.

assume that $\partial\alpha/\partial\theta_L < 0$. As in Acemoglu et al. (2010a), suppose that after a failed coup, the country becomes a democracy forever.

The model in this section has two effects: (a) the effect identified in Acemoglu et al. (2010a, 2010b) and Besley and Robinson (2010) where a stronger military has a greater capacity for a coup and therefore can extract a bigger surplus, and (b) the effect identified in this paper which stems from the need to incentivize the military to fight an active and rebellious citizenry.

The preceding assumptions imply that regardless of whether a coup fails or succeeds, either democracy or military rule becomes an absorbing state. Therefore, as before, given that a coup precedes a revolution, once a coup takes place, a revolution cannot occur. And a coup, regardless of whether it fails or succeeds, leads to the removal of the autocrat from power. In this case, it can be shown that in the analogue of the equilibrium in proposition 1 holds and that proposition 5 continues to hold.[42] Therefore, the assumption that the military cannot hold onto power after a coup is not crucial.

3.3 Remarks on (a) pseudo-democracy and (b) subgame perfection

The model described in this paper is applicable to pseudo-democracies (e.g., Robert Mugabe's Zimbabwe; Gnassingbe Eyadema's Togo; and Paul Biya's Cameroun) where the incumbent can use the military and other law-enforcement agencies to rig elections. In this case, θ_L is the probability that the citizens can vote an incumbent leader out of office conditional on the incumbent receiving the support of the military and other law-enforcement agencies to rig the election. Then θ_H is the probability that the citizens can vote the incumbent out of office if he does not receive the support of the military to

[42] The analysis is straightforward and is available on request.

rig the election.[43] As before, the military can remove the leader from office through a coup. Then proposition 1 and its analogue in section 3 is consistent with pseudo-democracies in which there are no coups and the incumbent rigs every election with the help of the military and other law enforcement agencies while proposition 2 is the case in which the autocrat does not receive the support of the military.

The equilibria in this paper hold even if the players use non-Markovian strategies. To see this, consider the model in section 2. The autocrat cannot punish the military if they mount a coup. So he must give them, at least, B to prevent a coup. When the citizens revolt and fail, he imposes the maximum punishment (i.e., zero transfer) on them in the current period. Suppose instead that if the citizens revolt in period t, he threatens to impose a much harsher punishment by giving them a zero transfer in period t and beyond regardless of whether they revolt or not revolt in period t+1 and beyond. But he cannot do better with this strategy than his payoff in the equilibria in section 2 because given $G_r^* = 0$, the citizens' continuation value of revolting, given by the recursive equation in (7), remains unchanged. Also, the military cannot impose a harsher punishment on the autocrat than removing him from office if he gives it a transfer less than B. Finally, the citizens cannot do better than revolting if the autocrat gives them less than $\hat{G}_{nr}$. The same arguments hold for the equilibria in section 3.

Since the military can remove the autocrat from power at no cost, and the autocrat gets a positive amount of the surplus, R, the citizens and military can be better off if they can collude. In this case, the military removes the autocrat from power and since

[43]Without the military, the leader can still use other law enforcement agencies like the police to the rig the elections.

$B + G_r^* < R$, there exists a distribution of the surplus that will make the citizens and the military better off relative to their equilibrium payoffs. But this collusion is not possible because the citizens cannot commit to not insisting on getting $R - B$ after democracy becomes an absorbing state.

4. Conclusion

Autocrats who have been in power for a long time (e.g., 20 or more years) are rarely removed from power by the military. This could be due to the fact that they managed to foil previous coups and this solidified their grip on power. But it could also be the case that their longevity makes it difficult for the military to believe that it can hold the country together after a successful coup. In such cases, it takes a citizens' rebellion or a civil war to remove such autocrats. But the success of a citizens' revolt depends on whether the military will fight on the autocrat's behalf. This paper has proven a number of results and demonstrated different equilibria under which the military may or may not support an autocrat. To revisit the terminology in Laksmana (2008), the paper, among others, clarifies the conditions under which the military will be a *regime spoiler* or a *regime pawn* and the conditions under which the citizens will be worst off.

One can think of several extensions to this paper. One could relax the assumption that the military does not have any internal dissent. For example, there could be factions of the military which support the autocrat because of ethnicity or other reasons. Modeling the incentives of different factions in the military will be an interesting extension. A challenging extension is to allow stochastic shocks to the parameters of the model after the autocrat has committed to his transfers.

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