Loyalty Signaling, Bureaucratic Compliance, and Variation of State Repression in Authoritarian Regimes

Appendix II: Formal Model

Model Intuition

I present a stylistic formal model to theorize the role of repressive campaigns in shaping the principal-agent relationship between the ruler and subordinate bureaucrats. My model aims to answer two interrelated questions not sufficiently addressed in previous research. First, how does *participation in repressive campaigns* against alleged power contenders impact a subordinate agent's behaviors and attitudes toward the incumbent autocrat? In other words, if tasked with implementing a repressive campaign, would the subordinate be more inclined to stay with the ruler despite potential incentives to defect? Second, *when* and *why* would a ruler choose to launch a repressive campaign to ensure the loyalty and compliance of their subordinates, and what is the underlying reason for this decision?

For the first question, the intuition offered by my model is that repressive campaigns can decrease a subordinate's incentive for non-compliance by *intentionally creating uncertainty about the level of threat facing the regime and the ruler's vulnerability*. If a political opponent challenges the ruler, the subordinate may interpret this as a clear sign of the adversary's confidence and potential to defeat the ruler. This perception may encourage the subordinate to act opportunistically and refuse to comply with the ruler's orders. However, if the autocrat mobilizes a repressive campaign preemptively *before* such a challenge occurs, the agent may remain uncertain about the adversary's strength and may be more likely to stay with the ruler as a precautionary measure. In other words, preemptive repression forces the agent to choose a side without complete information about the

adversary's strength and the level of threat, thus making them less likely to "hedge their bets" on the ruler's defeat.

When would an autocrat choose to launch a repressive campaign to induce the compliance of the subordinate? The second part of my theoretical model suggests that the ruler is more likely to do so when they anticipate their subordinate to be *less loyal*. While a preemptive repressive campaign can improve the ruler's chance of survival by inducing the agent's compliance in the event of a conflict, it can also be costly if the targeted adversary is actually weak and posed no *real* threat to the ruler — in which case a repression would be unnecessary. If the expected loyalty of the subordinate is high, the autocrat would trust them to come to the regime's defense in the face of a real challenge posed by the adversary, rather than launch a preemptive campaign to boost their compliance in advance. However, if the subordinate is perceived to lack loyalty and more likely to defect, the autocrat would choose to launch a repressive campaign because the expected benefit of increased compliance outweighs the cost of campaign implementation. Below, I present the mathematical details of this model.

Model Setup

Consider an authoritarian regime with an autocrat A, a subordinate S, and a potential adversary R. The adversary can be of two types, strong or weak, denoted by $t \in \{Strong, Weak\}$. During a power struggle with the autocrat, the weak adversary would never be able to overthrow the autocrat and thus pose no threat to the regime, while the strong adversary's chance of defeating the autocrat during conflict depends on the subordinate's response. All players share a common prior that the adversary is strong is δ. At the beginning of the game, the autocrat decides whether to order a repressive campaign against the adversary. If a repressive campaign is launched, the subordinate will choose a visible effort level of either high or low, i.e. $e \in \{e^H, e^L\}$. On the other hand, if the autocrat decides not to repress preemptively, the adversary decides whether to challenge the autocrat. If the adversary chooses not to challenge, the game ends and the autocrat remains in power. If the adversary chooses to challenge, a power struggle ensues, and the subordinate must

choose their effort level in aiding the autocrat. In both preemptive and defensive conflicts, the subordinate's action is observable to both the autocrat and the adversary.

The autocrat's chance of survival, as mentioned earlier, is a function of the adversary's strength and the subordinate's effort. If the adversary is weak, the autocrat survives with certainty, regardless of the subordinate's effort levels. However, if the adversary is strong, the autocrat's chances of survival when the subordinate makes high and low efforts are θ_H and θ_L. We assume the subordinate's effort always yield positive effects, implying $\theta_H > \theta_L$. From a real-world perspective, the parameter θ_L can be viewed as the autocrat's *personal strength*, which is the probability that they can resist the adversary's challenge *alone* without their subordinate's compliance. To summarize formally:

$$\begin{aligned} \text{Prob}(Survive = 1|\, t = Weak) &= 1 \\ \text{Prob}(Survive = 1|\, t = Strong, e = High) &= \theta_H \\ \text{Prob}(Survive = 1|\, t = Strong, e = Low) &= \theta_L \end{aligned} \tag{1}$$

The subordinate's net payoff, $b - c$, which represents their reward minus the cost of executing repression, depends on their observable actions, the autocrat's fate, and their private type. If the autocrat survives, the subordinate will receive a wage of $b_A > 0$ for making high effort and a wage of $b_0 = 0$ for making low effort or if no conflict occurs. However, if the adversary overthrows the autocrat and becomes the new ruler, the subordinate will receive a wage of $b_R > 0$ for making *low* effort and 0 for making high effort. In other words, the subordinate will be rewarded for their disobedience if the adversary comes to power. For simplicity, I treat the subordinate's payoff as an exogenous parameter rather than a choice variable decided by the principal. Because the model focuses on *how* and *when* the autocrat will use preemptive campaigns to incentivize the subordinate's compliance, treating the wage as another choice variable would unnecessarily complicate the story and distract from the main thesis of the model. Lastly, the cost of implementing repression is $c > 0$ if the subordinate makes high effort and 0 otherwise.

The subordinate has a private type, κ, which parameterizes their degree of loyalty to the auto-

crat. Following the conceptualization in canonical works such as Hirschman (1972), loyalty can be seen as the *cost of exit*: the greater the subordinate's loyalty, the more costly and difficult it would be for them to defect. In this model, we treat κ as the cost that the subordinate would bear if they defect to the adversary and are rewarded for their low effort in repression. In other words, if the subordinate has loyalty level κ, and they make low effort in repression resulting in the adversary overthrowing the autocrat, their net payoff would be $b_R - \kappa$. For simplicity, we assume that the subordinate's loyalty level is a random variable drawn from a uniform distribution with support $[0, \bar{\kappa}]$, where $\bar{\kappa}$ is the upper limit of the subordinate's loyalty. The autocrat knows the distribution, but not the specific value of κ for the subordinate. Thus, the ruler only has imperfect information about the subordinate's loyalty level, knowing only the range within which it falls.

Lastly, assume that staying in power produces a large positive utility $a > 1$ for both the autocrat and the adversary, which creates a strong incentive for them to struggle for power. Also assume that $a > \max\{b_A, b_R\} > 0$, which implies that once in power, their net gain after paying the subordinate is still positive. To sum up, the game proceeds in the following sequence:

1. *The autocrat chooses whether to launch a repressive campaign against the adversary.*

2a. *If a repressive campaign is launched, the subordinate chooses whether to make high or low effort to combat the adversary.*

2b. *If a repressive campaign is not launched, the adversary chooses whether to challenge the autocrat.*

   3i. *If the subordinate chooses not to challenge, no conflict will occur and the autocrat stays in power with certainty.*

   3ii. *If the subordinate chooses to challenge, a power struggle ensues, and the subordinate chooses whether to make high or low effort to combat the adversary.*

4. *The outcome of the autocrat's survival is realized, and the three players get their respective payoffs contingent on the outcome.*

The Subordinate's Problem

How does the subordinate determine which effort level e to choose in the event of a confrontation between the autocrat and the adversary? First, suppose the autocrat chooses not to repress the

adversary in the first place, and the adversary subsequently decides to challenge the autocrat. In this scenario, the subordinate can deduce that the challenger must be the *Strong* type, as the *Weak* type would not have any chance of winning the struggle and would never initiate a challenge. Hence, the subordinate's expected payoff would be $\theta_H b_A - c$ if they make high effort and $(1-\theta_L)(b_R - \kappa)$ if they make low effort. That is, they will exert high effort only if $\theta_H b_A - c \geq (1-\theta_L)(b_R - \kappa)$, or:

$$\kappa \geq b_R - \frac{\theta_H b_A - c}{1 - \theta_L} \tag{2}$$

In other words, in the event of a challenge from the adversary, the subordinate would only have the incentive to make high effort if their private loyalty level κ passes a certain **defensive threshold**, $\kappa_D \equiv b_R - \frac{\theta_H b_A - c}{1-\theta_L}$.

Similarly, under what circumstances would the subordinate choose to exert high effort when the autocrat orders a preemptive repression against the adversary? In contrast to the previous scenario where the adversary can *reveal* its type by choosing whether to challenge, the subordinate has no means to update their belief about the adversary's type in this case. If the subordinate chooses high effort, their expected payoff would be $\theta_H b_A - c$ if facing a strong adversary (with prior belief δ) and $b_A - c$ if facing a weak one. Accordingly, if the subordinate chooses low effort, the expected payoffs when facing strong and weak adversaries are $(1-\theta_L)(b_R - \kappa)$ and 0 respectively. Therefore, the subordinate's task is to solve the inequality $\delta\theta_H b_A + (1-\delta)b_A - c > \delta(1-\theta_L)(b_R - \kappa)$, which can be rearranged in terms of κ as follows:

$$\kappa \geq b_R - \frac{\delta\theta_H b_A + (1-\delta)b_A - c}{\delta(1-\theta_L)} \tag{3}$$

The threshold $\kappa_P \equiv b_R - \frac{\delta\theta_H b_A + (1-\delta)b_A - c}{\delta(1-\theta_L)}$, which I refer to as the **preemptive threshold** thereafter, is the minimum loyalty level κ required for the subordinate to exert high effort during preemptive repressive campaigns by the autocrat.

A comparison of the two thresholds, κ_D and κ_P, leads to several interesting observations.

First, it is always true that $\kappa_P < \kappa_D$, meaning that the loyalty threshold required for agents to make high effort during preemptive repression is *always lower* than the threshold needed for them to make high effort in defending the autocrat from the adversary's challenge. In other words, less loyal types of agents with a lower κ could be incentivized to make high effort against the adversary during repressive campaigns, even if they would have the incentive to disobey otherwise. The greater compliance of less loyal agents in preemptive repressive campaigns is due to their uncertainty about the adversary's strength (and the autocrat's vulnerability). The adversary's move to challenge the ruler reveals their type as strong and motivates less loyal agents to bet against the autocrat's chance of sustaining power. However, in the case of preemptive repressive campaigns, where the adversary has no chance to reveal its type before conflict, less loyal agents must consider the possibility that *the adversary may be weak and unwinnable*, therefore, more likely to comply with the ruler's directives. The following lemma summarizes the discussion:

Lemma 1 *There exist two thresholds for an agent's loyalty level κ, namely $\kappa_D := b_R - \frac{\theta_H b_A - c}{1-\theta_L}$ and $\kappa_P := b_R - \frac{\delta\theta_H b_A + (1-\delta)b_A - c}{\delta(1-\theta_L)}$, such that:*

1. *In the event that the adversary challenges the autocrat, agents will make high effort if their loyalty level $\kappa \geq \kappa_D$, and will make low effort otherwise.*

2. *In the event that the autocrat launches preemptive repression against the adversary, agents will make high effort if their loyalty level $\kappa \geq \kappa_P$, and will make low effort otherwise.*

With all parameters held equal, it always holds that $\kappa_P < \kappa_D$.

How *effective* is preemptive repression in inducing the subordinate's compliance? This question can be answered by observing the difference between two thresholds κ_D and κ_P. The difference of the two thresholds, $\kappa_D - \kappa_P = \frac{(1-\delta)(b_A - c)}{\delta(1-\theta_L)}$, indicates the degree to which a repressive campaign can motivate less loyal subordinates to comply. Clearly, the width of this gap *decreases* as the probability of the adversary being strong δ increases, and *increases* with the autocrat's committed salary b_A and strength θ_L. These results make intuitive sense in the real world: repressive

campaigns is more effective in inducing the agent's compliance if (1) the adversary is more likely to be weak and non-threatening;[1] (2) the agent's expected reward for compliance is greater; and (3) the ruler's personal strength relative to the adversary is stronger.

The Autocrat's Problem

Before we proceed to a discussion on the autocrat's problem, it is useful to examine the relationship between the two loyalty thresholds, κ_D and κ_P, and the upper limit of the agent's loyalty, $\bar{\kappa}$. As the agent's loyalty level κ is private information, how can the autocrat predict the potential behavior of agents with only knowledge of $\bar{\kappa}$? Apparently, if $\bar{\kappa} < \kappa_P$, the agent's loyalty level is certainly below both thresholds, and they would not make high effort in either scenario. In this case, the autocrat can expect the agent to be *unresponsive* and *unmobilizable* – they have neither the incentive to defend against an adversary challenge nor the motivation to comply with the ruler's order when called upon for a repressive campaign. If $\kappa_P \leq \bar{\kappa} < \kappa_D$, the agent's loyalty level κ is certainly below κ_D, while their value relative to κ_P can be larger or smaller. The subordinate would not make high effort in resisting the challenge from the adversary, but they may *potentially* comply during a repressive campaign if their private loyalty level κ is greater than κ_P. From the autocrat's perspective, such an agent is *unresponsive* but possibly *mobilizable*. Lastly, if $\bar{\kappa} \geq \kappa_D$, it is possible that the agent will make high effort *both* during a challenge by the adversary *and* during preemptive repression launched by the ruler. Accordingly, we refer to such an agent as both *responsive* and *mobilizable*. We illustrate this three-way classification in the following graph:

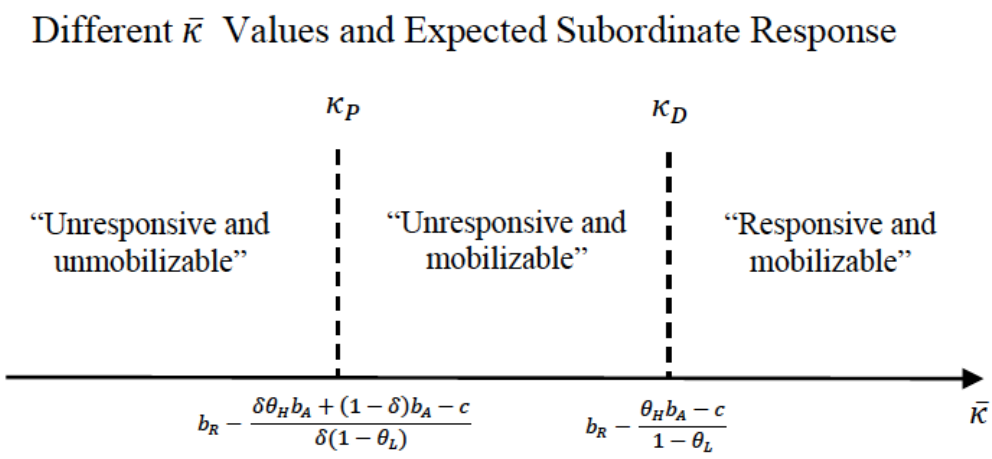

Figure 1: The subordinate's possible responses at different levels of $\bar{\kappa}$ from the autocrat's perspective. If $\bar{\kappa} < \kappa_P$, the agent will always make low effort both during an adversary challenge and a repressive campaign. If $\kappa_P \leq \bar{\kappa} < \kappa_D$, the agent will always make low effort during a adversary challenge and possibly make high effort during preemptive repression. If $\bar{\kappa} \geq \kappa_D$, high effort during the adversary's challenge and preemptive repression are both possible.

a. Unresponsive and Unmobilizable Agent

Let us start with the case where $\bar{\kappa} < \kappa_P$. In this scenario, the agent is not expected to exert high effort in response to either an attack from the adversary ("unresponsive") or during preemptive repression ("unmobilizable"). The autocrat's probability of survival, regardless of their decision to repress preemptively or not, is always $\delta\theta_L + (1-\delta)$: the probability of facing a strong adversary and winning the power struggle, plus the probability of facing a weak adversary (which the ruler always wins against). Since the ruler's gain from survival is a, and the payout to a non-compliant subordinate is 0, the expected payoff for both options is $[\delta\theta_L + (1-\delta)]a$. Therefore, in equilibrium, the ruler is indifferent between ordering a repressive campaign and waiting to counter a challenge from the adversary later. The Perfect Bayesian Equilibrium (PBE) in this case is simply:

Lemma 2 *(Equilibrium with unresponsive and unmobilizable agent).*
If the upper limit of the subordinate's loyalty level, $\bar{\kappa}$, is lower than the preemptive threshold κ_P, the autocrat is always indifferent between preemptive repression and waiting, and the subordinate will always choose to make low effort.

Intuitively, if the autocrat knows that the agent is too disloyal and cannot be motivated to com-

bat the adversary in any case, they would have no incentive to launch a preemptive repressive campaign in the first place.

b. Unresponsive but Mobilizable Agent

We now consider the case where $\kappa_P \leq \bar{\kappa} < \kappa_D$, meaning that the subordinate is expected to make low effort when the autocrat is challenged by the adversary ("unresponsive"), but they could possibly make high effort during a repressive campaign if their private loyalty level κ happens to be greater than κ_P ("mobilizable"). In this case, when would the autocrat use a preemptive repressive campaign to mobilize an otherwise unresponsive subordinate? Given that the subordinate's private type κ is drawn uniformly from the interval $[0, \bar{\kappa}]$, they are expected to make low effort with probability $\frac{\kappa_P}{\bar{\kappa}}$ and high effort with probability $1 - \frac{\kappa_P}{\bar{\kappa}}$ if the autocrat chooses to repress preemptively. Thus, the autocrat's expected payoff from preemptive repression is

$$\frac{\kappa_P}{\bar{\kappa}} \underbrace{[\delta\theta_L + (1-\delta)]a}_{\substack{\text{expected payoff with} \\ \text{a low-effort agent}}} + (1 - \frac{\kappa_P}{\bar{\kappa}}) \underbrace{[\delta\theta_H + (1-\delta)](a - b_A)}_{\substack{\text{expected payoff with} \\ \text{a high-effort agent}}} \tag{4}$$

Alternatively, if the autocrat chooses not to repress preemptively, there is a $(1-\delta)$ chance that the adversary will not challenge, and a $\delta\theta_L$ chance that the autocrat will encounter a challenge from the adversary and survive. In this case, the ruler's expected payoff is $[\delta\theta_L + (1-\delta)]a$. Put together, the ruler's problem is to solve the inequality

$$\frac{\kappa_P}{\bar{\kappa}}[\delta\theta_L + (1-\delta)]a + (1 - \frac{\kappa_P}{\bar{\kappa}})[\delta\theta_H + (1-\delta)](a - b_A) > [\delta\theta_L + (1-\delta)]a \tag{5}$$

As shown in the algebra, the ruler's decision whether to order a repressive campaign depends on the tradeoff between the expected increase in survival probability due to a highly-motivated subordinate (i.e., the difference between θ_H and θ_L) and the cost of rewarding the subordinate b_A. If the benefit of motivating the subordinate to make high effort exceeds the cost needed to reward them, the ruler would choose to repress preemptively. Solving the inequality with respect to the ruler's personal strength θ_L, we can obtain the condition for the autocrat to launch a preemptive

campaign in this scenario:

$$\theta_L < \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a} \tag{6}$$

The inequality (2.6) captures the autocrat's decision-making process in launching a repressive campaign. Specifically, it is easy to see that the value of $\frac{[\delta\theta_H+(1-\delta)]b_A}{\delta a}$ increases with both θ_H and δ, but decreases with b_A. This suggests that when facing an unresponsive but potentially mobilizable subordinate, the autocrat is more likely to choose preemptive repression if (1) the subordinate's high effort significantly increases the ruler's chance of survival, (2) the adversary is more likely to be strong, and (3) the cost of rewarding the subordinate is lower. The following lemma summarizes the equilibrium in this scenario:

Lemma 3 *(Equilibrium with unresponsive but mobilizable agent).*
If the upper limit of the subordinate's loyalty level $\bar{\kappa}$ falls between the preemptive and defensive thresholds, i.e. $\kappa_P \leq \bar{\kappa} < \kappa_D$, the autocrat will choose to launch preemptive repression if and only if $\theta_L < \theta_H - \frac{[\delta\theta_H+(1-\delta)]b_A}{\delta a}$ and will wait otherwise. During a repressive campaign, the subordinate will make high effort only if $\kappa \geq \kappa_P$ and will make low effort otherwise. During a challenge launched by the adversary, the subordinate will always make low effort.

c. Responsive and Mobilizable Agent

Now we turn to the main case in this study: what strategy will the autocrat choose when the agent's highest possible loyalty type $\bar{\kappa}$ exceeds both thresholds, i.e. $\bar{\kappa} \geq \kappa_D$? It is reasonable to assume that most real-world regimes fall within this category, since a rational autocrat would not recruit a subordinate unless they had some expectation that the latter would make high effort both during a challenge by the adversary and during a preemptive repressive campaign. In the case of a preemptive repression, the autocrat's expected payoff remains the same as in Expression (2.4) from the previous case. However, if the ruler chooses not to repress, their expected payoff is:

$$(1-\delta)a + \delta[\frac{\kappa_D}{\bar{\kappa}}a\theta_L + (1-\frac{\kappa_D}{\bar{\kappa}})(a-b_A)\theta_H], \tag{7}$$

where the first item indicates the ruler's payoff if the adversary does not challenge, and the second term represents the ruler's expected payoff in the event of a challenge by the adversary, where the subordinate makes high effort with probability $(1 - \frac{\kappa_D}{\bar{\kappa}})$ and low effort with probability $\frac{\kappa_D}{\bar{\kappa}}$. To sum, the autocrat would launch a preemptive repression campaign if and only if the inequality (2.4) > (2.7) holds, or:

$$\underbrace{\frac{\kappa_P}{\bar{\kappa}}[\delta\theta_L + (1-\delta)]a + (1 - \frac{\kappa_P}{\bar{\kappa}})[\delta\theta_H + (1-\delta)](a - b_A)}_{\text{Expected payoff for launching repressive campaign}} > \underbrace{(1-\delta)a + \delta[\frac{\kappa_D}{\bar{\kappa}}a\theta_L + (1 - \frac{\kappa_D}{\bar{\kappa}})(a - b_A)\theta_H]}_{\text{Expected payoff for waiting the adversary to challenge}} \tag{8}$$

Solving this inequality with respect to $\bar{\kappa}$, we get:

$$\bar{\kappa} < \kappa_P + (\kappa_D - \kappa_P)\frac{\delta[a(\theta_H - \theta_L) - \theta_H b_A]}{(1-\delta)b_A} \tag{9}$$

Equation (2.9) describes the autocrat's equilibrium strategy when the subordinate's maximum possible loyalty exceeds the defensive threshold, i.e. $\bar{\kappa} > \kappa_D$. By examining this equation, it is clear that a necessary condition for the autocrat to choose preemptive repression is $\frac{\delta[a(\theta_H - \theta_L) - \theta_H b_A]}{(1-\delta)b_A} > 1$. This condition must be met to ensure that the right-hand side of the inequality, $\kappa_P + (\kappa_D - \kappa_P)\frac{\delta[a(\theta_H - \theta_L) - \theta_H b_A]}{(1-\delta)b_A}$, exceeds κ_D, which is the lowest possible $\bar{\kappa}$ for the subordinate in this scenario. Rewrite this inequality with respect to the ruler's personal strength θ_L, we obtain

$$\theta_L < \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a} \tag{10}$$

Note that this condition is exactly the same as expression (6) in the previous case, which implies that the increase in the autocrat's chance of survival due to agent compliance (i.e. the difference between θ_H and θ_L) must be sufficiently large for the autocrat to consider taking the costly action of launching a repressive campaign.

If the constraint above is satisfied, the autocrat would then decide whether to launch a repressive campaign based on the upper bound of the agent's loyalty level, $\bar{\kappa}$. That is, the autocrat will launch a repressive campaign only if the agent's greatest possible loyalty level $\bar{\kappa}$ is lower than the threshold

$\kappa_P + (\kappa_D - \kappa_P)\frac{\delta[a(\theta_H - \theta_L) - \theta_H b_A]}{(1-\delta)b_A}$ and will wait otherwise. In other words, the ruler tends to mobilize the agent with preemptive repression when they expect the agent to be of *less loyal* types. To sum up all three scenarios, we present the overall equilibrium of this game as follows:

Proposition 1 *(Bayesian Perfect Equilibrium of the Game).*

1. *When the agent's maximum loyalty level $\bar{\kappa} < \kappa_P$: the autocrat will be indifferent between preemptive repression and waiting, and the agent will always make low effort.*

2. *When the agent's maximum loyalty level $\kappa_P \leq \bar{\kappa} < \kappa_D$:*

   if $\theta_L \geq \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a}$, the autocrat will wait;

   if $\theta_L < \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a}$, the autocrat will launch a repressive campaign.

   During preemptive repression, the subordinate will make high effort only if $\kappa \geq \kappa_P$ and will make low effort otherwise; during a challenge launched by the adversary, the subordinate will always make low effort.

3. *When the agent's maximum loyalty level $\bar{\kappa} \geq \kappa_D$:*

   if $\theta_L \geq \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a}$, the autocrat will wait;

   if $\theta_L < \theta_H - \frac{[\delta\theta_H + (1-\delta)]b_A}{\delta a}$, there exists a threshold $\bar{\kappa}^* \equiv \kappa_P + (\kappa_D - \kappa_P)\frac{\delta[a(\theta_H - \theta_L) - \theta_H b_A]}{(1-\delta)b_A}$, such that the autocrat will launch a repressive campaign if $\bar{\kappa} < \bar{\kappa}^*$ and will wait if $\bar{\kappa} \geq \bar{\kappa}^*$.

   When being called upon for a repressive campaign, the subordinate will make high effort only if $\kappa \geq \kappa_P$ and will make low effort otherwise; during a challenge launched by the adversary, the subordinate will make high effort only if $\kappa \geq \kappa_D$ and will make low effort otherwise.

This proposition, illustrated in **Figure 2.2**, highlights the tradeoff between an agent's *compliance* and the *cost efficiency* of preemptive repression. While launching a repressive campaign

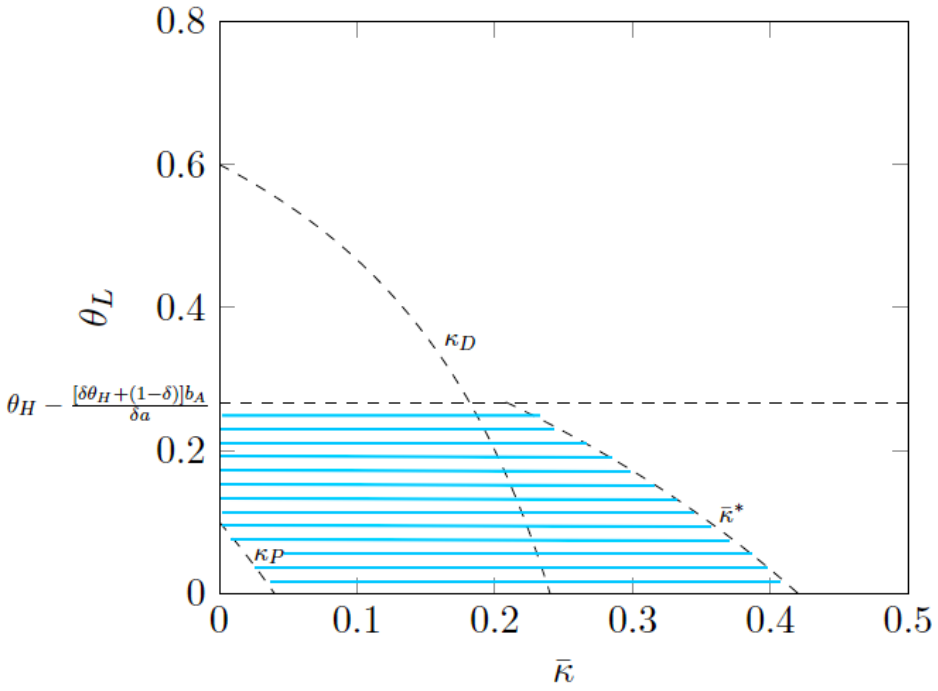

Figure 2: The graph visualizes the conditions required for the autocrat to launch preemptive repression against the adversary. The parameters δ, θ_H, a, b_A, and b_R are set to 0.5, 0.9, 1.2, 0.4, and 0.4 respectively. The three dashed curves (from left to right) indicate the subordinate's preemptive threshold κ_P, their defensive threshold κ_D, and the autocrat's repression threshold $\bar{\kappa}^*$. The shadowed area indicates the range where the autocrat has an incentive to launch preemptive repression. As shown in the graph, the autocrat would prefer preemptive repression when the subordinate's loyalty is sufficiently low (when $\bar{\kappa}$ is smaller) and the benefit of the agent's compliance on the autocrat's survival is sufficiently high (when θ_L relative to θ_H is smaller).

would increase the autocrat's chance of survival by making the subordinate more likely to make high effort, it would also guarantee that a conflict would occur regardless of the adversary's type. On the other hand, if the autocrat chooses to wait, only the strong-type adversary would challenge the ruler. Therefore, to launch a repressive campaign, the autocrat needs to consider the additional cost of unnecessarily combating the weak-type adversary who would otherwise never challenge the ruler. In other words, the autocrat's calculation is whether the expected benefit from the agent's greater compliance outweighs the extra payouts needed for repressive campaigns. As shown in the proposition, the expected benefit from agent compliance is determined by two factors: the *expected benefit from the agent's high effort* and the *perceived loyalty level* that determines an agent's likelihood to make high effort. For the former, if the agent's high effort would lead to a significantly

large increase in their chance of survival (indicated by a smaller θ_L relative to θ_H), a repressive campaign inducing the compliance of the agent would bring greater benefit to the ruler. For the latter, if the subordinate lacks loyalty and is perceived to be more likely to defect (indicated by a smaller $\bar{\kappa}$), the autocrat would be better off using repressive campaigns to induce them to make high effort. In contrast, if the expected loyalty of the subordinate is *already high*, the autocrat would rather trust them to come to the regime's defense when challenged by the adversary, rather than further investing in boosting their compliance.

My theory contributes to the literature in two ways. First, it offers new insights into how rulers can motivate and control their bureaucrats. Previous literature suggests that autocrats can retain their subordinates' allegiance by *sending* costly signals about their own strength. However, my study proposes that rulers can also induce agent compliance by *creating uncertainty* about their potential adversary' strength and the level threat facing the regime, thus reducing the subordinates' incentive to defect. Second, my theory provides a fresh perspective on the purpose and effect of authoritarian repression. Traditional literature assumes that repression serves to deter and eliminate *potential power contenders*. In contrast, my study examines the possibility that repression can be strategically employed by the ruler as a means of *incentivizing potentially non-compliant bureaucrats*. My theoretical framework therefore offers new insights into the principal-agent problem and bureaucratic management in authoritarian regimes like Mao's China.