Autocratic Rule and Economic Performance: Reframing the Loyalty-Competence Trade-off

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Abstract

Studies of authoritarian governance attribute their longevity and economic underperformance to the loyalty-competence trade-off: rulers sacrifice the competence of their subordinates, hiring incompetent but loyal agents. However, the theory fails to explain how many autocrats maintain longevity while simultaneously achieving economic prosperity. I endogenize loyalty and competence in a two-level principal-agent model between a ruler, a pool of subordinates, and a representative citizen with two core innovations. Policy outcomes can affect regime stability, and there is no institutionalized succession process. The model generates clear predictions about how two key elements - the threat of social protests and uncertainty regarding the policy preference of any successor ruler - shape the loyalty-competence trade-off. I then explore two extensions of the model, revealing counterintuitive findings. First, the shadow of democratization increases the set of kleptocratic regimes characterized by long tenures and poor economic performance. Second, a smooth succession, which is the process by which autocrats can transfer power to their offspring, reduces the set of kleptocratic regimes.

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Introduction

One important question in comparative political economy concerns the effects of regime types on economic performance. In recent decades, substantial theoretical and empirical research has delved into the question of whether democracy or autocracy is better for economic growth (Acemoglu et al., 2019; Barro, 1996; Brown and Mobarak, 2009; Krieckhaus, 2004; Przeworski et al., 2000; Przeworski and Limongi, 1993; Sirowy and Inkeles, 1990). While the link between regime type and economic growth is unclear [1], many scholars tend to favor democracy.

A common argument in the literature explains the longevity and economic underperformance of authoritarian regimes as resulting from the loyalty-competence trade-off: rulers sacrifice the competence of their subordinates, hiring individuals who lack competence but exhibit loyalty not to be challenged by them. Yet, the link between longevity and the economic performance of autocracies is mixed. To quote a few examples: Zambia under Kenneth Kaunda witnessed its average income falling from 1964 to 1991, and Zaire (now the Democratic Republic of Congo) under Mobutu (1965-1997) is probably the most clamorous example of economic disaster in the world (Li et al., 2014). There is also evidence of long-lived dictators presiding over good economic performance. For example, by 1975, Spain's per capita income under Franco was eight times as large as in 1945. Singapore's average growth rate from 1960 to 1990 under Lee Kuan Yew was around 5.9%. Finally, Taiwan had a 6% average growth rate from 1951 to 1974 under the dictatorial leadership of General Chiang Kai-Shek [2].

These contrasting empirical observations raise questions about the stability-performance nexus in authoritarian regimes. Why do some autocracies perform better and fall within a short period of time, while others produce disastrous economies and survive longer (and vice versa)? In other words, when does the loyalty-competence trade-off apply, and when does it not?

This paper ties the longevity-performance nexus in authoritarian regimes to internal power struggles between autocrats and officials they appoint to positions of power. I consider a two-period political agency and accountability model with a ruler (She), multiple subordinates (He for each), and a representative citizen (He). The ruler facing constant (coups and foreign interventions) and irregular (public uprisings) threats must rely on one subordinate to accomplish two tasks: ensure her survival in office and produce a public good. Ensuring the ruler's survival requires a costly and non-contractible effort (loyalty) on behalf of the appointed subordinate, and a successful public goods provision requires an investment from the ruler and competence from the appointed subordinate. Subordinates in the model are either competent or incomplete, and rulers vary in how they value the public good versus their private consumption. The

1. Empirical findings are conflicting, ranging from there being no relationship (Glaeser et al., 2004; Mulligan et al., 2004), a strong positive relationship (Papaioannou and Siourounis, 2008), an ambiguous relationship (Aghion et al., 2007), a weak positive relationship (Kormendi & McGuire, 1985), a weak or negative relationship (Gerring et al., 2005; Posner, 2010) between regime types and economic growth.

2. See Besley and Kudamatsu (2007) for a list of economically successful autocracies.

representative citizen values the public good and can protest when the state fails to deliver it. Therefore, the ruler's political survival depends on the loyalty of his appointed subordinate and the citizen's decision to protest. If the ruler is ousted, her subordinate becomes unemployed, and her ruler's successor, randomly selected in the pool of potential successors, must decide whether she should hire a competent or an incompetent subordinate. The analysis concentrates on identifying conditions under which the selection of a competent or incompetent subordinate corresponds to extended or shortened tenures for the ruler.

There are two core innovations in the model. First, there is no institutionalized succession process. The absence of institutionalized succession will introduce uncertainty regarding the policy preference of the ruler's successor. This is modeled by a random draw of the ruler's successor type in the pool of potential successors. The second innovation is that policy outcomes affect the stability of the regimes. Given that delivering public goods necessitates competence, appointing an incompetent subordinate can trigger a social protest. Consequently, the survival of the regime becomes contingent upon its vulnerability against social protests. When the regime's vulnerability against social protests is high (respectively low), the threat of revolution by the citizen following poor economic outcomes is credible (non credible).

The main result of the analysis is that a subordinate's loyalty, regardless of his competence, is negatively correlated with his expectation of serving under the autocrat's successor. Because loyalty is costly, if a subordinate does not expect demand for his services from the dictator's potential successor, his loyalty to the current regime will increase. For example, if an incompetent subordinate expects the ruler's successor to implement growth-enhancing policies, which require competence, his loyalty to the autocrat will increase. Similarly, if a competent subordinate expects the ruler's successor to engage in nepotism, his loyalty to the autocrat will increase. In each case, the subordinate knows that his political future is tied to that of the leader. In fact, the subordinate's sole avenue for continued employment in the subsequent period hinges upon the survival of the current regime. Therefore, the subordinate will be reluctant to betray his patron.

When the regime's vulnerability to social protests is low and incompetent subordinates have lower odds of being employed by the ruler's successor than competent subordinates, the loyalty competence trade-off prevails. Rulers who, for some reason (institutional or, perhaps, personal), value their private consumption more than the provision of the public good can secure longevity by compromising on performance. They employ incompetent subordinates and survive longer than those who employ capable subordinates. The type of regime that emerges in equilibrium is a Kleptocracy: the ruler implements inefficient policies (hires an incompetent subordinate) and survives longer.

When the regime's vulnerability to social protests is moderate, or competent subordinates face lower odds of selection by the ruler's successor compared to their inept counterparts, the loyalty-competence trade-off does not hold. Rulers who employ competent subordinates survive longer than those who employ incompetent ones. That is, growth-enhancing policies foster

survival. In this case, two types of regimes will emerge in equilibrium: a roving bandit (bad economic outcome and short tenure) or a stationary bandit (good economic outcome and long tenure).

After analyzing this baseline, I extend the model in two ways. First, I assume that when the current regime does not survive, the regime can transition toward a system that better selects rulers who value more the provision of the public good. I refer to this as the shadow of democratization. Second, I assume that rulers who place a greater emphasis on their personal consumption can effectively transfer power to their offspring, assumed to be of the same type. These extensions, while preserving the fundamental underpinnings of the argument, yield counterintuitive results.

Surprisingly, for some parameters of the game, the shadow of democratization engenders a higher prevalence of kleptocratic behavior compared to the baseline model. In fact, the shadow of democratization enhances (respectively diminishes) the loyalty of incompetent (respectively competent) subordinates. The reason is that incompetent subordinates know that their fates are tied to the autocrat's survival. If the regime does not survive, the ruler's successor will likely employ a competent subordinate. As competent subordinates find themselves more likely to secure positions under the successor, their loyalty to the current regime will decrease.

Another non-intuitive result is that the prospect of a smooth succession can reduce the set of parameters for which the equilibrium generates a kleptocracy. Conversely to the shadow of democratization, a smooth succession enhances (respectively diminishes) the loyalty of competent (respectively incompetent) subordinates. Now, competent subordinates know that the ruler's successor is more likely to employ an incompetent subordinate. Consequently, a competent subordinate's sole avenue to future employment rests upon the survival of the incumbent regime.

Clearly, the model I propose here is very specific; however, the purpose is not a generality but rather to construct a simple framework that can be used to understand the relationship between tenure and economic performance in autocracies. This framework is not an alternative but complementary to existing views of how autocracies work since the mechanism highlighted in the model may well coexist with the characteristics emphasized in the literature.

The rest of this paper is organized as follows. The next section reviews research that studies autocratic longevity and economic performance, both separately and in conjunction. Section 3 lays out the model and its assumptions, while section 4 presents the analysis and main results. Sections 5 and 6 delve into the robustness and extensions of the baseline model, respectively, and the final section provides concluding remarks.

Literature Review

This paper contributes to the theoretical literature on the longevity-performance nexus of authoritarian regimes. Two existing strands of this literature provide conflicting predictions about the relationship between longevity and economic performance in autocracies. The first strand of the literature that links autocrats' tenure and their economic performance is the loyalty-competence trade-off theory (Debs, 2007a; Egorov and Sonin, 2011; Zakharov, 2016).

Debs (2007a) studies a dynamic game in which a dictator chooses to retain or replace a subordinate who produces an economic output. The subordinate can undermine the dictator's authority by calling for an insurrection after a successful economic outcome. Given that successful output signals that the subordinate is competent, the dictator faces a trade-off between political survival and economic growth. Debs shows that insecure dictators undermine their subordinates' incentive to encourage growth.

Egorov and Sonin (2011) consider a dictator who faces a potential challenge, an internal coup, or mass protests. The dictator hires either a competent or an incompetent subordinate to judge the seriousness of the threat. In that model, competent viziers can discriminate against potential coup plotters, making them risky subordinates for the dictator.

Zakharov (2016) builds a dynamic model where the dictator decides to hire either a competent or an incompetent subordinate, and the subordinate's decision is how much effort (loyalty) to supply to secure the dictator. Zakharov shows that incompetent subordinates will always provide a higher level of loyalty than their competent counterparts. That will make them attractive to dictators who put less value on competence than others.

I have two key points of departure from this literature. First, it only considers exogenous threats to the regime. In fact, the ruler can implement inefficient policies without fear of protests [3] or takes it as exogenous[4]. In the model I present, the ruler faces both exogenous and endogenous threats. This assumption is consistent with stylized facts [5].

The second key difference between this paper and the loyalty-competence trade-off is the absence of institutionalized succession processes. This creates uncertainty regarding the policy preference of the ruler's successor. This paper argues that uncertainty regarding which policy the ruler's successor will implement can and does affect the loyalty of the subordinates in the current period. In doing so, it puts forth a novel mechanism that can help explain the variation in longevity and economic performance of autocrats.

3. Zakharov (2016) assumes that the ruler's survival depends solely on his (appointed) subordinate loyalty.

4. Egorov and Sonin (2011) consider that the challenge to the dictator can be mass protests. However, they assume that the threat is exogenous to the policy implemented by the regime.

5. While only 7% of autocratic leaders were deposed through revolt between 1950–2012, a quarter of all dictators who fell between 2010 and 2012 did so amid revolts (Frantz and Ezrow, 2011). In addition, economic development is one of the most critical factors that explain the onset of social revolution (Salih, 2013; Tiruneh, 2014).

Another strand of the literature explains the link between the longevity of a regime and its economic performance by the rule's time horizon. A well-known theory in this literature is the "stationary bandit of dictatorship" postulated by Olson (1993), later formalized by McGuire and Olson (1996). The theory argues that the behavior of a ruler who expects to be removed from power within a relatively short time period will be short-sighted and geared towards immediate results. Therefore, he will have little incentive to invest in the future. In contrast, rulers with long time horizons have very different incentives. Such rulers will look beyond immediate results and promote economic growth to increase their future consumption. Whether the ruler's time horizon is endogenous as in Olson or exogenous as in Overland et al. (2005) and Jong-A-Pin and Mierau (2011), this literature suggests a positive relationship between tenure and economic performance. Indeed, there has been growth and development in autocratic regimes with long tenure throughout history. Unfortunately, this literature cannot explain why many long-lived dictators preside over troubled economies. My primary difference with this literature is that it treats autocracy as a unitary form of government. In my model, the rule acts through an agent rather than directly and faces incompetence, which affects the quality of policies implemented, and betrayal, which affects the survival of the regime.

In addition to the aforementioned literature, this paper seeks to contribute to the literature on economic performance in authoritarian regimes. The main question in this literature is why inefficient states emerge in some dictatorships in some periods, while sometimes autocracies pursue congruent policies with good economic performances.

A part of this literature looks at the configuration of elites within the regime. Bueno de Mesquita et al. (2003) consider the role of the selectorate, those with a say in choosing the leader, and the winning coalition, those in the selectorate whose support is necessary for the incumbent politician to remain in power. They argue that in small winning coalitions and a large selectorate (rigged elections autocracy), a political leader faces incentives to buy the support of the members of his winning coalition with targeted goods (private goods). In such regimes, rulers produce poor public policies. The reason is that loyalty to a leader depends more on receiving private rewards than public benefits. In addition, the loyalty norm is stronger when the ratio of the size of the winning coalition divided by the size of the electorate is small. That is, the risks of defection for members of the winning coalition are too high, and the costs too great to abandon the leader.

Besley and Kudamatsu (2007) take a different approach. They model the winning coalition as a unitary actor and do not consider its size but rather its strength, that is, the probability of retaining the power if it decides to get rid of the ruler. In their model, the replacement of the leader triggers a contest where the opposition wins with a positive probability. They show that if the winning coalition is not powerful, the ruler will not implement welfare-enhancing policies[6].

The subordinate's behavior in my model is similar to that of the winning coalition (or mem-

6. See also Padró i Miquel (2007) for similar logic.

bers of the winning coalition) in their models. The probability of future employment of a subordinate if the current regime is replaced can be interpreted as the "loyalty norm" or the strength of the winning coalition. The fear of not being hired in the next period will increase the subordinate's loyalty in the current period. However, my model differs from Besley and Kudamatsu (2007) and Besley and Kudamatsu (2007) in many ways. The loyalty norm in my model is different for competent and incompetent subordinates, while it is the same for all subordinates in their models. Second, subordinates in my model are also responsible for the policy outcome.

Another strand of research on the emergence of inefficient states looks at structural factors such as natural resource endowments and geography, ethnolinguistic diversity, historical legacies, social capital, and political culture (Al-Ubaydli, 2012; Gerring and Thacker, 2008; Wu, 2004). Another part argues that institutions within authoritarian regimes induce the leader to implement certain policies and that different institutions are important to understanding government performance in dictatorships. For example, many authors argue that institutions such as parties or legislatures are likely to constrain policy selection in dictatorships (Gehlbach and Keefer, 2011; Magaloni, 2008). The results of this paper show how the absence of institutionalized succession processes can constrain the ruler to implement efficient policies. The model also generates the non-surprising result that credible threats from the citizens might restrain the ruler from adopting inefficient policies.

This paper also contributes to the growing literature on political struggles in weakly institutionalized politics. Svolik (2006) and Myerson (2008) focus on the moral hazard problem of the dictator, tempted to keep his payment to his supporters, in a static and dynamic game, respectively. They investigate conditions under which the dictator seeks support from members of the political elite instead of establishing a personal rule. Debs (2007b) studies the moral hazard problem of a subordinate who can use his delegated power to undermine the authority of a dictator by claiming credit for successful economic policies. To prevent his subordinate from doing so, the dictator would grant him short and uncertain tenure, turning him into a "roving bandit." This paper shows how the presence of a third party, the representative citizen, can affect the moral hazard problem between the ruler and the subordinates.

The Model

I consider a two-period game between a ruler (she), multiple subordinates (each he), and a representative citizen (he). At each period, the ruler, who faces constant and irregular threats, makes two decisions: appoints one subordinate and invests in the public good. The appointed subordinate performs two tasks. The first task is policy implementation to produce the public

good $y \in \{0,1\}$[7]. Such tasks may include drafting and carrying out economic policies or collecting taxes. Subordinates differ in their ability to deliver good policy outcomes. For simplicity, I assume that the policy outcome is successful if and only if the ruler invests $(i = 1)$ in the public good and appoints a competent subordinate $(a = C)$. That is, I assume a simple complementarity between the investment decision and the type of appointed subordinate:

$$y = \begin{cases} 1 & \text{if } i = 1 \ \& \ a = C \\ 0 & \text{else.} \end{cases} \tag{1}$$

One way to think about this modeling structure is that conditional on investments, competent subordinates always choose the right policy to implement, whereas incompetent subordinates always choose the wrong policy. I will assume that N_C subordinates are competent and N_I are incompetent.

The second task of the subordinate is to choose a level of effort $e \in [0,1]$ to protect the ruler. Such a task may include mobilizing support for the ruler amongst the general populace, repressing dissents, informing the ruler of potential sources of unrest, or protecting the ruler against coups or foreign threats. Such effort is noncontractible and costly, and for simplicity, I assume that the cost is $\frac{e^2}{2}$[8]. Every period that a subordinate is employed, he receives a fixed wage normalized to 1 and 0 when unemployed. Therefore, the per-period payoff of a subordinate is:

$$u_s(e) = \begin{cases} 1 - \frac{1}{2}e^2 & \text{if employed} \\ 0 & \text{else.} \end{cases} \tag{2}$$

Rulers in the model come in one of two forms: good (G) or bad (B). Rulers, independent of their types, get an ego rent E and receive Ψ when the policy outcome is successful. However, bad (resp good) rulers get a private benefit of r (resp get 0) from diverting public funds [9]. The per-period payoff of a ruler of type t_R is:

$$u_R(i,a,t_R) = E + \begin{cases} \Psi & \text{if } \ i = 1, \ a = C, \ \forall t_R \\ r & \text{if } \ i = 0 \ , t_R = B, \ \forall a \\ 0 & \text{else.} \end{cases} \tag{3}$$

After the ruler appoints one subordinate, the citizen observes the policy outcome y and decides to protest $p = 1$ or not $p = 0$[10]. When the citizen protests, he incurs a cost of κ. The per-period

7. I will sometimes refer to y as the policy outcome.

8. I show in the appendix that the results are still valid even when we consider that competent (or incompetent) subordinates are more efficient in protecting the ruler.

9. We can think of r as the return from diverting public funds that are supposed to be spent on public goods.

10. The citizen does not choose the ruler but can remove the ruler from office. This captures the idea that in autocracies, citizens do not have the power to choose the leader. Still, they have the de facto power to initiate a revolution to try

payoff of the citizen is:

$$u_c(p) = y - p\kappa\,. \tag{4}$$

The ruler's probability of survival into the second period depends on the loyalty of her employed subordinate and the citizen's decision to protest. For simplicity, I assume that

$$Pr(\text{survival}) = \begin{cases} e & \text{if } p = 0 \\ \gamma e & \text{if } p = 1,\ \gamma \in [0,1]. \end{cases} \tag{5}$$

All players discount the future with δ.

Information Structure

The ruler's type t_R and rents r are private information. However, the citizen and the subordinates share the same beliefs that the ruler is good with probability π, and that r is drawn according to a cumulative distribution F with the associated density $f > 0$ on $[\Psi, R]$[11], and mean $\bar{r}$.

The competence of each subordinate is public information, and each subordinate of each type has the same probability of being selected. That is, the probability that a particular competent (respectively incompetent) subordinate is selected is $\frac{1}{N_C}$ (respectively $\frac{1}{N_I}$).

Finally, the citizen's cost of protest κ is private information. However, the ruler and the subordinates share the common belief that κ is drawn from the uniform distribution on $[0, \bar{\kappa}]$.

The timing

The game proceeds as follows:

1- Nature selects the ruler's type in the first period and the citizen's cost of protest κ. If the ruler is bad, nature selects her first-period rents r_1. The ruler privately observes her type and makes her investment and appointment decisions.

2- The appointed subordinate implements the policy according to his type and chooses a level of effort e.

3- The citizen observes the policy outcome y, the cost of protest κ and decides to protest or not. The first period ends, and payoffs are realized.

   – If the citizen does not protest, the ruler survives with probability e.

to overthrow the regime.

11. Making Ψ the lower bound on rents guarantees that it is never possible to motivate a bad ruler to invest in public goods on the basis of his personal payoff at the current period only. I relax this assumption in the appendix.

– If the citizen protests, the ruler survives with probability $\gamma e, \ \gamma < 1$.

4- If the ruler survives, conditional of being bad, nature selects the second-period rents r_2. She makes her investment and appointment decisions in the second period.

5- If the ruler does not survive, nature selects her type, conditional on being bad, r_2. The new ruler makes her investment and appointment decisions.

The game ends, and the second period's payoffs are realized.

Figure (1) summarizes the timing of plays.

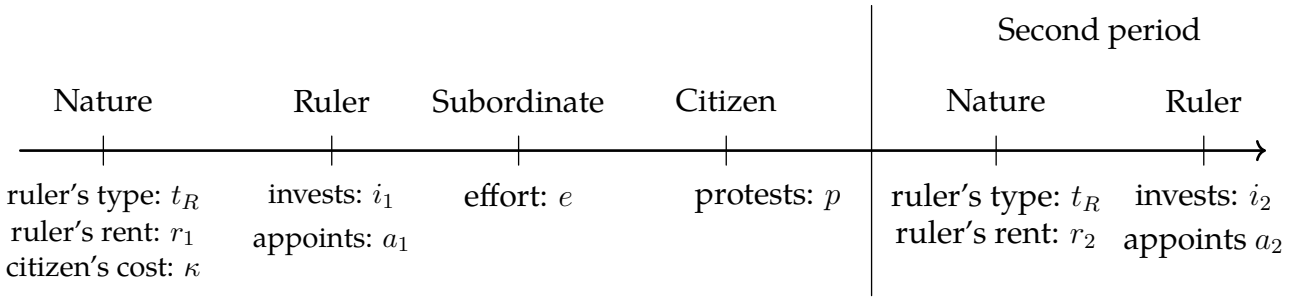


Figure 1: Timeline of the game

Comments on the model and its assumptions

Before proceeding to the analysis, I first discuss the model's key assumption and the interpretation of some important aspects.

Comments on the model. I distinguish between two kinds of services a subordinate provides. First, he implements a policy to fulfill the government's objective: here, the provision of a public good. This requires competence from the subordinate. We can think of a competent subordinate in the model as someone who provides better policy advice, is more supportive of growth-enhancing policies, or is less corrupt. Second, the subordinate supplies other services that are not linked to the provision of the public good but participate in the ruler's survival. While I assume that the competence needed to provide the public good is exogenous, the level of effort to protect the ruler is endogenous and costly [12]. There are several reasons why providing services to increase the dictator's tenure may be costly. First, the service may require the use of violence against the regime's opposition, like repression. Second, the cost can be beyond the effort itself. For example, the effort can bear the risk of retribution once the current regime is out of power. Regime officials in charge of dispensing violence often face banking restrictions, prosecutions,

12. See Zudenkova (2015) for a similar assumption.

travel bans, or arrestation while abroad. For example, Felicien Kabuga was arrested in France in May 2020 after being accused of financing the Rwandan genocide in 1994.

γ, one of the model's most important parameters, can be interpreted as the strength of the regime. It measures the regime's vulnerability to social protests or how protests affect the stability of the regime. γ can also be interpreted as the subordinate's effectiveness in prolonging the ruler's fate during protests. In that sense, γ measures the credibility of the threats of social protests. Lower (respectively higher) values of γ indicate credible (non credible) threats of protests.

It is important to notice that the ruler and the appointed subordinate jointly produce the public good: the ruler invests in the public good, and the subordinate produces the public good with the allocated funds. This specification departs from standard practices in moral hazard problems where the agent is solely responsible for the public good provision.

Modeling assumptions. There are three key assumptions in the model.
The first is that bad rulers benefit more from inefficient policies and are heterogeneous in how they value the provision of the public good versus their private consumption. The fact that dictators have varying preferences toward achieving economic performance can be explained by the fact that they might face different institutional constraints. For example, Besley and Kudamatsu (2007) show that when the winning coalition's hold on power is too dependent on a specific leader being in office, it can constrain the ruler to implement efficient policies. Otherwise, the ruler can implement inefficient policies yet obtain the support of the winning coalition. The fact that bad rulers benefit more from bad policies captures the idea that bad policy is always almost good politics (De Mesquita and Smith, 2011). For example, Mobutu in DRC did not construct any roads but had a dozen billion in his personal Swiss account[13]. Finally, the heterogeneity in their private consumption comes from the fact that rulers have access to different levels of resources available to steal.

The second main assumption is that coups and external threats are constant threats, and popular protests are endogenous and depend on the (economic) policy outcome. This assumption is first rooted in the observation that coups, external interventions, and civil uprisings are the main threats to authoritarian regimes (Svolik, 2012). Second, while the first two threats are common, economic deterioration is a primary factor that explains the onset of popular uprisings. The specification of the survival probability is a direct consequence of these empirical facts.

The third essential assumption is that subordinates can serve under multiple rulers. This assumption is not new. Zakharov (2016) for example, noticed that Charles Maurice Talleyrand of France, who was famous for his diplomatic prowess and political longevity, has held senior

13. http://www.cnn.com/WORLD/9706/03/mobutu/

offices under four different political regimes from 1797 under the French Directory to 1834 under the reign of King Philippe.

I will also assume throughout the paper that a ruler who survives into the second period cannot change a subordinate with another subordinate of the same competence. We can imagine, for example, that replacing a subordinate is costly.

Theoretical Analysis

A strategy for a type-k ruler in period $t \in \{1,2\}$ is a couple (i_t^k, a_t^k); $i_t^k : [\Psi, R] \bigcup \{0\} \to \{0,1\}$, and $a_t^k : [\Psi, R] \bigcup \{0\} \to \{C, I\}$. A strategy for the appointed subordinate of type $j \in \{C, I\}$ is his level of effort $e_j \in [0,1]$. A strategy for the citizen is $p : \{0,1\} \to \{0,1\}$. Let $\tilde{\pi}_j, \ \ j \in \{C, I\}$ the posterior belief of the citizen and the appointed subordinate that the ruler is good given that she appointed a type j subordinate.

The equilibrium concept that I use is the Perfect Bayesian Nash Equilibrium in pure strategies (PBNE) (henceforth equilibrium). This requires that, in every period, good and bad rulers behave optimally, given the subordinates' level of effort and the citizen's decision to protest. The subordinates and the representative citizen use the Bayes rule to update their beliefs about the ruler's type in the first period and respectively decide optimally on the level of effort and the decision to protest.

Second period's strategies

I start the analysis with the second period's strategy of the ruler. It is very easy to find the optimal behavior of the ruler in the second period, as it is the case for all two-period accountability models.

Because bad rulers have no concerns about maintaining power in the second period, they always divert public funds and appoint an incompetent subordinate in the second period. Because good rulers do not benefit from diverting public funds, they always invest in the public good and appoint a competent subordinate.

This result is true for the ruler's successor and a ruler who survived in the first period. It is important to mention here that I assumed that when indifferent, a bad ruler appoints an incompetent subordinate. This assumption comes from the fact that competent subordinates can also be a threat to the ruler. Citizens, for example, could want to replace the ruler with competent subordinates. We have the following lemma.

Lemma 1. *In the second period, good rulers always invest in the public good and appoint a competent subordinate, while bad rulers never invest in the public good and always appoint an incompetent subordinate. That is:*

- $i_2^{*B}(r_2) = 0 \quad \& \quad a_2^{*B}(r_2) = I \quad \forall r_2$
- $i_2^{*G}(0) = 1 \quad \& \quad a_2^{*G}(0) = C$

Citizen's decision to protest

Before turning to the citizen's decision to protest, I show in the appendix that at the equilibrium, a bad ruler in the first period either invests and appoints a competent subordinate or diverts and appoints an incompetent subordinate. That is, a bad ruler chooses

$$\Big(i_1^B(r_1), a_1^B(r_1)\Big) \in \{(0, I), (1, C)\}.$$

Given this, I show the following result.

Result 1. *There exists a threshold κ^* such that the citizen protests if and only if $y = 0$ and $\kappa < \kappa^*$.*

Proof. In the appendix. ■

Result (1) shows that the citizen never protests when the public good provision is successful ($y_1 = 1$) even though the citizen knows that there exists a positive probability that the ruler is bad. A bad ruler can get the "right the rule" in the second period when she provides the public good in the first period[14]. Therefore, the citizen protests if and only if the state fails to provide the public good and the protest cost is sufficiently low. In this case, if the ruler appoints an incompetent subordinate, the probability of social protests is simply $\frac{\kappa^*}{\bar{\kappa}}$. There are several observations from this result. First, as γ increases, the probability that the citizen protests decreases. Intuitively, the citizen never protests if doing so has a lower impact on the regime's stability. Thus γ captures the credibility of social protests. The same argument can be made for $\bar{\kappa}$. The second observation is that the probability of protests increases with the subordinate's level of effort. Thus, the subordinate effort can produce a backlash effect on the regime's survival.

Subordinates' optimal level of effort

Given the previous results, I show the following in the appendix.

Result 2. *When appointed, a competent and an incompetent subordinate choose respectively e_C^* and e_I^* defined by:*

$$\begin{cases} e_C^* = \delta\Big(\tilde{\pi}_C - \dfrac{\pi}{N_C}\Big) \\ e_I^* = \delta g(\gamma)\Big(1 - \dfrac{1-\pi}{N_I}\Big). \end{cases} \tag{6}$$

where g and $\tilde{\pi}_C$ are defined in the appendix.

14. This is sometimes referred to as the performance legitimacy (Cassani, 2017)

Proof. In the appendix ■

This result shows the main result of the analysis. We can see from (6) that two key elements will determine the level of effort (loyalty) of each subordinate type. First is the probability of serving under the autocrat's successor if the current regime is overthrown. This probability depends both on the pool of potential subordinates and the uncertainty regarding the type (policy preference) of the ruler's successor. If the current regime does not survive, the probability that a particular competent (respectively incompetent) subordinate will serve under the ruler's successor is the probability that the ruler's successor is good (respectively bad) times the probability of being selected among the competent (respectively incompetent) subordinates: That is $\frac{\pi}{N_C}$ (respectively $\frac{1-\pi}{N_I}$). We can see from (6) that equilibrium level of effort e_I^* (respectively e_C^*) is decreasing in $\frac{1-\pi}{N_I}$ (respectively $\frac{\pi}{N_C}$). This means that a subordinate's loyalty decreases with his probability of future appointments. Therefore, if the next ruler is more likely (respectively less likely) to implement growth-enhancing policies, π is high (respectively low), competent subordinates' loyalty will decrease (respectively increase). We have a similar result for incompetent subordinates. The second element that will affect incompetent subordinates' equilibrium level of effort is γ. The loyalty of an incompetent subordinate increases with γ[15]. The incompetent subordinate knows that there is a positive probability of protests following an unsuccessful public good provision. Thus, if the state is vulnerable to social protests, the subordinate will be less likely to exert the effort to prolong the ruler's fate in power. Simply because loyalty is costly.

Rulers' investment and appointment decisions in the first period

Using the same logic as in the second period, good rulers always invest and appoint a competent subordinate in the first period. We also know that, at the equilibrium, bad rulers have two possible strategies: implementing growth-enhancing policies or not: $\left(i_1^{*B}(r_1), a_1^{*B}(r_1)\right) \in \{(0, I), (1, C)\}$. When a bad ruler invests and appoints a competent subordinate in the first period, her continuation payoff is:

$$V_B(1, C) = \overbrace{E + \Psi}^{\substack{\text{Ego rents and policy payoff} \\ \text{in the first period}}} + \delta \underbrace{\delta\left(\tilde{\pi}_C - \frac{\pi}{N_C}\right)}_{\substack{\text{Probability of survival when appointing} \\ \text{a competent subordinate}}} \overbrace{(E + \bar{r})}^{\substack{\text{Ego rents and expected rents} \\ \text{from diverting public funds} \\ \text{in the second period}}} . \tag{7}$$

When a bad ruler diverts and appoints an incompetent subordinate in the first period, she knows that the citizen will protest with probability $\frac{\kappa^*}{\bar{\kappa}}$. Her continuation payoff is:

15. g is increasing in γ.

$$V_B(0,I) = \overbrace{E + r_1}^{\text{Ego rents and rents from diverting public funds in the first period}} + \delta \underbrace{\delta G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)}_{\text{Probability of survival when appointing an incompetent subordinate}} \overbrace{(E + \bar{r})}^{\text{Ego rents and expected rents from diverting public funds in the second period}} . \quad (8)$$

where G is defined in the appendix.
In what follows, I determine conditions under which a bad ruler will implement growth-enhancing policies at the equilibrium and the type of regime that emerges as a combination of longevity (short, long) and performance (good, bad).

I show in the appendix that the unique Perfect Bayesian Nash equilibrium can be completely characterized by γ and $q = \dfrac{1 - \frac{\pi}{N_C}}{1 - \frac{1-\pi}{N_I}}$, where q is the odds ratio of future employment of the subordinates. Higher values of q imply that an incompetent subordinate is more likely to be employed than a competent subordinate. Depending on the model's parameters, the regime that emerges can be in one of the three different equilibria: a separating equilibrium, a semi-separating equilibrium, or a pooling equilibrium.

Proposition 1 (**Separating equilibrium**). *There exists γ^* such that if $\gamma \in [\gamma^*, 1]$, the unique equilibrium is a separating equilibrium in which bad rulers do not invest in the public good and appoint an incompetent subordinate in the first period. That is $\Big(i_1^{*B}(r_1), a_1^{*B}(r_1)\Big) = (0, I) \ \forall r_1$.*

$$\gamma^* = \begin{cases} 1 & \text{if} \quad 1 < q \\ 1 - \sqrt{\dfrac{\bar{\kappa} N}{\delta^2 \pi}} & \text{if} \ G(0) < q < 1 \\ 0 & \text{if} \quad q < G(0) \end{cases} \quad (9)$$

where N is defined in the appendix.

Proof. In the appendix. ■

The first observation is that a necessary condition for this equilibrium to exist is $q < 1$ (see Fig (2)); that is $\dfrac{\pi}{N_C} > \dfrac{1-\pi}{N_I}$[16]. This means that the probability that an incompetent subordinate will be employed next if the current regime is overthrown must be lower than the probability that a competent subordinate will be employed. Proposition (1) says that if an incompetent subordinate has a low probability of being employed by the next ruler if the current ruler is replaced, and the threat of social protest is low ($\gamma > \gamma^*$), all bad rulers will separate themselves from good types appointing incompetent subordinates in the first period. In fact, incompetent subordinates will exert a high level of effort to secure the ruler's stay in power, compared to competent subordinates. This is because an incompetent subordinate knows that if the current

16. Otherwise, $\gamma^* = 1$

ruler is removed, it is unlikely that the future ruler will employ him. Thus, The fear of not being hired by the next ruler will reduce the subordinate's incentives to betray the ruler. Because of their loyalty, incompetent subordinates will be attractive to rulers who value their private consumption more than the provision of the public good.

Both conditions (low probability of retention $q < 1$ and low vulnerability to social protests $\gamma > \gamma^*$) are necessary and sufficient for this equilibrium to exist. In fact, suppose that an incompetent subordinate is highly effective in protecting the ruler but has a high probability of being retained by the next ruler. In this case, the subordinate will have a lower incentive to exert a high level of effort because he knows that the following ruler will hire him. Similarly, if an incompetent subordinate has a low probability of being retained if the current regime is removed but is ineffective in prolonging the stay of the ruler (low values of γ), he will be less likely to exert a high level of effort because he knows that the regime will be removed anyway.

In this equilibrium, rulers who employ incompetent subordinates survive longer. Thus, longevity and economic performance are negatively related. The next corollary that follows directly from proposition (1) describes the political regimes that can emerge in the separating equilibrium.

Corollary 1. *In the separating equilibrium,*

1) *two types of regimes can emerge.*

   i) *If the ruler is bad, she behaves as a kleptocrat: she does not invest in the public good and appoints an incompetent subordinate in both periods.*

   ii) *If the ruler is good, she has a prosperous regime: she invests in the public good and appoints a competent subordinate in both periods.*

2) *The kleptocrat survives longer than the prosperous regime.*

This result is consistent with the loyalty-competence trade-off. Bad rulers will trade the competence of highly capable subordinates for the loyalty of incompetent subordinates. Even though a bad ruler knows that the inefficient policy implemented by an incompetent subordinate can trigger a civil uprising, she will still appoint an incompetent subordinate because she knows that the incompetent subordinate will be more loyal (exert a high level of effort) than a competent subordinate. I will refer to this equilibrium outcome as "Kleptocrat" because the ruler who does not implement growth-enhancing policies has a longer tenure than the ruler who does implement good policies.

Proposition 2 (**Semi-separating equilibrium**). *If $\gamma < \gamma^*$, there exists r^* and γ^{**} such that, if $\gamma \in (\gamma^{**}, \gamma^*)$, the unique equilibrium is a semi-separating equilibrium in which bad rulers invest in the public good and appoint a competent subordinate if and only if their first-period rents is lower than r^*. That is $\left(i_1^{*B}(r_1), a_1^{*B}(r_1)\right) = (1, C)$ if and only if $r_1 < r^*$.*

$$\gamma^{**} = \begin{cases} 1 & \text{if} \quad 1 < q' \\ 1 - \sqrt{\frac{\bar{\kappa} N'}{\delta \pi}} & \text{if } G(0) < q' < 1 \\ 0 & \text{if} \quad q' < G(0) \end{cases} \tag{10}$$

where r^*, q' and N' are defined in the appendix.

Proof. In the appendix. ■

The intuition behind this equilibrium is similar to the previous proposition. First, for this equilibrium to exist, it must be the case that $\gamma < \gamma^*$. This is the case when either (1) $q > 1$ (incompetent subordinates have a higher probability of being employed if the regime is overthrown) or (2) γ is not too high (the threat of social protests is moderate). In this case, incompetent subordinates' loyalty will decrease compared to the pooling equilibrium. This is either because the threat of protest is credible or because they have higher chances of being employed than competent subordinates if the ruler is deposed. On the other hand, the loyalty of competent subordinates will increase. Thus, competent subordinates will be attractive to some bad rulers. In fact, a bad ruler faces a trade-off between maximizing her probability of staying in power (by implementing growth-enhancing policies) and maximizing her first period's rents (by diverting public funds). Consequently, in such an equilibrium, a bad ruler will invest in the public good and appoint a competent subordinate if her first-period rent is lower than the threshold r^* (defined in the appendix) and will prefer to divert the public funds and appoint an incompetent subordinate otherwise.

In this equilibrium, rulers who employ competent subordinates in the first period survive longer than those who employ incompetent ones. For this reason. Thus, longevity and economic performance are positively related. The following corollary describes the political regimes that can emerge in the semi-separating equilibrium. I will refer to this equilibrium as the "Stationary and roving bandits" equilibrium.

Corollary 2. *In the semi-separating equilibrium,*

1) *three types of regimes can emerge.*

   i) If the ruler is bad with first-period rents lower than the equilibrium threshold r^*, she behaves as a stationary bandit: she implements growth-enhancing policies in the first period only.

   ii) If the ruler is bad with first-period rents higher than the equilibrium threshold r^*, she behaves as a roving bandit: she does not implement growth-enhancing policies in both periods.

   iii) If the ruler is good, she has a prosperous regime: she implements growth-enhancing policies in both periods.

2) *The prosperous regime and the stationary bandit survive longer than the roving bandit.*

Proposition 3 (Pooling equilibrium). *If $\gamma \in [0, \gamma^{**}]$, the unique equilibrium is a pooling equilibrium in which all bad rulers invest in the public good and appoint a competent subordinate in the first period. That is, $\left(i_1^{*B}(r_1), a_1^{*B}(r_1)\right) = (1, C) \ \forall r_1$.*

Proof. In the appendix. ■

In this equilibrium, all bad rules mimic the behavior of good types in the first period: they pretend to be good types by investing in public goods and appointing competent subordinates. Therefore, the appointed competent subordinate and the citizen cannot update their beliefs about the ruler's type. In this case, bad rulers behave as stationary bandits. One notable observation is that this equilibrium does not exist if $N_C = 1$. In fact, if $N_C = 1$, the appointed competent subordinate knows that if the current regime does not survive, his probability of retention is π; the prior belief that the ruler is good. He also knows that if the current regime survives, his probability of being employed next is his posterior belief that the ruler is good (which is π given that the subordinate does not update his belief in the pooling equilibrium). That is, the competent subordinate has the same probability of being hired regardless of his level of effort. Thus, his level of effort will be 0, given that effort is costly. In this case, no bad rulers will want to employ the competent subordinate in the first period.

There are three reasons why all bad rulers would pretend to be good in the first period. First, when the maximum rent that they can extract is sufficiently small (small values of R), it is not worth diverting the public funds in the first period. Second, when the expected future rent is sufficiently high, it is worth mimicking the good ruler and expecting a high return in the next period (the distribution F is left-skewed). Third, when the ruler is patient enough (high discount factor δ). The following corollary describes the regimes that can emerge in this equilibrium. I will refer to this equilibrium as the "Stationary bandit" equilibrium.

Corollary 3. *In the pooling equilibrium,*

1) *two types of regimes can emerge.*

   i) If the ruler is bad, she behaves as a stationary bandit: she implements growth-enhancing policies in the first period only.

   ii) If the ruler is good, she has a prosperous regime: she implements growth-enhancing policies in both periods.

2) *Both regimes have the same tenure but different levels of public good provision.*

Figure (2) summarizes the unique equilibrium.

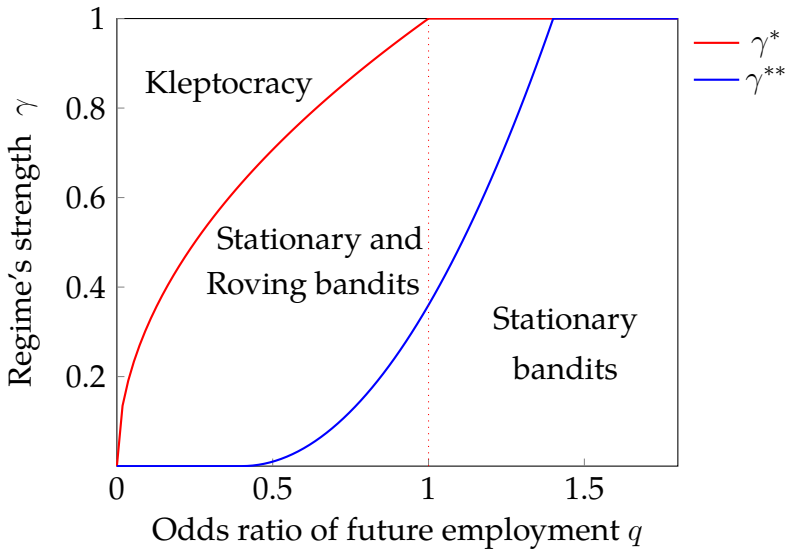


Figure 2: Political Regimes of the unique equilibrium.

Comparative Statics

In this section, I look at how the different exogenous parameters affect the equilibrium and, therefore, the regime that emerges at the equilibrium. The comparative statics will be with respect to γ^* and γ^{**} since they are keys in determining the equilibrium type (pooling, semi-separating, and separating) that we should observe.

Proposition 4. *Conditional on* $\gamma^*, \gamma^{**} \in (0,1)$,

i) γ^* *is increasing in* N_C *and decreasing in* $N_I, \pi, \bar{\kappa}$, *and* δ.

ii) γ^{**} *is increasing in* N_C, π *and decreasing in* $N_I, \bar{\kappa}, \delta$.

When π increases, the ruler's successor, independent of the incumbent's type, is more likely to be good. Given that good types always appoint a competent subordinate, the chances that the ruler's successor hires an incompetent subordinate decrease. In that case, when hired in the first period, incompetent subordinates will exert a higher level of effort, making them attractive to bad rulers who otherwise would have appointed a competent subordinate. We will observe more kleptocratic regimes as described by figure (3a). An increase in π has two effects on competent subordinates. First, it increases their chances of retention if the current regime is deposed, decreasing their level of effort. Second, it also increases their chances of keeping their job if the current regime survives, as they are more convinced that the current leader is more likely to be a good type and not a bad one pretending to be good. This increases their level of effort. The second effect dominates the first one as their posterior beliefs that the ruler is a good type are higher than their prior beliefs. This will make competent subordinates attractive to bad types with lower first-period rents. This will increase the set of stationary bandits.

This comparative static shows that if a ruler expects her successor to hire an incompetent subordinate, she will be less likely to engage in nepotism. This is because current competent

subordinates will exert a higher level of effort, given that they will be less likely to be employed by the ruler's successor.

When the pool of incompetent subordinates becomes larger, each incompetent subordinate faces an increasingly smaller probability of being hired by the future ruler. This increases their level of effort in the first period. Therefore, incompetent subordinates are more attractive to bad rulers. This will increase the set of kleptocracies and roving bandits and decrease the set of stationary bandits (fig 3b). In fact, there exists N_I^* such that for all $N_I > N_I^*$, the kleptocratic equilibrium **always** exists.

When the pool of competent subordinates becomes larger, the probability of retention for competent subordinates decreases, and this increases their level of effort. Therefore, competent subordinates are attractive to some or all bad rulers. This will increase the set of stationary bandits and decrease the set of kleptocracies and roving bandits (fig 3c). In fact, there exists N_C^* such that for all $N_C > N_C^*$, the kleptocratic equilibrium **never** exists.

These comparative statics have different implications on how the bureaucracy's quality affects autocracies' tenure. In weak states, an improvement in the quality of the bureaucracy increases the longevity of the regime. However, in strong authoritarian regimes, the poor quality of the bureaucracy increases the regime's longevity. That is, longer leader tenure will be negatively (respectively positively) correlated with the quality of the bureaucracy in strong (respectively vulnerable) authoritarian regimes.

When the total resources available to steal increases, the cutoff rents r^* at which bad rulers are indifferent between implementing good or bad policies decreases. That is, bad rulers are more likely to implement bad policies. An increase in the total resources to steal does not affect the level of effort of competent or incompetent subordinates because I assume a non-contractible effort on behalf of the subordinate (fig 3d). One could imagine that if the ruler can offer a contract to the subordinate that specifies a wage depending on his effort, a dictator with a high first-period rent would be willing to offer better deals to increase his survival. Therefore, without the agency problem between the ruler and her subordinates, we should expect bad rulers with more resources to employ incompetent subordinates and have longer tenures. This is known as the resource curse and is well documented in the literature[17].

When the cost of overthrowing the ruler increases (fig 3e), the citizen becomes less likely to protest. This reduces the threat of removal by social unrest. In this case, the public good's provision does not improve the ruler's survival per se, as the citizen will be less likely to protest if the ruler diverts the public funds. This will increase the set of kleptocrat and roving bandit regimes. That is, bad rulers will be more likely to implement inefficient policies and still survive longer in office. This result implies that political instability, measured as the occurrence of social protests, will increase the quality of the public good. This is consistent with Adsera et al.

17. See Vahabi (2018) for a recent survey.

(2003), who showed that political instability significantly increases the quality and efficiency of the bureaucracy.

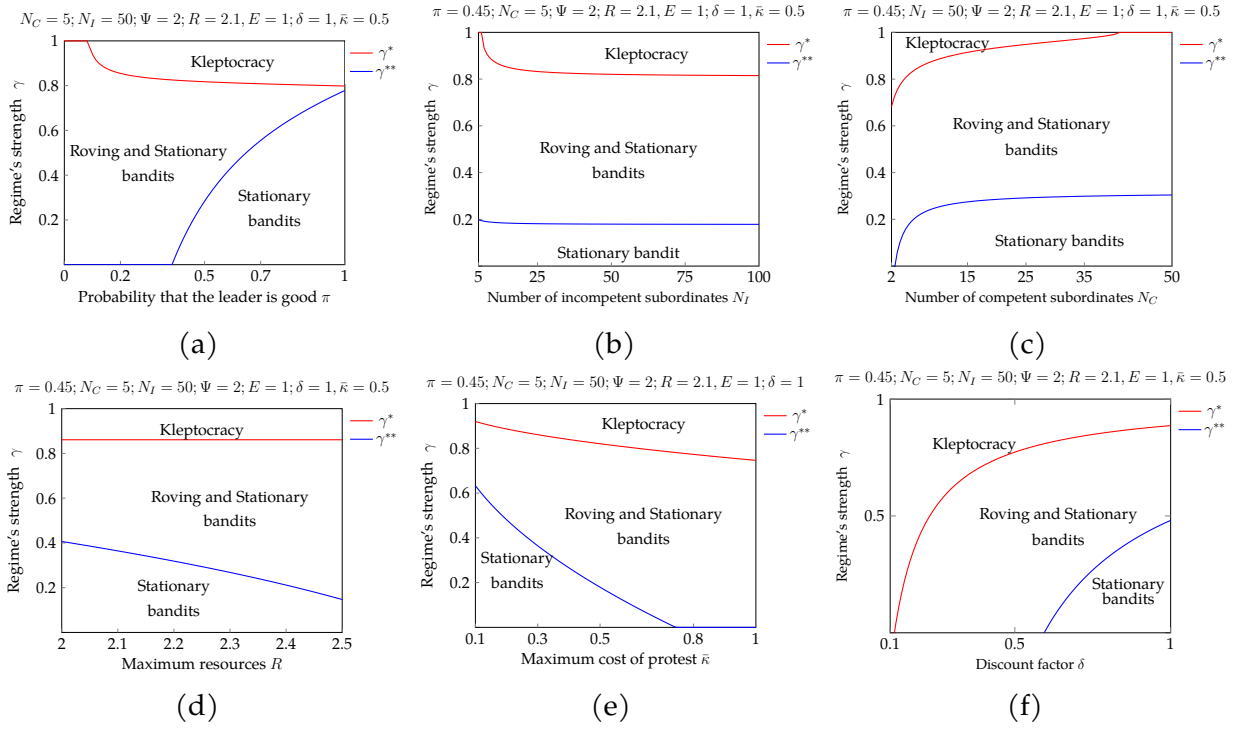


Figure 3: Comparative statics with respect to exogenous parameters.

Robustness

Different efficiency level for subordinates

In this subsection, I relax the assumption that competent and incompetent subordinates have the same efficiency. Here I assume that the cost of the effort for competent subordinates is $\frac{1}{2\mu}e^2$. If $\mu > 1$ (respectively < 1), competent subordinates are more (respectively less) efficient than incompetent subordinates. There are several reasons why competent subordinates might be less efficient than incompetent subordinates. Recall that competence in this setting is the ability of the subordinate to implement efficient policies. It can be argued that the skills needed to protect the ruler differ from those needed to produce the public good. In this case, incompetent subordinates can be more efficient than competent subordinates. On the other hand, if the cost of the effort reflects the forgotten opportunity of serving under the future regime (like in Egorov and Sonin (2011)), incompetent subordinates might be the ones losing more than competent subordinates. Also, suppose the cost of effort reflects, for example, the difficulty or the "ease" of making the right decisions to protect the ruler. In that case, it makes sense to argue that competent subordinates will make less effort to achieve the same goal than incompetent subordinates. In this case, competent subordinates will be more efficient.

I show the following result.

Proposition 5. *There exist γ_μ^* and γ_μ^{**}, the corresponding values of γ^* and γ^{**} in the baseline model, that determine the equilibrium outcome of the new model. Moreover, γ_μ^* and γ_μ^{**} are decreasing is μ.*

First, this result shows that relaxing the assumption on the efficiency of subordinates does not change the normative results of the baseline model. Both the likelihood of future employment for each subordinate's type and the subordinate's effectiveness against social protests will determine the equilibrium outcome. In addition, it shows how the subordinate's efficiency affects the equilibrium outcome. If competent subordinates are less efficient, then the set of kleptocrats and roving bandits increases. If competent subordinates are more efficient, then the set of stationary bandits increases. These results are straightforward, as a more efficient subordinate will increase his equilibrium level of effort. First, this result shows that relaxing the assumption on the efficiency of subordinates does not change the normative results of the baseline model. Both the likelihood of future employment for each subordinate's type and the subordinate's effectiveness against social protests will determine the equilibrium outcome. In addition, it shows how the subordinate's efficiency affects the equilibrium outcome. If competent subordinates are less efficient, then the set of kleptocrats and roving bandits increases. If competent subordinates are more efficient, then the set of stationary bandits increases. These results are straightforward, as a more efficient subordinate will increase his equilibrium level of effort.

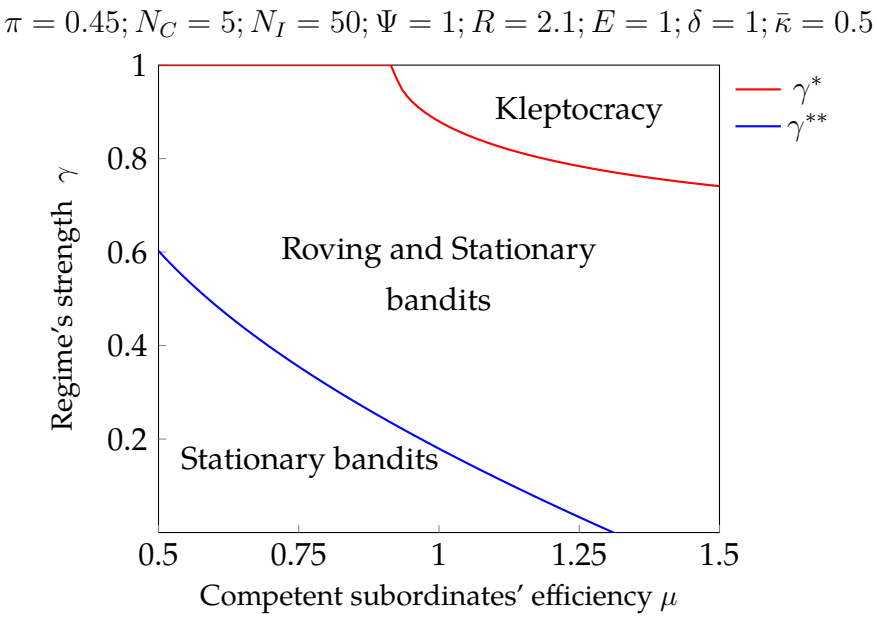


Figure 4: Equilibrium outcomes with different efficiency levels for subordinates

The shadow of a purge

In this subsection, I assume that if a regime collapses in the first period, the ruler's successor can decide to purge the previous subordinate. There are several examples of new autocrats

getting rid of bureaucrats from the previous regime. The first example is from Iraq. In July 1979, President Ahmad Hassan al-Bakr resigned under the threat of force and formally transferred the presidency to Saddam Hussein. Only one week later, Saddam Hussein imprisoned and killed several of the ruling Baath Party. The second example comes from South Korea. After seizing power through a military coup d'état in 1961, Park Chung-hee embarked on a "purification" campaign, blacklisting a whole generation of politicians and bureaucrats who had served under the previous regime (Lagerlöf, 2012).

In light of these stylized facts, I assume in this section that with probability σ, the subordinate employed in the first period will be purged and, therefore, cannot serve under the ruler's successor if the current regime is deposed. Let's γ_σ^* and γ_σ^{**} the values of γ that determine the equilibrium outcome.

Proposition 6. *We have the following result.*

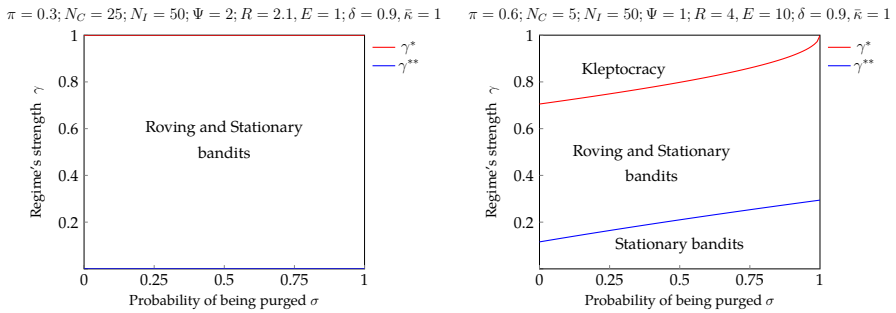
- *If $q > 1$, then the shadow of a purge does not affect the set of kleptocracies and increases the set of roving bandits: that is, $\gamma_\sigma^* = 1$ and γ_σ^{**} is decreasing in σ.*
- *If $q \leq 1$, then the shadow of a purge reduces the set of kleptocracies and roving bandits: that is, γ_σ^* and γ_σ^{**} are increasing in σ.*

We know from the baseline model that one important parameter that determines the equilibrium outcome is the ratio $q = \dfrac{1 - \frac{\pi}{N_C}}{1 - \frac{1-\pi}{N_I}}$. Therefore, to study how the shadow of a purge affects the equilibrium outcome, we have to determine how it affects this ratio. I show in the appendix that the shadow of a purge increases the equilibrium level of effort for both subordinate types. However, the shadow of a purge will have a bigger effect on the subordinate with a higher probability of being employed next without the purge. Therefore, when $q > 1$, the shadow of a purge has a bigger effect on incompetent subordinates. In this case, incompetent subordinates will increase their level of effort more than competent subordinates. Thus, some bad rulers who otherwise would have appointed a competent subordinate in the first period will now appoint an incompetent subordinate. That is, the set of roving bandits will increase.
When $q \leq 1$, the shadow of a purge has a bigger effect on competent subordinates, and we have a reverse mechanism than the mechanism previously described.

Extensions

The Shadow of Democratization

In this section, I study how the shadow of democratization affects the equilibrium outcome and, therefore, the regime that emerges. I assume that when a regime is overthrown, it transitions



(a) $q > 1$ (b) $q \leq 1$

Figure 5: The effect of purges on equilibrium outcomes

to a "democracy" with probability θ. In this setting, a democracy is a regime that better selects good rulers. One way to think about this is to assume that democracies can better constrain rulers to implement efficient policies than autocracies. Many instances of authoritarian regimes transition to democracy when the autocrat is removed from office. One example is the Chilean transition to democracy in 1990 after the 16-year Pinochet rule.

For simplicity, I assume that a democracy selects a good ruler with probability 1. I show in the appendix that there exist γ_θ^* and γ_θ^{**} the corresponding values of γ that determine the equilibrium outcome.

Proposition 7. *For some game parameters, the shadow of democratization increases the set of kleptocracies and roving bandits. That is γ_θ^* and γ_θ^{**} are decreasing in θ.*

The shadow of democratization has three important effects. First, it increases the likelihood that the citizen protests when the ruler does not implement growth-enhancing policies. This is because the benefit of a regime change increases as the next ruler is more likely to implement growth-enhancing policies. Second, the shadow of democratization decreases competent subordinates' equilibrium level of effort. In fact, competent subordinates are more likely to be employed if the regime transitions to democracy. Therefore, they will reduce their level of effort in the first period. Lastly, allowing the regime to transition to a democracy increases the equilibrium level of effort of incompetent subordinates. Given that incompetent subordinates are less likely to be employed by the next ruler, they will do everything it takes to ensure the survival of the current regime. Thus, they will exert a higher level of effort. For some game parameters, the two last effects will dominate the first. In this case, the set of kleptocrats and roving bandits will increase.

This result is counterintuitive. It shows that implementing democratic institutions (like elections) that are weak in authoritarian regimes can worsen governance. Because those institutions threaten the future employment of incompetent subordinates, they can steal elections to ensure their patron remains in power.

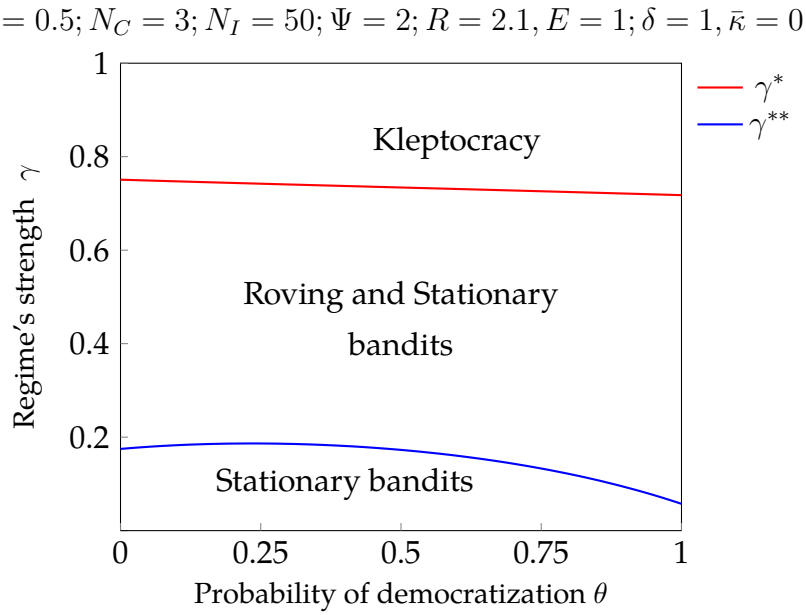


Figure 6: The shadow of democratization on equilibrium outcomes

Smooth Succession

In practice, many autocrats are able to transfer power to one of their children, who are more likely to be bad types. For example, Heydar Aliyev, in Azerbaijan, successfully passed power onto his son Ilham Aliyev after 10 years in power. Also, Ali Bongo in Gabon and Mahamat Déby in Chad were able to succeed their fathers after they ruled respectively for 41 and 30 years in office.

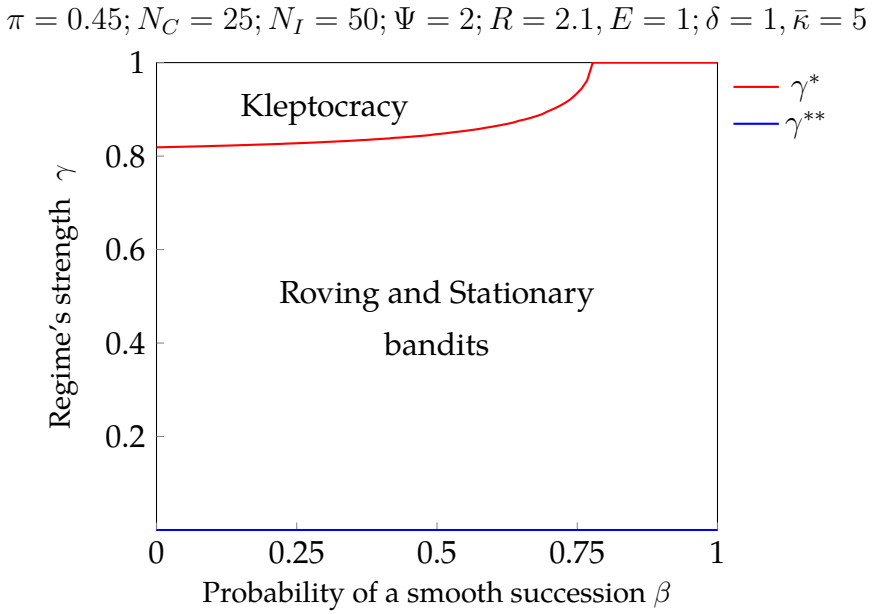
In this section, I assume that an autocrat can transfer power to his child with probability β when ousted from power. In this case, the ruler's successor is assumed to be of a similar type: bad type. With probability $1 - \beta$, the ruler's successor is selected as before. He is good with probability π.

I show in the appendix that there exist γ^*_β and γ^{**}_β the corresponding values of γ that determine the equilibrium outcome.

Proposition 8. *For some game parameters, a smooth succession decreases the set of kleptocracies and roving bandits. That is γ^*_β and γ^{**}_β are increasing in β.*

This result shows that a predetermined succession by the autocrat could undermine her tenure. In fact, a predetermined succession decreases the likelihood that the citizen protests when the ruler does not implement growth-enhancing policies. This is because the benefit of a regime change decreases as the next ruler is more likely to implement bad policies. Second, competent subordinates' equilibrium level of effort will increase. In fact, competent subordinates are less likely to be employed if the regime does not survive. Therefore, they will increase their level of effort in the first period. Lastly, allowing bad rulers to handle power to their children decreases the equilibrium level of effort of incompetent subordinates. In fact, incompetent

subordinates are now more likely to be employed by the ruler's successor. They will reduce their level of effort, given that effort is costly. Thus, they will exert a lower level of effort. I show in the appendix that the two last effects will dominate the first for some game parameters. In this case, the set of kleptocrats and roving bandits will decrease.



Conclusion

While many scholars argue that democracy outperforms autocracy on average, there is a consensus that the variation in economic performance is higher in autocracy than in democracy. Studies of authoritarian governance explain their longevity and economic underperformance as resulting from the loyalty-competence tradeoff. This approach does not seem sufficient to understand the link between the stability and economic performance in autocracies such as Spain (under Franco from 1945 to 1975), Singapore (under Lee Kuan Yew from 1960 to 1990), and Taiwan (under Chiang Kai-Shek from 1951 to 1974). In these polities, the loyalty-competence tradeoff theory cannot explain the link between their stability and economic performance.

In light of these stylized facts, I developed a formal model to show that political institutions, economic performances, and the survival of dictators are linked, but perhaps not in the most obvious way. The model is motivated by the different threats of autocrat's removal and the absence of institutionalized succession processes. An autocrat faces exogenous (foreign interventions, coups) and endogenous (social protests) threats and must rely on the loyalty of his subordinate to remain in power. The model shows that both the subordinate's likelihood of future employment and the credibility of social protests will determine the link between longevity and economic performance of authoritarian regimes. Uncertainty in succession can make the subordinate reluctant to betray the ruler, and a credible threat of social unrest can make the ruler unwilling to appoint an incompetent subordinate. The model generates four regime types at the

equilibrium: Kleptocracy, Roving Bandit, Stationary Bandit, and successful autocracy.

The model also generates the surprising result that the shadow of democratization can increase the set of Kleptocrats. This result calls for more precaution, given the policies pushed forward to improve governance in weakly institutionalized polities. In fact, analysis of authoritarian politics explains their inefficiencies as resulting from the very specific set of constraints that weak institutions impose on their rulers. Thus, efforts to help these countries emphasize the implementation of democratic institutions that would impose greater accountability on autocrats. My analysis reveals we should be cautious about implementing weak democratic institutions in authoritarian regimes because this will foreshorten the political survival of incompetent subordinates. Thus, they know they will do whatever it takes for the autocrat to stay in power.

To my knowledge, this paper is the first that uses a two-level principal-agent model to analyze the stability and performance of authoritarian regimes. However, the model did not incorporate the toolkits that dictators have in hand to increase their stay in office. For example, the ruler could decide to repress any social unrest. This can be included in the model by endogenizing either the cost of protest or the regime's vulnerability.

References

Acemoglu, D., S. Naidu, P. Restrepo, and J. A. Robinson (2019). Democracy does cause growth. *Journal of political economy 127*(1), 47–100.

Adsera, A., C. Boix, and M. Payne (2003). Are you being served? political accountability and quality of government. *The Journal of Law, Economics, and Organization 19*(2), 445–490.

Aghion, P., A. F. Alesina, and F. Trebbi (2007). Democracy, technology, and growth.

Al-Ubaydli, O. (2012). Natural resources and the tradeoff between authoritarianism and development. *Journal of Economic Behavior & Organization 81*(1), 137–152.

Barro, R. J. (1996). Democracy and growth. *Journal of economic growth 1*(1), 1–27.

Besley, T. J. and M. Kudamatsu (2007). Making autocracy work. *LSE STICERD Research Paper No. DEDPS48*.

Brown, D. S. and A. M. Mobarak (2009). The transforming power of democracy: regime type and the distribution of electricity. *American Political Science Review 103*(2), 193–213.

Bueno de Mesquita, B., A. Smith, R. M. Siverson, and J. D. Morrow (2003). The logic of political survival.

Cassani, A. (2017). Social services to claim legitimacy: comparing autocracies' performance. *Contemporary Politics 23*(3), 348–368.

De Mesquita, B. B. and A. Smith (2011). *The dictator's handbook: why bad behavior is almost always good politics*. PublicAffairs.

Debs, A. (2007a). Political strength and economic efficiency in a multi-agent state. Technical report, Citeseer.

Debs, A. (2007b). The wheel of fortune: Agency problems in dictatorships. Technical report, MIT mimeo.

Egorov, G. and K. Sonin (2011). Dictators and their viziers: Endogenizing the loyalty–competence trade-off. *Journal of the European Economic Association 9*(5), 903–930.

Frantz, E. and N. M. Ezrow (2011). *The politics of dictatorship: Institutions and outcomes in authoritarian regimes*. Lynne Rienner Publishers Boulder, CO.

Gehlbach, S. and P. Keefer (2011). Investment without democracy: Ruling-party institutionalization and credible commitment in autocracies. *Journal of Comparative Economics 39*(2), 123–139.

Gerring, J., P. Bond, W. T. Barndt, and C. Moreno (2005). Democracy and economic growth: A historical perspective. *World politics 57*(3), 323–364.

Gerring, J. and S. C. Thacker (2008). *A centripetal theory of democratic governance*. Cambridge University Press.

Glaeser, E. L., R. La Porta, F. Lopez-de Silanes, and A. Shleifer (2004). Do institutions cause growth? *Journal of economic Growth 9*(3), 271–303.

Jong-A-Pin, R. and J. O. Mierau (2011). No country for old men: Aging dictators and economic growth.

Krieckhaus, J. (2004). The regime debate revisted: A sensitivity analysis of democracy's economic effect. *British Journal of Political Science 34*(4), 635–655.

Lagerlöf, N.-P. (2012). A dynamic theory of competence, loyalty and stability in dictatorships. *The BE Journal of Macroeconomics 12*(1).

Li, Y., M. Gilli, et al. (2014). Accountability in autocracies: The role of revolution threat. Technical report, Stockholm School of Economics, Stockholm China Economic Research Institute.

Magaloni, B. (2008). Credible power-sharing and the longevity of authoritarian rule. *Comparative Political Studies 41*(4-5), 715–741.

McGuire, M. C. and M. Olson (1996). The economics of autocracy and majority rule: the invisible hand and the use of force. *Journal of economic literature 34*(1), 72–96.

Mulligan, C. B., R. Gil, and X. Sala-i Martin (2004). Do democracies have different public policies than nondemocracies? *Journal of Economic Perspectives 18*(1), 51–74.

Myerson, R. B. (2008). The autocrat's credibility problem and foundations of the constitutional state. *American Political Science Review*, 125–139.

Olson, M. (1993). Dictatorship, democracy, and development. *American political science review 87*(3), 567–576.

Overland, J., K. L. Simons, and M. Spagat (2005). Political instability and growth in dictatorships. *Public Choice 125*(3), 445–470.

Padró i Miquel, G. (2007). The control of politicians in divided societies: The politics of fear. *The Review of Economic Studies 74*(4), 1259–1274.

Papaioannou, E. and G. Siourounis (2008). Democratisation and growth. *The Economic Journal 118*(532), 1520–1551.

Posner, R. (2010). Autocracy, democracy, and economic welfare. *The Becker Posner Blog: A Blog by Gary Becker and Richard Posner*.

Przeworski, A., R. M. Alvarez, M. E. Alvarez, J. A. Cheibub, F. Limongi, F. P. L. Neto, et al. (2000). *Democracy and development: Political institutions and well-being in the world, 1950-1990*. Number 3. Cambridge University Press.

Przeworski, A. and F. Limongi (1993). Political regimes and economic growth. *Journal of economic perspectives 7*(3), 51–69.

Salih, K. E. O. (2013). The roots and causes of the 2011 arab uprisings. *Arab Studies Quarterly 35*(2), 184–206.

Sirowy, L. and A. Inkeles (1990). The effects of democracy on economic growth and inequality: A review. *Studies in comparative international development 25*(1), 126–157.

Svolik, M. (2006). A theory of government dynamics in authoritarian regimes. *University of Illinois at Urbana-Champaign mimeo*.

Svolik, M. W. (2012). *The politics of authoritarian rule*. Cambridge University Press.

Tiruneh, G. (2014). Social revolutions: their causes, patterns, and phases. *SAGE Open 4*(3), 2158244014548845.

Vahabi, M. (2018). The resource curse literature as seen through the appropriability lens: a critical survey. *Public Choice 175*(3), 393–428.

Wu, C.-e. (2004). *Regime types, structural factors, and economic performance*. University of Michigan.

Zakharov, A. V. (2016). The loyalty-competence trade-off in dictatorships and outside options for subordinates. *The Journal of Politics 78*(2), 457–466.

Zudenkova, G. (2015). Political cronyism. *Social Choice and Welfare 44*(3), 473–492.

Appendix

Let $\tilde{\pi}_j,\ j \in \{C, I\}$, be the posterior belief that the ruler is good given that she appointed a type j subordinate. $\boldsymbol{a} = (a_2^G, a_2^B)$ respectively, the probability that the good and the bad type will appoint a competent subordinate in the second period, and $\mathbf{P} = (P_C, P_I)$ the probability of survival when appointing a competent and an incompetent subordinate in the first period respectively. δ is the discount factor.

I first write the continuation payoffs for the ruler (without the ego rent E) and the appointed subordinate in the first period.

The continuation payoff of a good ruler: In the first period, a good ruler has 0 if she diverts public funds and hires an incompetent subordinate, and survives with probability P_I. She gets Ψ if she invests in public goods and hires a competent subordinate, and survives with probability P_C. Therefore, her continuation payoff is:

$$V_G(\boldsymbol{a^G}, i^G, \mathbf{P}) = a_1^G(r_1)\left(\Psi \mathbb{1}_{i_1^G=1} + \delta P_C\left(a_2^G(r_2)\Psi \mathbb{1}_{i_2^G=1}\right)\right) + \left(1 - a_1^G(r_1)\right)\left(0 + \delta P_I\left(a_2^G(r_2)\Psi \mathbb{1}_{i_2^G=1}\right)\right)$$

The continuation payoff of a bad ruler: In the first period, a bad ruler gets Ψ if she invests in public goods and hires a competent subordinate. In this case, she survives with probability P_C. She gets r_1 if she diverts public funds and hires an incompetent subordinate and survives with probability P_I. Therefore, her continuation payoff is:

$$V_B(\boldsymbol{a^B}, i^B, \mathbf{P}) = a_1^B(r_1)\left(\Psi \mathbb{1}_{i_1^B=1} + \delta P_C\left(a_1^B(r_2)\Psi \mathbb{1}_{i_2^B=1} + (1 - a_1^B(r_2))r_2\right)\right) + \left(1 - a_1^B(r_1)\right)\left(r_1 + \delta P_I\left(a_2^B(r_2)\Psi \mathbb{1}_{i_2^B=1} + (1 - a_2^B(r_2))r_2\right)\right)$$

The continuation payoff of the subordinate: The subordinate receives 1 every period that he is employed by a ruler and 0 otherwise. The employed subordinate also incurs costs $\frac{1}{2}e^2$ due to his efforts to prolong the ruler's term in office.

The continuation payoff of a competent subordinate is:

$$U_C(\boldsymbol{a}, e_C) = 1 - \frac{1}{2}e_C^2 + \delta P_C\Big(\tilde{\pi}_C a_2^G + (1 - \tilde{\pi}_C)a_2^B\Big) + \delta\Big(1 - P_C\Big)\Big(\frac{\tilde{\pi}_C}{N_C}a_2^G + \frac{(1-\pi)}{N_C}a_2^B\Big)$$

The continuation payoff of an incompetent subordinate is:

$$U_I(\boldsymbol{a}, e_I) = 1 - \frac{1}{2}e_I^2 + \delta P_I\Big(\tilde{\pi}_I(1 - a_2^G) + (1 - \tilde{\pi}_I)(1 - a_2^B)\Big) + \delta\Big(1 - P_I\Big)\Big(\frac{\pi}{N_I}(1 - a_2^G) + \frac{(1-\pi)}{N_I}(1 - a_2^B)\Big)$$

Bad rulers' optimal strategies set

At the equilibrium, a bad ruler in the first period either invests and appoints a competent subordinate or diverts and appoints an incompetent subordinate. $\Big(i_1^B(r_1), a_1^B(r_1)\Big) \in \{(0, I), (1, C)\}$.

Proof. Suppose that a bad ruler with the first-period rents r_1 invests and appoints an incompetent subordinate. Because the appointed subordinate is incompetent, $y_1 = 0$. The ruler's expected payoff will be $\delta\Big(p_0\gamma+(1-p_0)\Big)e_I\bar{r}$; where p_0 is the probability that the citizen protests when $y = 0$. Suppose now that he divers and appoints an incompetent subordinate. His expected payoff will be $r_1 + \delta\Big(p_0\gamma + (1 - p_0)\Big)e_I\bar{r}$. Thus, a bad ruler cannot invest and appoint an incompetent subordinate.

Suppose that a bad ruler with first-period rents r_1 diverts and appoints a competent subordinate in the first period. In this case, $y_1 = 0$, and the competent subordinate knows that the ruler is bad. Therefore, he will not exert any effort because he knows that if the ruler survives into the next period, the ruler will appoint an incompetent subordinate. In this case, the ruler's expected payoff is just his first-period rents r_1. Suppose now that the ruler diverts and appoints an incompetent subordinate. His expected payoff will be $r_1 + \delta\Big(p_0\gamma + (1 - p_0)\Big)e_I\bar{r}$. Thus, a bad ruler cannot divert and appoint a competent subordinate in the first period.

The last two results show that $\Big(i_1^{*B}(r_1), a_1^{*B}(r_1)\Big) \in \{(0, I), (1, C)\}$ ■

Citizen's decision to protest

Proof. When the policy outcome is successful $(y = 1)$, the citizen posterior beliefs that the ruler is good is $\tilde{\pi}_C = \dfrac{\pi}{\pi + (1 - \pi)a_1^B} \geq \pi$. If the citizen does not protest, his expected utility is $1 + \delta\Big(e_H\tilde{\pi}_C+(1-e_H)\pi\Big)$. If the citizen protests, his expected utility is $1-\kappa+\delta\Big(\gamma e_H\tilde{\pi}_C+(1-\gamma e_H)\pi\Big)$. Therefore, the citizen protests if and only if $\kappa < \underbrace{-\delta(1 - \gamma)(\tilde{\pi}_C - \pi)e_H}_{<0}$. Which can never be true since $\kappa \in [0, \bar{\kappa}]$. Thus, the citizen never protests when $y = 1$.

When the policy outcome is unsuccessful $(y = 0)$, the citizen can infer that the ruler is bad, given that only bad types can divert public funds and appoint an incompetent subordinate. In this case, if the citizen does not protest, his expected utility is $\delta(1-e_I)\pi$. If the citizen protests, his expected utility is $\delta(1-\gamma e_I)\pi-\kappa$. Thus, the citizen protests if and only if $\kappa < \delta(1-\gamma)\pi e_I = \kappa^*$. ■

Subordinates' optimal level of effort

When appointed, an incompetent subordinate knows that the ruler is bad $(\tilde{\pi}_I = 0)$ and that the citizen will protest with probability $\dfrac{\delta\pi}{\bar{\kappa}}(1 - \gamma)e_I^*$. Given the second-period choices of both good

and bad rulers, and given the probability that the citizen protests when $y = 0$, I simplify the expression of the continuation payoffs of an incompetent subordinate.

$$U_I(e_I) = 1 - \frac{1}{2}e_I^2 + \delta\left(\left(1 - \frac{\delta\pi}{\bar{\kappa}}(1-\gamma)^2 e_I\right)\left(1 - \frac{1-\pi}{N_I}\right)e_I + \frac{1-\pi}{N_I}\right)$$

When the ruler appoints an incompetent subordinate, the appointed subordinate solves the following maximization problem

$$\max_{e_I} \quad 1 - \frac{1}{2}e_I^2 + \delta\left(\left(1 - \frac{\delta\pi}{\bar{\kappa}}(1-\gamma)^2 e_I\right)\left(1 - \frac{1-\pi}{N_I}\right)e_I + \frac{1-\pi}{N_I}\right)$$

The first order condition is

$$\frac{\partial U_I}{\partial e_I} = -e_I + \delta\Big(1 - \frac{1-\pi}{N_I}\Big)\Big(1 - \frac{2\delta\pi}{\bar{\kappa}}(1-\gamma)^2 e_I\Big) = 0$$

The unique solution is

$$e_I^* = \frac{\delta}{1 + \frac{2\delta^2\pi}{\bar{\kappa}}(1-\gamma)^2(1 - \frac{1-\pi}{N_I})}\Big(1 - \frac{1-\pi}{N_I}\Big) = \delta g(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big) \tag{11}$$

When appointed, a competent subordinate believes that the ruler is good with probability $\tilde{\pi}_C = \frac{\pi}{\pi + (1-\pi)a_1^B}$, where a_1^B is the probability that a bad ruler appoints a competent subordinate in the first period. The competent subordinate knows that the public good will be successfully provided; that is, the citizen will not protest. Given the second-period choices of both good and bad rulers, I simplify the expression of the continuation payoffs of a competent subordinate.

$$U_C(e_C) = 1 - \frac{1}{2}e_C^2 + \delta\left(\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big)e_C + \frac{\pi}{N_C}\right).$$

When the ruler appoints a competent subordinate, the appointed subordinate solves the following maximization problem.

$$\max_{e_C} \quad 1 - \frac{1}{2}e_C^2 + \delta\left(\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big)e_C + \frac{\pi}{N_C}\right).$$

The first order condition is

$$\frac{\partial U_C}{\partial e_C} = -e_C + \delta\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big) = 0.$$

The unique solution is

$$e_C(\tilde{\pi}_C) = \delta\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big). \tag{12}$$

Bad rulers' appointment decision in the first period

If a bad ruler with first-period rents r_1 appoints a competent subordinate in the period, her probability of survival is e_C^*, and her continuation payoff is:

$$E + \Psi + \delta^2\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big)(E + \bar{r}).$$

If she appoints an incompetent subordinate, her probability of survival is:

$$\Big(1 - \frac{\delta\pi}{\bar{\kappa}}(1-\gamma)^2 e_I^*\Big)e_I^* = \frac{1 + \frac{\delta^2\pi}{\bar{\kappa}}(1-\gamma)^2(1-\frac{1-\pi}{N_I})}{\Big(1 + \frac{2\delta^2\pi}{\bar{\kappa}}(1-\gamma)^2(1-\frac{1-\pi}{N_I})\Big)^2}\delta\Big(1 - \frac{1-\pi}{N_I}\Big) = G(\gamma)\,\delta\Big(1 - \frac{1-\pi}{N_I}\Big)$$

, and her continuation payoff is

$$E + r_1 + \delta^2\ G(\gamma)\ \Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r}).$$

I now turn to the proofs of the main propositions. For ease of exposition, I pose : $\widetilde{N}_C = 1 - \frac{\pi}{N_C}$, $\widetilde{N}_I = 1 - \frac{1-\pi}{N_I}$, $q = \frac{\widetilde{N}_C}{\widetilde{N}_I}$.

Proof of proposition 1: the Separating equilibrium

There $\exists\ \gamma^*$, so that if $\gamma \geq \gamma^*$, the following strategy profile and beliefs constitute the unique (separating) PBNE:

i) $i_1^{*G}(0) = 1$ and $a_1^{*G}(0) = C$

ii) $i_1^{*B}(r_1) = 0$ and $a_1^{*B}(r_1) = I \quad \forall r_1$

iii) $e_I^* = \delta g(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)$; $e_C^* = \delta\Big(1 - \frac{\pi}{N_C}\Big)$

iv) $p^* = 1$ iff $y = 0$ and $\kappa \leq \kappa^*$

v) $\tilde{\pi}_C = 1$; $\tilde{\pi}_I = 0$

Proof. Given the rulers' strategies, the citizen and the appointed subordinate can perfectly distinguish good and bad rulers. If the ruler appoints a competent (respectively an incompetent) subordinate, using the Bayes rule, the posterior beliefs of the citizen and the appointed subordinate is $\tilde{\pi}_C = 1$ (respectively $\tilde{\pi}_I = 0$). Given (7) and (11) a competent (respectively an incompetent) subordinate chooses e_C (respectively e_I) such that:

$$e_C(\tilde{\pi}_C = 1) = \delta\Big(1 - \frac{\pi}{N_C}\Big)$$

and

$$e_I = \delta g(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)$$

If a bad ruler with first-period rents r_1 appoints a competent subordinate, she gets

$$E + \Psi + \delta^2\Big(1 - \frac{\pi}{N_C}\Big)(E + \bar{r}).$$

If she appoints an incompetent subordinate, she gets

$$E + r_1 + \delta^2\ G(\gamma)\ \Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r}).$$

A bad ruler with first-period rents Ψ will always divert public funds and appoint an incompetent subordinate if and only if

$$G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big) > \Big(1 - \frac{\pi}{N_C}\Big) \Leftrightarrow G(\gamma) > q \tag{13}$$

We know that $G(1) = 1$. That is, if $q > 1$, the previous inequality is never true. Now assume $q < 1$. If $G(0) > q$, then (13) is always satisfied for all $\gamma \in [0, 1]$. If $G(0) < q$, let $X = \frac{\delta^2\pi}{\bar{\kappa}}(1-\gamma)^2\widetilde{N}_I$. (13) is equivalent to

$$\frac{1+X}{(1+2X)^2} > q$$

It is easy to show that (13) is satisfied iff $X < \dfrac{\sqrt{8q+1} - (4q-1)}{8q} = \bar{X}$. Replacing X by its value, we obtain

$$\gamma > 1 - \sqrt{\frac{\bar{\kappa}N}{\delta^2\pi}}$$

where $N = \dfrac{\bar{X}}{\widetilde{N}_I}$. That is $a_1^B(r_1) = 0$ and $i^B(r_1) = 0\ \ \forall r_1$ if $\gamma > \gamma^*$, where

$$\gamma^* = \begin{cases} 1 & \text{if } \ 1 < q \\ 1 - \sqrt{\dfrac{\bar{\kappa}N}{\delta^2\pi}} & \text{if } \ G(0) < q < 1 \\ 0 & \text{if } \ q < G(0) \end{cases} \tag{14}$$

■

Proof of proposition 2: the semi-separating equilibrium

Let's show that if $\gamma < \gamma^*$ there $\exists$ r*, γ^{**} such that if $\gamma \in \left(\gamma^{**}, \gamma^*\right)$, the following strategy profile and beliefs constitute the unique (semi-separating) PBNE:

i) $i_1^{*G}(0) = 1$ and $a_1^{*G}(0) = C$

ii) $\left(i_1^{*B}(r_1) = 1 \text{ and } a_1^{*B}(r_1) = C\right) \Leftrightarrow r_1 < r^*$

iii) $e_I^* = g(\gamma)\,\delta\left(1 - \dfrac{1-\pi}{N_I}\right)$; $e_C^* = \delta\left(\tilde{\pi}^* - \dfrac{\pi}{N_C}\right)$

iv) $p^* = 1$ iff $y = 0$ and $\kappa \leq \kappa^*$

v) $\tilde{\pi}_C = \tilde{\pi}^*$; $\tilde{\pi}_I = 0$

where,

$$r^* = \Psi + \delta^2\left(\left(\tilde{\pi}^* - \frac{\pi}{N_C}\right) - G(\gamma)\left(1 - \frac{1-\pi}{N_I}\right)\right)\left(E + \bar{r}\right) \tag{15}$$

and

$$\tilde{\pi}^* = \frac{\pi}{\pi + (1-\pi)F(r^*)}. \tag{16}$$

Proof. Given rulers' strategies, the citizen and the appointed subordinate can perfectly learn the ruler's type if she appoints an incompetent subordinate. That is, $\tilde{\pi}_I = 0$. In this case, the appointed incompetent subordinate chooses e_I according to (11).

The citizen and the appointed subordinate, however, cannot perfectly learn the ruler's type if she appoints a competent subordinate. The posterior beliefs of the citizen and the appointed competent subordinate, using Bayes's rule, is

$$Pr(t_R = \text{G}|a_1 = 1) = \frac{Pr(a_1^G = 1|t = \text{G}) \times Pr(t = \text{G})}{Pr(a_1^G = 1|t = \text{G}) \times Pr(t = \text{G}) + Pr(a_1^B = 1|t = \text{B}) \times Pr(t = \text{B})}$$

That is

$$\tilde{\pi}_C = \frac{\pi}{\pi + (1-\pi)F(r^*)} = \tilde{\pi}^*$$

In this case, the appointed competent subordinate chooses $e_C(\tilde{\pi}^*)$ according to (7).
If a bad ruler with first-period rents r_1 appoints a competent subordinate, her continuation payoff is

$$E + \Psi + \delta^2\left(\tilde{\pi}^* - \frac{\pi}{N_C}\right)(E + \bar{r}).$$

If she appoints an incompetent subordinate, her continuation payoff is

$$E + r_1 + \delta^2 G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r}).$$

A bad ruler will be indifferent between appointing a competent or an incompetent subordinate if and only if

$$E + \Psi + \delta^2\Big(\tilde{\pi}^* - \frac{\pi}{N_C}\Big)(E + \bar{r}) = E + r_1 + \delta^2 G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r})$$

which is equivalent to

$$r^* = \Psi + \delta^2\left(\Big(\tilde{\pi}^* - \frac{\pi}{N_C}\Big) + G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)\right)\Big(E + \bar{r}\Big).$$

This equilibrium exists if and only if $\tilde{\pi}^*$ exists and is unique. To show that, let's define

$$h(x) = x\left(\pi + (1-\pi)F\Big(\Psi + \delta^2(E + \bar{r})\Big(x - \frac{\pi}{N_C}\Big) - \delta^2(E + \bar{r})G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)\Big)\right) - \pi$$

on the interval $[\pi, 1]$.

Given that $\gamma < \gamma^*$, $h(1) > 0$. $h(\pi) < 0$ if and only if:

$$\Big(\pi - \frac{\pi}{N_C}\Big) - G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big) < \frac{R - \Psi}{\delta^2(E + \bar{r})} \tag{17}$$

This is equivalent to

$$G(\gamma) > q'$$

where $q' = \dfrac{\pi - \frac{\pi}{N_C}}{1 - \frac{1-\pi}{N_I}} - \dfrac{R - \Psi}{\delta^2(1 - \frac{1-\pi}{N_I})(E + \bar{r})} = q - \dfrac{\delta^2(1-\pi)(E + \bar{r}) + R - \Psi}{\delta^2(1 - \frac{1-\pi}{N_I})(E + \bar{r})}$.

If $G(1) = 1 < q'$, the last inequality is never true. That is there is no $\gamma \in (0, 1)$ that satisfies (17). Thus $\gamma^{**} = 1$. If $G(0) > q'$, then all $\gamma \in (0, 1)$ satisfy (17). Thus $\gamma^{**} = 0$. If $G(0) < q' < 1$, then using the same analysis as previously, (17) is satisfied if and only if $\gamma > \gamma^{**}$

$$\gamma^{**} = \begin{cases} 1 & \text{if } 1 < q' \\ 1 - \sqrt{\dfrac{\bar{\kappa}N'}{\delta^2\pi}} & \text{if } G(0) < q' < 1 \\ 0 & \text{if } q' < G(0) \end{cases} \tag{18}$$

$N' = \dfrac{\sqrt{8q' + 1} - (4\widetilde{N}' - 1)}{8q'\tilde{N}_I}$.

h is strictly increasing on $[\pi, 1]$ with $h(\pi) < 0$ and under (17), $h(1) > 0$. Therefore, $\tilde{\pi}^*$ exists and is unique if and only if $\gamma^{**} < \gamma < \gamma^*$. This concludes the proof for the semi-separating equilibrium. ■

Proof of proposition 3: the Pooling Equilibrium

If $\gamma \in [0, \gamma^{**}]$, the following strategy profile and beliefs constitute a PBNE.

i) $i_1^{*G}(0) = 1$ and $a_1^{*G}(0) = C$

ii) $i_1^{*B}(r_1) = 1$ and $a_1^{*B}(r_1) = C \; \forall r_1$

iii) $e_I^* = g(\gamma)\delta\Big(1 - \dfrac{1-\pi}{N_I}\Big)$; $e_C^* = \delta\Big(\pi - \dfrac{\pi}{N_C}\Big)$

iv) $p^* = 1$ iff $y = 0$ and $\kappa \leq \kappa^*$

v) $\tilde{\pi}_C = \pi$; $\tilde{\pi}_I = 0$

Proof. Given the rulers' strategies, the citizen and the appointed competent subordinate cannot update their beliefs about the incumbent's type in the first period. Posterior beliefs equal prior beliefs: that is $\tilde{\pi}_C = \pi$. The appointed competent subordinate chooses $e_C(\tilde{\pi}_C = \pi)$ according to (7). Off the equilibrium-path beliefs are $\tilde{\pi}_I = 0$ since only bad rulers can appoint an incompetent subordinate. The incompetent subordinate chooses $e_I(\tilde{\pi}_I = 0)$ according to (11).

If a bad ruler with first-period rent r_1 appoints a competent subordinate, her continuation payoff is

$$E + \Psi + \delta^2\Big(\pi - \frac{\pi}{N_C}\Big)(E + \bar{r})$$

If she appoints an incompetent subordinate, her continuation payoff is

$$E + r_1 + \delta^2 G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r}).$$

Given that we assumed $\gamma < \gamma^{**}$, a bad ruler with the highest first-period rent R will appoint a competent subordinate in the first period. In fact, $\gamma < \gamma^{**}$ implies that (17) is not satisfied. That is

$$E + \Psi + \delta^2\Big(\pi - \frac{\pi}{N_C}\Big)(E + \bar{r}) > E + R + \delta^2 G(\gamma)\Big(1 - \frac{1-\pi}{N_I}\Big)(E + \bar{r})$$

Therefore, a bad ruler will always hire a competent subordinate in the first period. That is $i_1^{*B}(r_1) = 1$ and $a_1^{*B}(r_1) = C \quad \forall r_1$. ■

Comparative Statics

$$\frac{\partial \gamma*}{\partial N_C} = \frac{\partial \gamma*}{\partial N}\frac{\partial N}{\partial N_C} = \frac{1}{2}\sqrt{\frac{\bar{\kappa}}{\delta^2 \pi N}}\Big(\frac{1-\frac{1}{\sqrt{8q+1}}}{2\tilde{N}_C} + \frac{N}{q}\Big)\Big(\frac{\pi}{N_C^2 \tilde{N}_I}\Big) > 0$$

$$\frac{\partial \gamma*}{\partial N_I} = \frac{\partial \gamma*}{\partial N}\frac{\partial N}{\partial q}\frac{\partial q}{\partial N_I} = -\frac{1}{2}\sqrt{\frac{\bar{\kappa}}{\delta^2 \pi N}}\Big(\frac{1-\frac{1}{\sqrt{8\tilde{N}+1}}}{2\tilde{N}_C \tilde{N}_I}\Big)\Big(\frac{(1-\pi)q}{N_I^2}\Big) < 0$$

$$\frac{\partial \gamma*}{\partial \pi} = -\frac{1}{2}\sqrt{\frac{\bar{\kappa}\pi}{\delta^2 N}}\left(\pi\Big(1-\frac{1}{\sqrt{8\tilde{N}+1}}\Big)\frac{N_C+N_I-1}{2N_I\tilde{N}_I^2} - N\big(N_C-2\pi\big)\right)\Big(\frac{1}{\tilde{N}_C N_C \pi^2}\Big) < 0$$

$$\frac{\partial \gamma*}{\partial \bar{\kappa}} = -\frac{1}{2}\sqrt{\frac{N}{\delta^2 \pi \bar{\kappa}}} < 0$$

Robustness and Extensions

Different efficiency level for subordinates

In this section, I assume that the per-period payoff of an employed competent subordinate is $1 - \frac{1}{2\mu}e^2$. Equation (7) becomes

$$e_C(\tilde{\pi}_C) = \delta\mu\Big(\tilde{\pi}_C - \frac{\pi}{N_C}\Big). \tag{19}$$

Of course, we must add constraints on μ to satisfy $e_C \in [0,1]$. In this case,

$$\gamma_\mu^* = \begin{cases} 1 & \text{if } \ 1 < q_\mu \\ 1 - \sqrt{\dfrac{\bar{\kappa}N_\mu}{\delta^2\pi}} & \text{if } \ G(0) < q_\mu < 1 \\ 0 & \text{if } \ q_\mu < G(0) \end{cases} \tag{20}$$

where $q_\mu = \mu q$.

$$\gamma_\mu^{**} = \begin{cases} 1 & \text{if } \ 1 < q'_\mu \\ 1 - \sqrt{\dfrac{\bar{\kappa}N_\mu}{\delta^2\pi}} & \text{if } \ G(0) < q'_\mu < 1 \\ 0 & \text{if } \ q'_\mu < G(0) \end{cases} \tag{21}$$

where $q'_\mu = q_\mu - \dfrac{\mu(R-\Psi) + \delta^2(1-\pi)(E+\bar{r})}{\delta^2\mu(E+\bar{r})N_I}$

The shadow of purges

In this section, I assume that if a regime does not survive into the second period, the ruler's successor will purge the existing bureaucrat with probability σ. In this case, we can show that, when appointed, a competent and an incompetent subordinate will choose respectively:

$$\begin{cases} e_C^{*p} = \delta\Big(\tilde{\pi}_C - \dfrac{(1-\sigma)\pi}{N_C}\Big) \\ \\ e_I^{*p} = \delta g_p(\gamma)\Big(1 - \dfrac{(1-\sigma)(1-\pi)}{N_I}\Big) \end{cases} \tag{22}$$

Using the same logic as in the baseline model, it is easy to show that

$$\gamma_\sigma^* = \begin{cases} 1 & \text{if } \ 1 < q_\sigma \\ 1 - \sqrt{\dfrac{\bar{\kappa} N_\sigma}{\delta^2 \pi}} & \text{if } \ G_\sigma(0) < q_\sigma < 1 \\ 0 & \text{if } \ q_\sigma < G_\sigma(0) \end{cases} \tag{23}$$

where $q_\sigma = \dfrac{1 - \frac{(1-\sigma)\pi}{N_C}}{1 - \frac{(1-\sigma)(1-\pi)}{N_I}}$, $N_\sigma = \dfrac{\sqrt{8q_\sigma + 1} - (4q_\sigma - 1)}{8q_\sigma \tilde{N}_I}$. We have $\dfrac{\partial \gamma_\sigma^*}{\partial \sigma} < 0$ iff $q_\sigma < 1$.

The Shadow of Democratization

In this section, I assume that when a regime collapses, it transitions to democracy with probability θ. I also assume that democracies better select good rulers than autocracies. For simplicity, I assume that when a regime transitions to democracy, it selects a good ruler with probability 1. The likelihood of protests when $y = 0$. In fact, it is easy to show that

$$p^*(y) = \begin{cases} 1 & \text{if y = 0 \& } \kappa < \delta(1-\gamma)\Big(\theta + (1-\theta)\pi\Big)e_I^* \\ 0 & \text{else.} \end{cases} \tag{24}$$

Therefore, the probability that the citizen protests is $\dfrac{\delta(1-\gamma)}{\bar{\kappa}}\Big(\theta + (1-\theta)\pi\Big)e_I^*$. Using the same analysis as in the baseline model, it is easy to show that

$$\begin{cases} e_C^{*d} = \delta\Big(\tilde{\pi}_C - \dfrac{\theta + (1-\theta)\pi}{N_C}\Big) \\ \\ e_I^{*d} = \delta g_d(\gamma)\Big(1 - \dfrac{(1-\theta)(1-\pi)}{N_I}\Big) \end{cases} \tag{25}$$

The probability of survival when a bad ruler employs an incompetent subordinate is:

$$\Big(1-\frac{\delta(\theta+(1-\theta)\pi)}{\bar{\kappa}}(1-\gamma)e_I^*\Big)e_I^*=\frac{1+\frac{\delta^2(\theta+(1-\theta)\pi}{\bar{\kappa}}(1-\gamma)^2\widetilde{N}_I^d}{\Big(1+\frac{2\delta^2(\theta+(1-\theta)\pi)}{\bar{\kappa}}(1-\gamma)^2\widetilde{N}_I^d\Big)^2}\delta\widetilde{N}_I^\theta=G_d(\gamma)\,\delta\widetilde{N}_I^\theta$$

where $\widetilde{N}_I^\theta=1-\dfrac{(1-\theta)(1-\pi)}{N_I}$.

Using the same method as the baseline model, there exists γ_θ^* and γ_θ^{**} defined by:

$$\gamma_\theta^*=\begin{cases}1 & \text{if } 1<q_\theta\\ 1-\sqrt{\dfrac{\bar{\kappa}N_\theta}{\delta^2(\pi+(1-\pi)\theta)}} & \text{if } G_\theta(0)<q_\theta<1\\ 0 & \text{if } q_\theta<G_\theta(0)\end{cases}\tag{26}$$

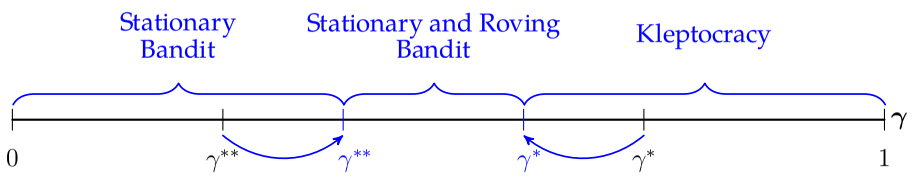
$$\gamma_\theta^{**}=\begin{cases}1 & \text{if } 1<q'_\theta\\ 1-\sqrt{\dfrac{\bar{\kappa}N_\theta}{\delta^2(\pi+(1-\pi)\theta)}} & \text{if } G_\theta(0)<q'_\theta<1\\ 0 & \text{if } q'_\theta<G_\theta(0)\end{cases}\tag{27}$$

$q_\theta=\dfrac{1-\frac{\theta+(1-\theta)\pi}{N_C}}{1-\frac{(1-\pi)(1-\theta)}{N_I}}=\dfrac{\widetilde{N}_C^\theta}{\widetilde{N}_I^\theta}$; $N_\theta=\dfrac{\sqrt{8q_\theta+1}-(4q_\theta-1)}{8q_\theta\tilde{N}_I^\theta}$; $q'_\theta=q_\theta-\dfrac{(R-\Psi)+\delta^2(1-\pi)(E+\bar{r})}{\delta^2(E+\bar{r})\widetilde{N}_I^\theta}$.

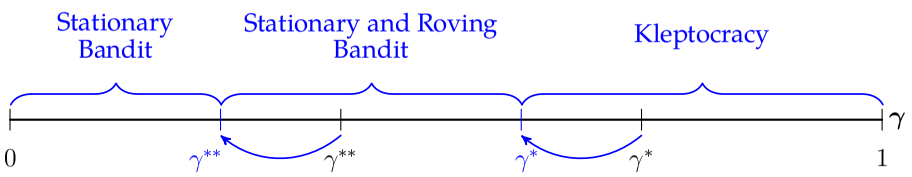
We have the following results:

$$\frac{\partial\gamma_\theta^*}{\partial\theta}=-\frac{1}{2\pi_\theta^2}\sqrt{\frac{\bar{\kappa}\pi_\theta}{\delta^2N_\theta}}\left(\pi_\theta\Big(1-\frac{1}{\sqrt{8q_\theta+1}}\Big)\Big(\frac{\tilde{N}_\theta\frac{1-\pi}{N_C}+\tilde{N}_C^\theta\tilde{N}_I}{2\tilde{N}_C^\theta\tilde{N}_I^\theta}\Big)-\frac{(1-\pi)N_\theta}{\tilde{N}_C^\theta}\right).\tag{28}$$

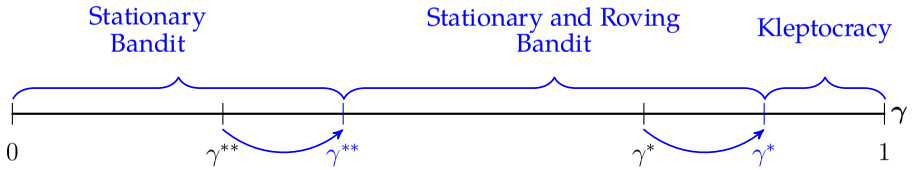
where $\pi_\theta=\pi+\theta(1-\pi)$.



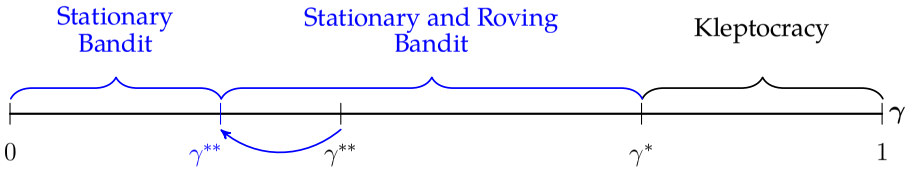
(a) π increases



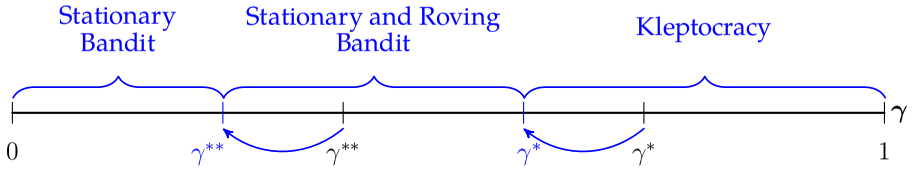
(b) N_I increases



(c) N_C increases



(d) R increases



(e) $\bar{\kappa}$ increases

Figure 7: Comparative statics with respect to π, N_C, N_I, R and $\bar{\kappa}$.