# Costly Signaling in Autocracy

Robert J. Carroll* Amy Pond†

May 5, 2018

**Abstract**

Those who would revolt against an autocrat often face a dilemma: they would like to revolt if the ruler would respond with democratization, but they would prefer to concede if the ruler would choose instead to repress. Consequently, the autocrat must decide how to best signal his resolve in the hopes of deterring revolt. Using a simple signaling model, we find that rulers cannot meaningfully convey their type by transferring wealth to the citizenry; however, they *can* convey their type through escalation, where the resolved autocrat has a competitive advantage in escalation. The results illustrate a more general result in a broad class of signaling models: information transmission is only possible when the cost of the signal is smaller for the type that wants to distinguish himself.

*Department of Political Science, Florida State University. E-mail: rjcarroll@fsu.edu
†Department of Political Science, Texas A&M University. E-mail: apond@tamu.edu

No autocrat wants revolution. Suppressing revolution is expensive and bloody, but forgoing revolutions via democratization may be even worse. At best, the autocrat must share his rents following democratization. At worst, the autocrat, his family, and his supporters may be killed or exiled. Of course, not all autocrats are the same: some would prefer to supress the revolt rather than to give up and democratize. But, all would agree that the *status quo* beats anything that follows after citizens take up arms.

How, then, can autocrats deter revolution? The question is old, and most answers focus on striking a balance between cruelty and compassion. In opening his analysis of whether it is better to be loved than feared, Machiavelli (1961 [1561], Chapter XVII) argues that

> "...a prince must want to have a reputation for compassion rather than for cruelty; none the less, he must be careful that he does not make bad use of compassion. Cesare Borgia was accounted cruel; nevertheless, this cruelty of his reformed the Romagna, brought it unity, and restored order and obedience. On reflection, it will be seen that there was more compassion in Cesare than in the Florentine people, who, to escape being called cruel, allowed Pistoia to be devastated. So a prince must not worry if he incurs reproach for his cruelty so long as he keeps his subjects united and loyal."

Borgia's cruelty provided the foundation for a united, stable state. The opposition knew precisely how Borgia would respond to rebellion: immediate, unrelenting cruelty. Borgia's reputation thus eliminated opposition. By focusing on reputation, Machiavelli tasks the prince to think about the role public inference plays in determining how autocrats should act: the autocrat must assess how his actions signal his willingness to repress revolution to the citizenry.[1] Cruelty and compassion differ in a number of important ways, and these differences introduce a subtlety to the signaling process. In this article, we explore this subtlety to explain why autocrats differ in the amount of repression they employ. We argue that cruelty—modeled here as escalation—allows strong rulers to signal their type to citizens; conversely, compassion—modeled here as material transfers to the citizenry—does not. In selecting transfers then, rulers forego the ability to demonstrate their resolve.

[1] Though we follow Machiavelli's logic and focus on one-sided incomplete information, it should be noted that informational problems can be two-sided (Wintrobe, 1998). For example, the stronger an autocrat is, the less the citizenry is willing to say in political discourse, meaning the less the autocrat knows about the citizens' beliefs and preferences.

Due to variation in autocrats' costs to employ violence, escalation provides a richer signaling apparatus than do transfers. The autocrat's capacity to escalate is related to his ability to repress. Put differently, keeping some level of escalation fixed, strong autocrats pay lower costs than weak autocrats. The autocrat's capacity to provide transfers depends only on his access to resources and is independent of his ability to repress. Thus, escalation can signal strength, while transfers cannot. Transfers provide no information about the ruler's strength. Indeed, turning the point around introduces a subtle and underappreciated point: *transfers are not signs of weakness, as they are not signs of anything*.

Signaling through repression, then, comports quite well with the classic exposition of signaling games introduced by Spence (1973*a*). In the original model, would-be employees differ in the costs they pay for some educational attainment, whereas here autocrats differ in the costs they pay for some amount of escalation. In both applications the difference in marginal costs is the key in supporting *separation*: the revelation of different types through different equilibrium choices. Strong autocrats separate themselves from weak autocrats by striking different balances between cruelty and compassion, and identifying the conditions when strong autocrats can and will communicate their resolve is the primary contribution of the analysis presented here.

In taking on questions of autocratic decisionmaking, our work is related to an important and growing literature on preventing revolution. To prevent revolution, autocrats provide the smallest transfers necessary to make the opposition indifferent between revolting and conceding (Acemoglu and Robinson, 2001; Boix, 2003). Rent-sharing is critical, as ruling coalitions can be maintained with material transfers (Bueno de Mesquita et al., 2003; Gandhi, 2008). Gandhi (2008) deserves special consideration for relating rent-sharing back to the quality of institutions, though Taylor (2011) reminds us that repression relies on them too. The autocrat can also deter revolution by increasing the cost of revolution (Wintrobe, 1998). Our analysis holds the cost of revolution constant and instead explores how autocrats can signal their repressive abilities, contrasting the signaling capacity of transfers and escalation.

Our result complements that of Dal Bó and Powell (2009), who find that "spoils" cannot always deter domestic breakdown. Our treatment differs from theirs, however, in that we focus on the strength of rulers rather than on the size of economic spoils. The model is somewhat consistent with what Davenport (2007, 7) calls the Law of Coercive Responsiveness: "when challenges to the status quo take place, authorities generally employ some form of repressive action to counter or eliminate the behavioral threat." In our model, autocrats may

deter such challenges to the status quo, making repressive action unnecessary. We can support separating equilibria where strong autocrats escalate and weak autocrats do not. We can also support pooling equilibria where both strong and weak autocrats use transfers to prevent revolution. Our results do, however, rationalize Davenport's Punishment Puzzle—the fact that repression's effect on dissent is quite erratic (for results of varying kinds, see Hibbs, 1973; Francisco, 1996; Muller, 1985; Moore, 1998; Gurr and Moore, 1997). We would contend that this is because the literature has largely ignored the important signaling qualities of repression and transfer and focused instead on largely material or behavioral factors.

Although the model explicitly explores the sources of revolution in autocracy, the same logic extends to the international arena. Because conflict is costly, most aggressors would prefer that the other side lays down its arms and provides concessions. Thus, one of the central considerations in interstate war also stems from reputation and resolve (e.g., Wolford, 2007). In deciding whether to challenge the status quo, potential belligerents balance the cost of war with the likelihood that their adversaries will actually fight. The central result here provides insight into civil and international conflict: if transfers cannot signal resolve, while escalation can, rulers are likely to escalate conflicts when their credibility is questioned.

As Clausewitz (1832) observed, "The Conqueror is always a lover of peace: he would prefer to take over our country unopposed." Nevertheless, the Conqueror will use force to achieve his aims when force is needed. Moreover and reconsidering the advice of Machiavelli, the use of force in one arena may foster a reputation that subdues the opposition and makes the future use of force unnecessary.

Theoretically, our model bears some resemblance to those of Calvert (1987), Alt, Calvert and Humes (1988), and their synthesis by Banks (1991), which in turn are similar to the seminal model from Kreps and Wilson (1982). As our model is not explicitly about reputation and how interactions between two parties affect the beliefs on a third, our apparatus is far simpler. However, straightforward technical extensions along those lines would lead us to substantive territory similar to Weeks (2008).

Our paper also interfaces with an older literature on multidimensional signals. Not long after the initial breakthrough of signaling models (Spence, 1973*a*,*b*, 1974), theorists naturally turned their attention to interactions where signalers have multiple tools at their disposal. After all, when perusing a resume, an employer is bombarded not only with education levels and outcomes

but also with extracurricular activities, references, work study, and so on. The elegance of the initial unidimensional signaling model is appealing, and one would hope that its clean results would survive the dimensional generalization. However, Kohlleppel (1983) provides a two-dimensional extension where equilibrium fails to exist, which sent theorists back to the white board. Focusing first on multdimensional signaling in unidimensional type spaces, Milgrom and Roberts (1986) demonstrate that separation is supportable (thus also guaranteeing existence), and Wilson (1985) establishes that their remarkable result is obtainable in more general contexts. Other theorists (e.g. Quinzii and Rochet, 1985; Engers, 1987) have examined results under multidimensional type spaces, which goes beyond the scope of our application. However, to our knowledge, applications of multidimensional signaling models, even in the unidimensional type case, are relatively rare in political science.

The paper proceeds as follows. We first present a simple model exploring information transmission from an autocrat to the political opposition. We show that, in equilibrium, the autocrat cannot communicate his resolve using transfers, whereas information *can* be transmitted using escalation in equilibrium. We then extend the model to allow for plausible equilibrium selection to better assess the underlying welfare properties of the equilibria. We illustrate the theoretical insights using escalation in Saudi Arabia during the Arab Spring, showing that in times of greatest uncertainty, the Saudi government used escalation to signal resolve. We then conclude.

# 1 Analysis

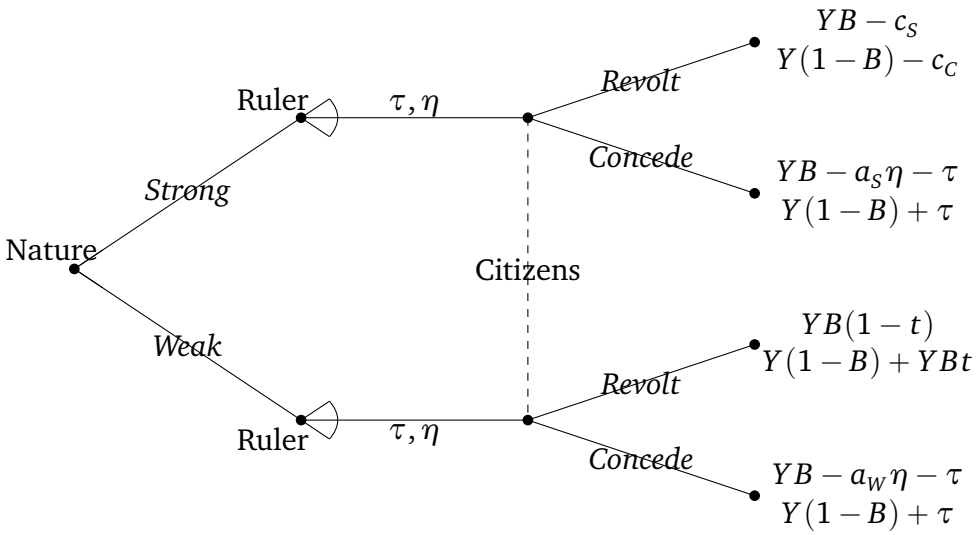
Here we outline and analyze a model of autocratic signaling and revolt.

## 1.1 The Game

As is standard in signaling games, there are two players: a Ruler and the Citizens. The Ruler has private information about his strength: the Ruler's type is denoted $\theta \in \{S, W\}$, where $S$ denotes a Strong Ruler and $W$ denotes a Weak Ruler. The game proceeds in four stages:

1. Nature determines the type of Ruler; he is Strong with probability $\alpha$ and Weak with probability $1 - \alpha$;

**Figure 1.** Sequence of Moves




2. The Ruler chooses a two-dimensional signal. The first dimension is a transfer, denoted $\tau \geqslant 0$,; the second is escalation, denoted $\eta \geqslant 0$. The signal, then, is $m = (\tau, \eta) \in \mathbb{R}^2_+$;

3. Upon observing the signal, the Citizens decide whether to concede or revolt. If the Citizens concede, then the game ends and payoffs are realized as specified below; and

4. If the Citizens revolt, then the Ruler decides whether to democratize or to repress. Regardless, the game ends and payoffs are realized as specified below.

The game is depicted in Figure 1.

There are three outcomes: one where the Citizens have conceded; one where the Citizens revolt and the Ruler democratizes; and a third where the Citizens revolt and the Ruler represses. We introduce payoffs for each in turn.

**Citizens concede**. Here the Ruler's payoff is $YB - a_\theta\eta - \tau$, where $Y > 0$ is the size of the economy; $B \in [0, 1]$ is the Ruler's share of the economy; $\eta$ is the level of escalation; and $\tau$ is the level of transfers. $a_\theta > 0$ is the marginal cost of escalation; it is assumed to be lower for Strong Rulers than for Weak Rulers, $a_W > a_S > 0$. This assumption is consistent with the idea that Strong Rulers are

better equipped to escalate conflict and repress the population—that is what makes them strong.

Conversely, we assume that the cost of the transfer is the same across ruler types. Transfers may be thought of as the cost of co-optation or the price of a monetary transfer, which does not depend on the ruler's type. The cost of a transfer will depend on the size of the transfer that is needed to prevent revolution. In the model here then, the cost of the transfer is determined endogenously and depends on the Citizens' cost to revolt, the chance that revolution is successful, and their returns following revolution. The Ruler could use transfers to deter revolution by making the Citizens indifferent between revolt and concede.[2] For Citizens, the payoff for concession is $Y(1-B)+\tau$, where $Y(1-B)$ is the Citizens' share of the economy and $\tau$ is the transfer from the Ruler.

**Citizens revolt and Ruler represses**. Here the Ruler's payoff is $YB - c_\theta$, where $c_\theta > 0$ is the cost of repression. We assume that the cost of repression is lower for the Strong Ruler, so $c_W > c_S > 0$. Escalation, parameterized as $\eta$, does not factor into the payoff, as it is subsumed into $c_\theta$. The Citizens' payoff for the repression outcome is $Y(1-B) - c_C$, where $c_C > 0$ is the Citizens' cost of being repressed. We assume that, if the Ruler represses, then he is able to recoup the transfer he had offered.

**Citizens revolt and Ruler democratizes**. Here the Ruler's payoff is $YB(1-t)$, where $t \in [0,1]$ is the tax rate selected under the new democratic government. The tax provides a transfer to the Citizens, whose payoff is now $Y(1-B)+YBt$.

These utility functions induce two possible mechanisms by which the Ruler can encourage the Citizen to concede. First, and more obviously, increases in transfers, $\tau$, directly increase the Citizen's payoff from conceding. If $\tau$ is sufficiently large, the now-sated Citizens will concede. Second, increases in escalation, $\eta$, do not directly affect the Citizens' utility. Because escalation is cheaper for the Strong Ruler, it will be shown later that escalation may provide information about the Ruler's resolve. Following a sufficient level of escalation, the Citizens know that the ruler is resolved, and they choose to concede. Thus, escalation indirectly affects the Citizens' decision. If escalation also had a direct effect on Citizen utility, it would only serve to reinforce the indirect effect of this

[2] It is plausible that the marginal cost of transfers is lower for the Weak Ruler. Perhaps he is better equipped to provide transfers; this would enable the Weak Ruler to signal its weakness, but no government would want to communicate that information (reinforcing the results below). In equilibrium, larger transfers are incentive compatible for the Weak Ruler, because the cost of revolution is higher for him. This behavior is derived from the model.

signal of resolve.[3] Here we emphasize the indirect effect, which we want to show is unique to escalation. Put differently, we want to examine this more subtle informational effect in isolation with respect to the more obvious direct effect, and so we have designed the model to identify the effect of each mechanism—transfers and escalation—independently.

We now make our key substantive assumption designed to capture the core incentives present in the strategic interaction. In particular, we assume that the Strong Ruler will always choose to repress, $YB - c_S \geqslant YB(1-t) \Rightarrow c_S \leqslant YBt$, and the Weak Ruler will always democratize, $YB - c_W \leqslant YB(1-t) \Rightarrow c_W \geqslant YBt$. Taken together, we have $c_S \leqslant YBt \leqslant c_W$. This implies that the Citizens prefer to concede to the Strong Ruler, since it leads to $Y(1-B) - c_C < Y(1-B) + \tau$, which obtains for any $\tau \in \mathbb{R}_+$.

We study perfect Bayesian equilibrium behavior where the Ruler employs only one kind of signal at a time. Independent consideration of each strategy is sufficient here, because the costs of the strategies are linear and independent of each other.[4] The leader will thus implement only the less costly strategy in equilibrium. We do so to examine how well Rulers can communicate their types with each kind of signal in isolation. There are thus two kinds of simple signaling; one where the Ruler uses transfers but does not use escalation ($\eta = 0$); and one where the ruler uses escalation but does not use transfers ($\tau = 0$). To assess the plausibility of communication under simple signaling, we assess whether a separating equilibrium is supportable for each kind of simple signal.

## 1.2 Signaling through Transfers

Our analysis of signaling via transfers yields the following result.

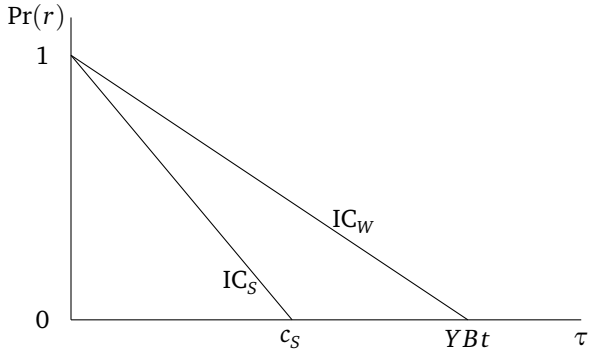
**Proposition 1:** *Rulers cannot communicate their type through transfers.*

(All proofs in the Appendix.) The intuition for the result is simple. The cost of repression is lower for the Strong Ruler than it is for the Weak Ruler. In fact, the Strong Ruler is willing to repress revolutions, precisely because his

[3] See for example Epstein and Zemsky (1995), where electoral war chests directly increase the probability of winning and indirectly signal fundraising ability.

[4] Recall the leader's utility function: $YB - a_\theta \eta - \tau$. The marginal cost of transfers is 1, which does not depend on escalation. The marginal cost of escalation is $a_\theta$, which does not depend on transfers. In equilibrium, the ruler will select the policy, transfers or escalation, that yields the smaller total cost. The decision is a bit more complex than just comparing the marginal cost, $1 \gtrless a_\theta$, because the size of the transfer and escalation needed to prevent revolution differ.

**Figure 2.** Indifference Curves for Strong and Weak Rulers using Transfers




Note: $\tau$ is the amount of transfers selected by the Ruler. $\Pr(r)$ is the probability of revolution given $\tau$. The indifference curves show the amount of transfers that each type would be willing to expend to reduce the probability of revolution from one to zero. Separation in equilibrium is impossible; separation would require transfers by the Strong Ruler such that $\tau_S \in [YBt, c_S]$, but we know by assumption that $c_S \leqslant YBt$, so any signal that is incentive compatible for the Strong Ruler would likewise be compatible for the Weak Ruler, making separation impossible.

cost of repression is small. The Weak Ruler is willing to expend more resources to prevent revolution, because his cost of repression is higher. Due to these differences in the cost of repression, the Weak Ruler will always be willing to spend more to prevent revolution than the Strong Ruler will, so any strategy that is incentive compatible for the Strong Ruler is likewise incentive compatible for the Weak Ruler. Because the Weak Ruler would also benefit from being perceived as a Strong Ruler—recall that the Citizens want to concede to a Strong Ruler—the Strong Ruler cannot distinguish himself using transfers.

Figure 2 displays the difference in the two types' willingness to pay to prevent revolution. Here we plot the probability of revolution as a function of the transfer across types. In short, the Weak Ruler is willing to spend more than the Strong Ruler to prevent revolution, so the Strong Ruler cannot use transfers to distinguish himself from the Weak Ruler.

Because the Ruler is unable to distinguish himself using transfers, the Citizens are unable to update their beliefs in a model with only transfers. Thus, any equilibrium would be pooling, and the Citizens' decision of whether to revolt is contingent on their prior belief about the type of the ruler, $\alpha$. More precisely, the Citizens' decision depends on which side of the following equation is larger.

The Citizen will revolt if:

$$\alpha\left[Y(1-B)-c_C\right]+(1-\alpha)\left[Y(1-B)+YBt\right]\geqslant Y(1-B)+\tau \Rightarrow \alpha \leqslant \frac{YBt-\tau}{c_C+YBt}.$$

Note that this latter expression can be rearranged to $Y \geqslant \frac{\alpha c_C+\tau}{(1-\alpha)Bt}$, implying that revolt is more likely when the economy is large. This result provides a micro foundation for modernization theory (e.g. Przeworski et al., 2000). Revolt is also more likely when the gains to Citizens in democracy are large ($t$) and the transfers to Citizens in autocracy are small ($\tau$).

This result is disappointing, because conflict is costly, and the inability of the Strong Ruler to distinguish himself leads to conflict under certain conditions ($\alpha$ sufficiently small and $\tau$ too large to be incentive compatible for both types, i.e., the equilibrium falls apart once the Weak Ruler is willing to provide the transfer and Strong Ruler is not; the Citizens would update and that would lead the Weak Ruler not to provide the transfer).

The result also lends some insight into the role of information in causing conflict. Rationalists generally use problems of information, indivisibility, and commitment to explain war (Fearon, 1995). Powell (2002) demonstrates that commitment is frequently the source of problems of information and indivisibility. Commitment is a severe problem in the civil war context, as combatants must disarm (Walter, 1997).

The model here shows that commitment is not the sole source of informational conflict within countries. Information transmission is not possible when the costs of signaling are equal or positively correlated with capacity across types. In the application here, symmetric costs undermine the ability of the Strong Ruler to differentiate himself, particularly when the Weak Ruler is willing to spend more to avoid revolution. Information transmission relies on the actors having a signaling apparatus available to them that is negatively correlated with the actors' types. Conflict origin is not just about commitment—it is also about the richness of the informational environment and the availability of adequate signaling methods.

## 1.3 Signaling through Escalation

We now consider signaling wherein the Ruler may employ escalation but cannot make transfers. The analysis relies on the least restrictive case, where escalation only affects the political opposition through information and does not have a direct effect on the opposition's ability to revolt. The direct effect would

only reinforce the communication effect; the autocrat could use escalation to demonstrate his resolve *and* to weaken the opposition.

**Proposition 2:** *Rulers can communicate their types through escalation.*

This is so because escalation is more costly for the Weak Ruler than for the Strong Ruler—who can expertly wield and display his military might. This difference in costs enables the Strong Ruler to implement a higher level of escalation than is incentive compatible for the Weak Ruler. Thus, after observing escalation, the Citizens update their beliefs and know exactly which type of leader they face.

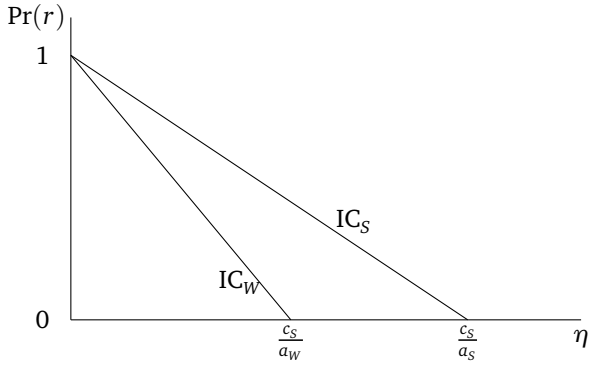
Figure 3 displays the result graphically. Unlike with transfers, escalation is cheaper for the Strong Ruler than it is for the Weak Ruler. Consequently, there is a continuum of values of escalation that the Strong Ruler is willing – and the Weak Ruler is unwilling – to implement. This is precisely the level of escalation that reveals information to the Citizenry. If sufficient escalation is observed, Citizens are able to update their prior information; they know that only a Strong Ruler would be willing to mete out that level of escalation.

In sum, it is only through escalation that the two types of rulers may distinguish themselves. And, although escalation—or Machiavellian cruelty—is costly, in equilibrium it makes full revolution unnecessary. The Strong Ruler is able to reveal his type, and in doing so the Weak Ruler is also revealed. In the former case, the Citizens avoid revolution by conceding. In the latter case, revolution is not necessary, as the Ruler democratizes. With only transfers available to the autocrat, this type of information revelation is impossible, and Citizens facing a Strong Ruler would—under certain conditions—revolt and intensive repression would follow.

# 2 Equilibrium Selection

Having established that the two signals at work contain different information, we turn our attention to what kind of equilibria one might expect in plausible settings. To do so, we introduce a move at the beginning of the game, after Nature selects the type of the Ruler but before the Ruler selects the level of escalation and transfers, where the Ruler states the equilibrium that he will play. The Ruler makes the declaration, because he has political power in autocracy and thus has a collective action advantage and also likely has control of state

**Figure 3.** Indifference Curves for Strong and Weak Rulers using Escalation




Note: $\eta$ is the amount of escalation selected by the ruler. $\Pr(r)$ is the probability of revolution given $\eta$. The indifference curves show the amount of escalation that each type would be willing to expend to reduce the probability of revolution from one to zero. Separation is possible in equilibrium here, as $\eta_S \in \left[\frac{c_S}{a_W}, \frac{c_S}{a_S}\right]$. This range always exists, as $a_W > a_S$.

media and the capacity to conduct outreach. This move provides the players with an opportunity to select a focal point.

We are especially interested in the truthful equilibrium where the Ruler's statement determines the equilibrium of the game. There is only one such truthful equilibrium, though—as always in these types of games—there is the potential for something akin to a babbling or uninformative equilibrium.

We now introduce a refinement: we focus only on weakly dominant strategies and therefore efficient equilibria. Because it is the Ruler that will declare the equilibrium and in doing so take advantage of his political power, he will always report the equilibrium that is least costly for him. The Ruler will ultimately want to choose an equilibrium that minimizes the provision of each policy while achieving the desired policy objective (namely, staying in power), because both escalation and transfers are costly from the Ruler's perspective. For example, if our Ruler decides to choose a separating equilibrium, he will choose the *least costly* separating equilibrium. In doing so, the Strong Ruler minimizes the amount of escalation employed, whereas the Weak Ruler minimizes the amount of transfer offered. If pooling, the Ruler declares the efficient pooling equilibrium, where he provides the smallest transfers needed to prevent the Citizens from revolting.

Efficiency ensures that the Ruler will not declare and thus will not provide more escalation or transfers than are necessary—to distinguish themselves or to prevent revolution, respectively—as escalation and transfers are costly to the Ruler. Such selection is critical for the analysis of extensive-form Bayesian games of this type, where strategies that seem counter-intuitively expensive nonetheless survive the requirements of perfect Bayesian equilibrium. Borrowing the language and notation from the analysis up to this point, this means we will focus primarily on the lower bound of the sets of equilibria.

This leaves the Ruler with three potential statements in the initial sub-game: *separation* where the Strong Ruler uses escalation to distinguish himself, *pooling followed by revolt* where no transfers or escalation is used, and *pooling followed by concede* where the smallest transfer necessary is used to prevent revolt.

Table 1 reports the payoffs from each equilibrium, first to the Ruler and then to the Citizens. Figure 4a displays all the feasible equilibria for different values of $\alpha$ (the probability of a Strong Ruler) and $\tau^*$ (the size of transfers that would be needed to prevent revolution in equilibrium). Figure 4b identifies the equilibrium preferred by the Strong Ruler, chosen from the set of feasible equilibria. Figure 4c identifies the equilibrium preferred by the Weak Ruler. Figure 4d identifies the equilibrium preferred by the Citizens.

Comparison of the Citizens' utility from each of the equilibria yields the following insight.

**Lemma 1:** *The Citizens would always prefer the separating equilibrium.*

The Citizens pay nothing for the signal but benefit from the information it provides. Once the Citizens know which type of Ruler they face, they can behave optimally, revolting against a Weak Ruler and conceding to a Strong Ruler.

The Strong Ruler also prefers the separating equilibrium for a larger range of $\tau^*$ than the Weak Ruler—this is because escalation is cheaper for him than it is for the Weak Ruler, who would rather use transfers to prevent revolution. The Strong Ruler only prefers transfers, when the transfers needed to prevent revolution are rather small and consequently cheaper even than signaling his type.

Because the utility functions are common knowledge to all the players, the Citizens anticipate the preferences of both Ruler types and can thus also anticipate the statement of the Ruler in the initial sub-game. Since the Strong Ruler would never have an incentive to misrepresent his preferences and the Citizens' preferences are more similar to the preferences of the Strong Ruler,

**Table 1.** Payoffs from Each Equilibrium

Ruler

| | Strong Ruler | Weak Ruler |
|---|---|---|
| Separating equilibrium | $YB - a_s\eta$ | $YB(1-t)$ |
| Pooling with revolt | $YB - c_s$ | $YB(1-t)$ |
| Pooling with concede | $YB - \tau$ | $YB - \tau$ |

Citizens

| | Strong Ruler | Weak Ruler |
|---|---|---|
| Separating equilibrium | $Y(1-B)$ | $Y(1-B) + YBt$ |
| Pooling with revolt | $Y(1-B) - c_c$ | $Y(1-B) + YBt$ |
| Pooling with concede | $Y(1-B) + \tau$ | $Y(1-B) + \tau$ |

the Citizens will always play the stated equilibrium when it conforms to the Strong Ruler's preferences.

Since the Strong Ruler will always state his preferred equilibrium, the Citizens would know that they face a Weak Ruler when they observe any statement that does not also represent the preference of the Strong Ruler. Consequently, the Weak Ruler has a weakly dominant strategy to also report the preference of the Strong Ruler.

In short, the Citizens play the equilibrium strategies identified in the statement when they align with the preferences of the Strong Ruler. When they do not align with the preferences of the Strong Ruler, the Citizens instead revolt (knowing that the Ruler must be weak). The Weak Ruler then always declares the equilibrium preferred by the Strong Ruler.

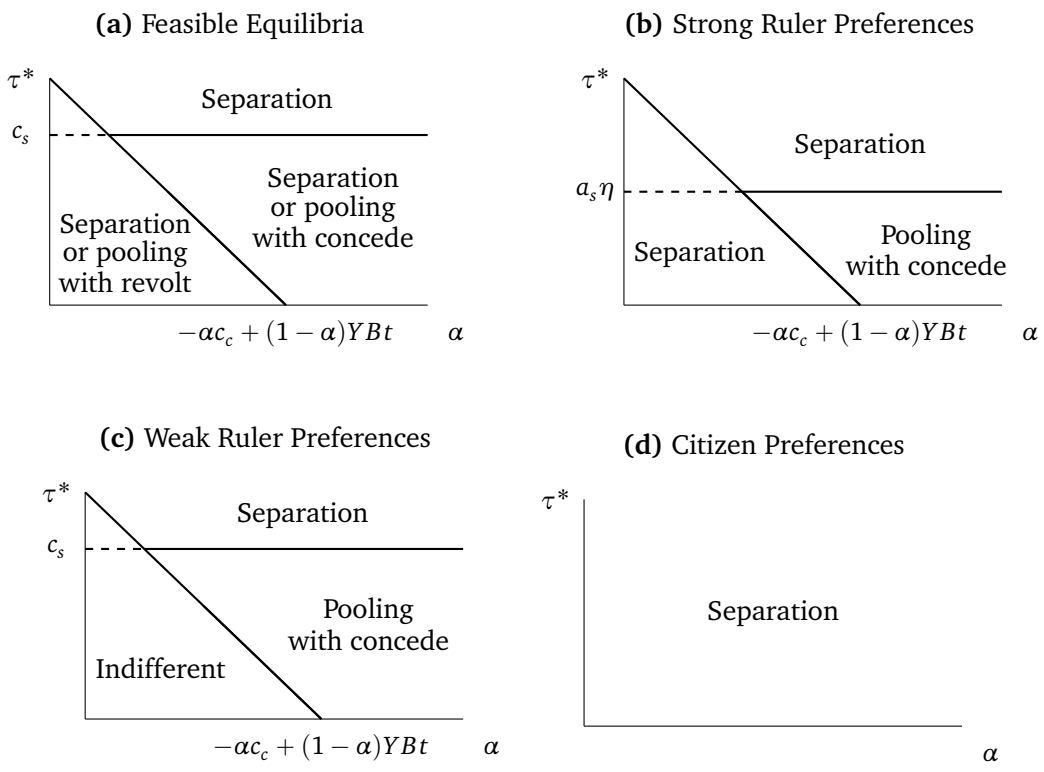
**Proposition 3:** *The Strong Ruler's preferences will prevail in the Ruler's statement.*

Thus, the actors will play the equilibrium preferred by the Strong Ruler, and no actor has an incentive to deviate.[5] This is not the only equilibrium of the game, even with the sub-game where the autocrat states his intentions, but the strategies required in the other equilibria are weakly dominated by the strategies described here.

Drawing on the Strong Ruler's preferences, we can state formally the conditions when the Ruler wants to separate himself. First consider the effect of

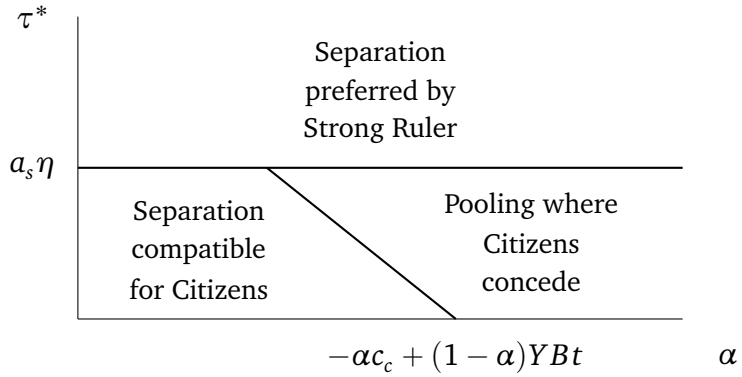
[5]This is similar to the hegemonic equilibrium described in Morrow (1994).

**Figure 4.** Equilibria and Preferences




Note: $\tau^*$ is the equilibrium transfer that would be required to prevent the Citizens from revolting. $\alpha$ is the probability that the Ruler is strong.

**Figure 5.** Equilibrium Outcomes




$\tau^*$ is the equilibrium transfer required to prevent the Citizens from revolting.

changing the Citizens' belief about the Ruler's strength. Recall that the Citizens believe that the Ruler is strong with probability $\alpha$. If the Ruler's resolve is brought into question (for example by international pressure on the regime to respect human rights and to allow political contestation), the Citizens' estimate of $\alpha$ diminishes. When the Citizens begin to question the Ruler's resolve—this represents a *decrease* in $\alpha$, which shifts the downward sloping line to the right—the size of the pooling equilibrium outcome decreases.

**Proposition 4:** *The separating equilibrium is more likely when the Ruler's resolve is questioned.*

The proposition provides us with an expectation of when we should observe escalation as a signal. When the Ruler's resolve is questioned, the Strong Ruler should favor escalation to distinguish himself from the Weak Ruler, even if he could use transfers to make revolution less attractive. In the next section, we draw on anecdotal evidence from the Arab Spring to illustrate the Proposition.

# 3 Saudi Arabia and the Arab Spring

The Arab Spring provides a unique opportunity to illustrate the model's key implications. Regional tensions began with the self immolation of a street vender, Mohamed Bouazizi, in Tunisia in December, 2010. His action sparked mass protests, which led to clashes with the police and eventually the failure of the government of Tunisia in January, 2011. The protests then spread to Algeria,

Jordan, Egypt, and, to differing degrees, all over the Middle East. Governments fell in Egypt and Libya. Conflict and state failure followed in Yemen and Syria, and large-scale, government repression ensued in Bahrain. The Arab Spring provides an external source of uncertainty about the government's resolve: citizens question their rulers' resolve due to the inability or unwillingness of *other* leaders (e.g., Lohmann, 1994), in this case beginning with Tunisian leaders, to suppress revolt.

The model anticipates that the government should use more escalation, rather than co-optation, when the government's willingness to suppress revolution is uncertain. Since escalation is a necessary condition for information transmission, we expect governments to use escalation in response to the diffusion of revolution during the Arab Spring as a way to signal their resolve. As proof of concept, we consider how this played out in the Saudi case.

Following events abroad, there were two weeks of scattered protests in Saudi Arabia in late February and early March, 2011 (Post Staff, Updated July 13, 2011). The government responded rapidly. On March 6th and 7th, public protests were banned, and on March 11th, the police displayed its full force in Riyadh: "Security in Riyadh was high-profile and intense, with helicopters hovering overhead and police checks on cars and individuals heading for mosques, where protests were expected after prayers" (Black, March 11, 2011). These actions did not directly harm many dissidents.[6] Rather than suppressing all opposition, the Saudi government wanted to send a clear signal that protests would not be tolerated in the kingdom. *Foreign Affairs* reported that "the government made clear it would respond to any further dissent by 'any mercenary or misled person' with 'an iron fist;'" this signal was reinforced when the government sent tanks across the border to suppress the neighboring uprising in Bahrain (Bradley, October 13, 2011).

To be clear, the government also used some co-optation: King Abdullah "sought to defuse opposition demands for change by unveiling an unprecedented package worth about $37bn (£23bn) to pay for unemployment benefits, education and housing subsidies" (Black, March 11, 2011). However, the announcement came after the initial escalation made the government's resolve clear. The transfers may make the status quo more palatable, as they do in the model, but they do not provide information.

[6]Police shot and killed at least two protestors on March 10, 2011 (Black, March 11, 2011).

# 4 Conclusion

This paper explores the signaling potential of two strategies, transfers and escalation—or compassion and cruelty for Machiavelli. Our model demonstrates that only escalation provides information. Although transfers may be used to prevent citizens from supporting revolution, it is not because they convey any information. A Weak Ruler will always outspend a Strong Ruler to prevent revolution. Information transmission requires that the signal is too costly for the type that would misrepresent his strength. Only escalation meets this criterion. Escalation is less costly for Strong Rulers, who can use escalation to distance themselves from Weak Rulers and communicate their resolve.

In considering the signaling apparatuses available to autocrats, the paper complicates our understanding of the causes of conflict. Conflict may result from informational asymmetries, if an actor is unable to communicate her type. When the preferences of the actors are diametrically opposed, communication is impossible if there is no available signal that is sufficiently costly to rule out mimicry by other actors.

In a normative sense, this is a tragic result, as some violence seems necessary for information transmission. Consequently, shows of force or low-intensity violence at least may be characteristic of autocratic rule. That is, the cost of escalation induces some inefficiency in autocracies, where Strong Rulers must use escalation to signal their strength. This is because violence carries more relevant information within it than does economic transfer. Although escalation is costly, the low-intensity conflict it entails may deter the high-intensity conflict that revolution would produce. Though disagreeable, autocratic escalation may be more efficient than its alternatives. This, in turn, calls into question the idea that we should be consistently sanguine about the pacifying effect of institutions or buyoffs, which map better to transfer than to escalation.

The normative differences between escalation and transfer should not be downplayed. Autocratic signaling presents Public Choice problems of an extreme form (Tullock, 1987), so it is unsurprising that many theoretically-minded scholars (e.g. Olson, 1993) have focused on how escalation affects development. Escalation wastes lives, resources, and time. Transfers waste none of these things. Indeed, transfers play an important role in the normative study of economic exchange, where they render any efficient outcome supportable (e.g. Mas-Colell, Whinston and Green, 1995, Proposition 16.D.1). Given these efficiency differences, we would hope that transfers prove to be useful signals, but we show that they do not.

# References


Acemoglu, Daron and James A. Robinson. 2001. "A Theory of Political Transitions." *American Economic Review* 91(4):938–963.

Alt, James E., Randall L. Calvert and Brian D. Humes. 1988. "Reputation and Hegemonic Stability: A Game-Theoretic Analysis." *American Political Science Review* 82(2):445–466.

Banks, Jeffrey S. 1991. *Signaling Games in Political Science*. Chur, Switzerland: Harwood.

Black, Ian. March 11, 2011. "Saudi Arabian security forces quell 'day of rage' protests." *The Guardian* `http://www.theguardian.com/world/2011/mar/11/saudi-arabia-police-quell-protests`.

Boix, Carles. 2003. *Democracy and Redistribution*. Cambridge, UK: Cambridge University Press.

Bradley, John R. October 13, 2011. "Saudi Arabia's Invisible Hand in the Arab Spring: How the Kingdom is Wielding Influence Across the Middle East." *Foreign Affairs* `https://www.foreignaffairs.com/articles/middle-east/2011-10-13/saudi-arabias-invisible-hand-arab-spring`.

Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson and James D. Morrow. 2003. *The Logic of Political Survival*. Cambridge, MA: MIT Press.

Calvert, Randall L. 1987. "Reputation and Legislative Leadership." *Public Choice* 55(1):81–119.

Clausewitz, Carl von. 1832. *On War*. Berlin: N. Trübner & Co.

Dal Bó, Ernesto and Robert Powell. 2009. "A Model of Spoils Politics." *American Journal of Political Science* 53(1):207–222.

Davenport, Christian. 2007. "State Repression and Political Order." *Annual Review of Political Science* 10:1–23.

Engers, Maxim. 1987. "Signalling with Many Signals." *Econometrica* 55(3):663–674.

Epstein, David and Peter Zemsky. 1995. "Money Talks: Deterring Quality Challengers in Congressional Elections." *American Political Science Review* 89(2):295–308.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49(3):379–414.

Francisco, Ronald A. 1996. "Coercion and Protest: An Empirical Test in Two Democratic States." *American Journal of Political Science* 40(4):1179–1204.

Gandhi, Jennifer. 2008. *Political Institutions under Dictatorship*. Cambridge, UK: Cambridge University Press.

Gurr, Ted Robert and Will H. Moore. 1997. "Ethnopolitical Rebellion: A Cross-Sectional Analysis of the 1980s with Risk Assessments for the 1990s." *American Journal of Political Science* 41(4):1079–1103.

Hibbs, Douglas. 1973. *Mass Political Violence: A Cross-National Causal Analysis*. New York: Wiley.

Kohlleppel, Laurenz. 1983. "Multidimensional Market Signalling." Discussion Paper #125, Institute für Gesellschafts- und Wirstschaftwissenshaften, Universität Bonn.

Kreps, David M. and Robert Wilson. 1982. "Reputation and Imperfect Information." *Journal of Economic Theory* 27(2):253–279.

Lohmann, Susanne. 1994. "The Dynamics of Informational Cascades: The Monday Demonstrations in Leipzig, East Germany, 1989-91." *World Politics* 47(1):42–101.

Machiavelli, Niccolò. 1961 [1561]. *The Prince*. London: Penguin.

Mas-Colell, Andreu, Michael D. Whinston and Jerry R. Green. 1995. *Microeconomic Theory*. New York: Oxford University Press.

Milgrom, Paul and John Roberts. 1986. "Price and Advertising Signals of Product Quality." *Journal of Political Economy* 94(4):796–821.

Moore, Will H. 1998. "Repression and Dissent: Substitution, Context, and Timing." *American Journal of Political Science* 42(3):851–873.

Morrow, James D. 1994. "Modeling the Forms of International Cooperation: Distribution Versus Information." *International Organization* 48(3):387–423.

Muller, Edward N. 1985. "Income Inequality, Regime Repressiveness, and Political Violence." *American Sociological Review* 50(1):47–61.

Olson, Mancur. 1993. "Dictatorship, Democracy, and Development." *American Political Science Review* 87(3):567–576.

Post Staff. Updated July 13, 2011. "Middle East and North Africa in turmoil." *The Washington Post* `http://www.washingtonpost.com/wp-srv/special/world/middle-east-protests/`.

Powell, Robert. 2002. "Bargaining Theory and International Conflict." *Annual Review of Political Science* 5:1–30.

Przeworski, Adam, Michael Alvarez, José Antonio Cheibub and Fernando Limongi. 2000. *Democracy and Development*. Cambridge, U.K.: Cambridge University Press.

Quinzii, Martine and Jean-Charles Rochet. 1985. "Multidimensional Signaling." *Journal of Mathematical Economics* 14(3):261–284.

Spence, Michael. 1973*a*. "Job Market Signaling." *Quarterly Journal of Economics* 87(3):355–374.

Spence, Michael. 1973*b*. *Market Signaling: Information Transfer in Hiring and Related Processes*. Cambridge, MA: Harvard University Press.

Spence, Michael. 1974. "Competitive and Optimal Responses to Signals: An Analysis of Efficiency and Distribution." *Journal of Economic Theory* 7(3):296–332.

Taylor, Brian D. 2011. *State Building in Putin's Russia: Policing and Coercion after Communism*. Cambridge, UK: Cambridge University Press.

Tullock, Gordon. 1987. *Autocracy*. Dordrecht, Germany: Kluwer.

Walter, Barbara F. 1997. "The Critical Barrier to Civil War Settlement." *International Organization* 51(3):335–264.

Weeks, Jessica L. 2008. "Autocratic Audience Costs: Regime Type and Signaling Resolve." *International Organization* 62(1):35–64.

Wilson, Robert. 1985. "Multi-Dimensional Signaling." *Economics Letters* 19(1):17–21.

Wintrobe, Ronald. 1998. *The Political Economy of Dictatorship*. Cambridge, UK: Cambridge University Press.

Wolford, Scott. 2007. "The Turnover Trap: New Leaders, Reputation, and International Conflict." *American Journal of Political Science* 51(4):772–788.

# A Appendix

We briefly introduce notation for the Citizens' updated beliefs upon observing a signal. Let $\mu : \mathbb{R}^2_+ \to [0,1]$ be the Citizens' updated belief that the Ruler is Strong given some signal $m$. Since $\mu(\theta \mid m)$ is cumbersome, we simplify to $\mu(m) = \mu(S \mid m)$ and $1 - \mu(m) = \mu(W \mid m)$.

**Proposition 1:** *Rulers cannot communicate their type through transfers.*

*Proof.* We work backwards and prove via contradiction. In a separating equilibrium, there is some transfer $\tau_S$ sent by the Strong Ruler and some other transfer $\tau_W \neq \tau_S$ sent by the Weak Ruler. Accordingly, $\mu(\tau_S, \eta = 0) = 1$ and $\mu(\tau_W, \eta = 0) = 0$.

Since our assumptions have cleanly parsed out the Citizens' best response when the updated beliefs have a degenerate distribution—as is the case here—we immediately turn our attention to the Ruler's incentives, and in particular we assess when the two types of Ruler will separate in the way described above holding the Citizens' best response constant. Begin with the Strong Ruler; playing $\tau_S$ leads to a concession from the Citizens, yielding a payoff of $YB - \tau_S$. Conversely, deviating to $\tau_W$ leads to a revolt. Recall that the Strong Ruler will repress after a revolt, yielding $YB - c_S$. For the Strong Ruler to prefer to play $\tau_S$, then, we must have $c_S \geqslant \tau_S$.

Now the Weak Ruler. Playing $\tau_W$ leads to a revolt, after which the Weak Ruler chooses to democratize, yielding $YB(1-t)$. Conversely, deviating to $\tau_S$ leads to a concession, yielding a payoff of $YB - \tau_S$. For the Weak Ruler to want to play $\tau_W$, we must have $\tau_S \geqslant YBt$. But this is a contradiction, since $\tau_S < YBt$ by assumption. □

**Proposition 2:** *Rulers can communicate their types through escalation.*

*Proof.* The analysis proceeds as in the proof of Proposition 1. Suppose there is some level of escalation, $\eta_S$, employed by the Strong Ruler and some other level of escalation, $\eta_W \neq \eta_S$, employed by the Weak Ruler. Since we are again considering separating equilibria, the Citizens again update to perfect inference: $\mu(\tau = 0, \eta_S) = 1$ and $\mu(\tau = 0, \eta_W) = 0$. So, the Citizens concede if they see $\eta_S$ and revolt if they see $\eta_W$.

Consider the Strong Ruler, who must prefer to play $\eta_S$ over $\eta_W$. Playing $\eta_S$ leads to concession and subsequent payoff $YB - a_S\eta_S$. Choosing instead to play $\eta_W$ leads to revolt, which the Strong Ruler chooses to repress, yielding payoff $YB - c_S$. The requirement, then, is that $c_S \geqslant a_S\eta_S$.

Now the Weak Ruler. Choosing $\eta_W$, as hypothesized, leads to revolt and democratization, yielding a payoff of $YB(1-t)$. Choosing instead to play $\eta_S$ leads to a concession, yielding payoff $YB - a_W\eta_S$. For the Weak Ruler to prefer to play $\eta_W$, then, we must have that $a_W\eta_S \geqslant YBt$. Since $YBt \geqslant c_S$ by assumption, we have $a_W\eta_S \geqslant YBt \geqslant c_S$, and from the analysis of the Strong Ruler above, we obtain $a_W\eta_S \geqslant c_S \geqslant a_S\eta_S$. We therefore must have that $\frac{c_S}{a_W} \leqslant \eta_S \leqslant \frac{c_S}{a_S}$. This is a plausible requirement, as $a_W > a_S$.

The preceding analysis implies that the Weak Ruler chooses $\eta_W < \frac{c_S}{a_W}$. However, observe that, for any such $\eta_W$, the payoff is the same: the Citizens revolt and the Weak Ruler subsequently democratizes, yielding $YB(1-t)$. Accordingly, the Weak Ruler is indifferent for any $\eta_W \in \left[0, \frac{c_S}{a_W}\right)$, making any choice in that range optimal.

Having established incentive compatibility along the path of play, our final task is to pin down compatible off-path beliefs. Fix an $\eta_S \in \left[\frac{c_S}{a_W}, \frac{c_S}{a_S}\right]$, and define the monotonic beliefs

$$\mu(\tau = 0, \eta) = \begin{cases} 1, & \eta \geqslant \eta_S \\ 0, & \eta < \eta_S \end{cases}.$$

These beliefs obviously give the Strong Ruler no incentive to deviate to any other $\eta$, as doing so would lead to revolt, which we have already established is worse than choosing $\eta_S$ when $\eta_S \leqslant \frac{c_S}{a_S}$. The Weak Ruler has no incentive to deviate to some $\eta \neq \eta_W$, as any such $\eta$ that is not $\eta_S$—which we have already established makes the Weak Ruler worse off—yields the same outcome as $\eta_W$. We therefore conclude that the actions and beliefs posited to this point constitute an equilibrium. □

We now turn our attention to welfare.

**Lemma 1:** *The Citizens would always prefer the separating equilibrium.*

*Proof.* The Citizens must prefer to concede rather than to revolt to sustain the pooling with concede equilibrium: $Y(1-B) + \tau \geqslant \alpha[Y(1-B) - c_c] + (1-\alpha)[Y(1-B) + YBt] \Rightarrow \tau \geqslant -\alpha c_c + (1-\alpha)YBt$. The size of the transfer needed to sustain the pooling equilibrium is decreasing in the probability that the Ruler is strong, $\alpha$: the Citizens require more if they believe the Ruler is likely to be weak. Because we focus on efficient equilibria, we can now define the equilibrium transfer in the pooling equilibrium where the Citizens concede: $\tau = -\alpha c_c + (1-\alpha)YBt$.

The Citizens would always prefer the separating equilibrium to either pooling equilibrium (they are indifferent between the two pooling equilibria,

as $\tau$ is set to achieve this indifference) as long as the following inequality is met: $Y(1-B)+(1-\alpha)YBt \geqslant Y(1-B)+\tau \Rightarrow \tau \leqslant (1-\alpha)YBt$. This is always true in equilibrium, because $\tau = -\alpha c_c + (1-\alpha)YBt$. Thus, the Citizens would always prefer the separating equilibrium. □

**Proposition 3:** *The Strong Ruler's preferences will prevail in the Ruler's statement.*

*Proof*. To establish the feasibility of the pooling equilibrium with concede, the Strong Ruler must also be willing to provide the transfer in the pooling equilibrium (otherwise, the Citizens will revolt; this supports the use of the transfer): $YB-\tau \geqslant YB-c_s \Rightarrow \tau \leqslant c_s$.

The Strong Ruler would prefer the pooling equilibrium where the Citizens concede only if their payoff from the pooling equilibrium is better than their payoff to the separating equilibrium: $YB-\tau \geqslant YB-a_s\eta \Rightarrow \tau \leqslant a_s\eta$.[7] We ignore the Strong Ruler's incentive to report the pooling equilibrium with revolution, because he would never prefer this outcome, as $YB-c_s < YB-a_s\eta$ by assumption in the paper.

The Weak Ruler's preferences are similar. Because the separating and pooling with revolt equilibria both result in democratization when the Citizens face a Weak Ruler, the Weak Ruler is indifferent between these two equilibria. The Weak Ruler however prefers to maintain the transfers for longer than the Strong Ruler, as $YB-\tau > YB(1-t)$ by assumption – otherwise transfers are identical or strictly worse than democratization for the Ruler.

Thus, the Citizens always prefer the separating equilibrium, and there is only one preference difference between the two types of Rulers. The preference difference between the two types of Rulers is when $\tau^* \in [a_s\eta, c_s]$. The Strong Ruler prefers separation and the Weak Ruler prefers pooling. Knowing these preferences (recall they are common knowledge), the Citizens would update their beliefs that they are dealing with a Weak Ruler if the Ruler declared the equilibrium to be pooling with concede when $\tau^* \in [a_s\eta, c_s]$, as only the Weak Ruler would make that declaration. Anticipating this, the Weak Ruler will also declare separation when $\tau^* \in [a_s\eta, c_s]$. □

**Proposition 4:** *The separating equilibrium is more likely when the Ruler's resolve is questioned.*

[7] In the paper, we assume that $c_s > a_s\eta$, as we fold $a_s\eta$ into the $c_s$ payoff. If we maintain this assumption, $a_s\eta$ is the more restrictive transfer threshold.

*Proof*. Questioning of the ruler's resolve is represented in the model by a reduction in $\alpha$, the probability that the ruler is strong. The Strong Ruler prefers the separating equilibrium as long as $\tau \leqslant -\alpha c_c + (1-\alpha)YBt$ (or $\tau \geqslant a_s \eta$). A decrease in $\alpha$ increases the right hand side of the equation, making it more likely to hold. Therefore, when the ruler's resolve is questioned, in other words when $\alpha$ decreases, the Strong Ruler is more likely to prefer the separating equilibrium. □