

# The Authoritarian Wager: Political Action and the Sudden Collapse of Repression

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## Abstract

Authoritarian rulers tend to prevent political action, but sometimes allow it even if it leads to social conflict. The collapse of preventive repression is especially puzzling when rulers have reliable security forces capable of preventing protests. We develop a game-theoretic model that explores the incentives of authoritarians to repress or permit political contestation. We show that rulers with the capacity to fully repress political action create despotic regimes, but rulers with more moderate capacity might opt to allow open contestation. The status quo bias that favors regime supporters weakens their incentive to defend it. Rulers take the authoritarian wager by abandoning preventive repression and allowing opposition that threatens the status quo. The resulting risk gives incentives to the supporters to defend the regime, increasing the rulers' chances of political survival. Even moderate changes in the structural capacity to repress might result in drastic policy reversals involving repression.

## Keywords

conflict processes, democratization and regime change, formal theory, nondemocratic regimes

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It is not true that nobody foresaw the 1989 revolutions that toppled the communist governments in Eastern Europe. Setting aside the arguments for the inevitable collapse of communism—arguments that would submit to no timetable for the event they purported to predict, that contained large elements of wishful thinking, and that at any rate still envisioned long-haul containment right up to the fall—there were the specialists who had noted the economic stagnation, the fall in consumption, the deteriorating social conditions since the late 1970s, and who were forecasting popular upheavals and political crises by the mid-1980s.<sup>1</sup> As these analysts duly noted, all structural factors were pointing to an impending systemic shake-up, but even they usually assumed that the Soviet government (and its satellite regimes) would use repression to keep itself in power and maintain the integrity of the union and the bloc. After all, this was exactly what had happened in East Germany (1953), Hungary (1956), Czechoslovakia (1968), and Poland (1981). It was because of this assumption that even as late as May 1988, the intelligence services estimated only a remote to low likelihood of serious challenges to Party control in Eastern Europe over the next 5 years. This was the consensus among academic Sovietologists as well (Howard & Walters, 2014).

The surprise was not that the system was shaking, it was that those who benefited from it did not fight to preserve it. Why did the East European communist governments allow protests to occur despite knowing that they could only end either in massive repression or the political collapse of the ruling party? Their own past pointed to the consequences of permitting mass dissent. In Germany, Hungary, and Czechoslovakia, it took Soviet troops to quash the protests. The Chinese government had just violently cracked down on its own demonstrators in Beijing. Why not avoid all of this? In Poland, the government had introduced martial law that lasted nearly 2 years and severely curbed civil and political rights (with many restrictions remaining in place after martial law was lifted), but there was no large-scale violence and the regime survived another 8 years. In the Soviet Union itself, effective repressive measures had stamped out the dissident movement in the 1960s and had kept the country quiet for over quarter of a century (Garcelon, 2005, p. 46). These experiences raise two questions: why did the communist governments fail to repress the protests when they grew, and, perhaps even more importantly, *why did they allow the protests to grow in the first place?*

Our main goal in this article is to explain the collapse of *preventive* repression. What is the mechanism that could explain how allowing the dissidents to mobilize and challenge the regime improves its chances of survival?

We present a model of the interaction between a ruler, who can use preventive repression to increase the costs of any political action, and political actors, who must decide whether to support the ruler, oppose the ruler, or do

nothing. We show that a *status quo bias* in favor of supporters weakens their incentive to come to the defense of the regime when it is threatened by dissidents who stand to lose unless they act. These asymmetric incentives result in different responses to preventive repression: supporters become strictly more likely to abstain from any action as repression increases, whereas under some conditions opponents might become even more emboldened.

We find that if the government cannot repress sufficiently severely to deter all but the most extreme dissidents, then it might be strictly better off abandoning preventive repression altogether. By doing so, it puts the well-being of its supporters at significant risk, which motivates them to act to prevent the ouster of the ruler. This *authoritarian wager* is the bet the government takes that unleashing political action could work out in its favor. Even a relatively modest deterioration of the regime's coercive capacity could cause the sudden collapse of preventive repression, which could lead to anything from a reassertion of the regime's authority to regime change, or to civil war. If it turns out that the dissidents are not sufficiently strongly opposed to the regime to take action against it, the ruler remains in power; if it turns out that the government has overestimated how supportive the citizens are of the regime, then the ruler is ousted peacefully; and if there are enough committed opponents and supporters, then a costly conflict ensues and the ruler survives it with probability that depends on the regime's coercive power. The variation of equilibrium outcomes can help explain the rather different consequences of political contestation in the Arab Spring of 2011. Aside from Tunisia, with its shaky democratization, the outcomes there ranged from dismal to disastrous: a military coup (Egypt), a failed state (Libya), a drastic repression (Bahrain), a prolonged strife (Yemen), and a bloody civil war (Syria). One could also add to this list the resilient authoritarianism in some of the Soviet successor states, and the Iranian revolution-that-wasn't in 2009.

## The Repression of Political Action

Governments repress for the same reason they do most everything else: to stay in power.<sup>2</sup> Violence is not the only instrument leaders have to cling to power. Being costly and risky, it might not rank high among the ones preferred even by determined autocrats. Cultivating loyalty, dispensing patronage and maintaining clientelistic networks, coopting the opposition, sharing power, and divide-and-rule, all are in the strategic repertoire of political survival.<sup>3</sup> Of course, even these tactics are implemented in the shadow of power, so both their content and effects are conditioned on the ever-present threat or actuality of repression (Ritter, 2014).

Thinking of repression as an instrument of governance implies that the ruler must weigh the pros and cons of such a policy, and compare them at least to the alternative of inaction. That is, it implies a choice. It might come as a surprise, then, that many studies of repression either ignore that choice or assume it. Reviewing the studies of the subject, Davenport (2007, p. 17) observed that scholars often argue that governments resort to repression when its expected benefits outweigh its costs. In spite of this, he then noted, we have neither good theories of why repression occurs nor systematic evaluation about its purported benefits for regime survival.

### *Repression as a Choice*

People can be quite aggrieved and live in a system widely perceived as unjust for a very long time without mounting any political action against it (Portes, 1995; Tarrow, 1993). Potential dissidents must bear serious risks and costs in organizing a challenge to the regime, which creates incentives for free-riding (Taylor, 1987). They face tremendous coordination problems because information is scarce and likely wrong (Kuran, 1995b). They might also confront debilitating capacity constraints (Tilly, 1978). There are tactics that dissidents could use to deal with some of these problems (Lichbach, 1995).<sup>4</sup> Their chances of success, however, depend on the political system and the government's strategy of dealing with opposition (Lichbach, 1994; Sharman, 2003). Thus, to understand violent political action, one must analyze how the government prepares for it, and how it deals with it (Tilly, 1993, p. 5).

This might appear self-evident, but it is striking to what extent research has assumed away the role of the state even, paradoxically, when it has made it the central part of the arguments. The absent state is most noticeable in the mechanisms that explain mass political action as the result of behavioral or informational cascades (Kricheli, Livne, & Magaloni, 2011; Kuran, 1991; Lohmann, 1994). In these models, people will only act if they believe enough others will join them, which means that inaction can be a self-fulfilling prophecy irrespective of the true distribution of preferences in the population. Small groups of early participants could, however, persuade more abstainers to join them, and the swelling crowd might, under certain conditions, trigger an avalanche creating a mass protest. Elaborations analyze how protest participants coordinate their efforts (Beissinger, 2007; Maves & Braithwaite, 2013). But nowhere do these explanations deal with the way the state might choose to respond to these protests, especially in their initial limited phase. It is not even clear how aggregated individual grievances would cause the demise of a repressive regime while the coercive apparatus remains loyal to it. History is littered with failed revolutions,

and even though their eruption was often unforeseen, their dismal wrecking was far more predictable.<sup>5</sup>

This, of course, is the essence of the traditional structuralist approaches to explaining revolutions: as long as the state retains its capacity to repress, dissidents have no chances of success. These political movements can only achieve anything when the state is disabled somehow by a fiscal crisis, international pressure, or military overextension (Skocpol, 1979), or when its ability to coordinate a response is compromised because the elites are split on how to confront the challenge (Goldstone, 1991; Lachmann, 1997), or when its coercive apparatus is of dubious loyalty (Gause, 2011). Even though these models make the state the focus of analysis, they deny it any agency (Kiser, 1995). Repression seems important, but it is taken as a given, and the analysis proceeds toward factors that determine it. But nowhere here is the government doing that determining. The implicit assumption seems to be that, barring cosmetic concessions to placate some of the malcontent, repression in authoritarian regimes is a no-brainer: if the rulers could repress, then they would. When they do not, it is because they cannot, not because they might not want to.

Why should that matter? Because regimes often retain sufficient capacity to repress largely disorganized and unarmed crowds, especially if they are small as they would have to be before they trigger a cascade. In this sense, if cascades occur, they necessarily involve the deliberate permission of the government. One could argue that it was the “removal of the Soviet threat, with Gorbachev’s unwillingness to commit Soviet troops to support East European Communist governments” that precipitated their downfall (Coleman, 1995). But the Soviet troops did fire on protesters in Lithuania when ordered to do so, the security forces in East Germany did disperse demonstrators when ordered to do so, and even in Czechoslovakia the repressive apparatus kept dissidents at bay when ordered to do so. It is by no means clear that the security forces would have disobeyed orders or lacked the capacity to quell any disturbances. Repression collapsed because the governments chose not to order them to do so.<sup>6</sup>

### *Reactive Repression Versus Prevention*

In a sense, Davenport’s (2007) assessment of the state of theorizing about repression was a bit pessimistic. Studies of regime transitions had already explicitly incorporated elites (the state, which they control) deciding between repressing nonelites (the poor) or offering them some political or economic bargain to stave off revolution (Acemoglu & Robinson, 2000; Boix, 2003). Repression could also be a reaction to dissident behavior (Gartner & Regan,

1996; Moore, 2000; Wintrobe, 2007). Its severity could depend on how it affects the chances of political survival (Ritter, 2014).

For our purposes, however, all these studies share one particular assumption: They take the existence of mobilized dissent as given, and explore the trade-offs between concessions and hard-line repression (possibly followed by further escalation to revolution). They are focused on reactive repression.

*Reactive repression* is the regime's coercive response to mobilized dissent that challenges the status quo. This dissent can take many forms—demonstrations, protests, boycotts, strikes, and riots—all of which impose costs on the government, threaten the stability of its rule, and undermine its legitimacy. This repression aims to eliminate the direct threat, and level of force employed can range from physical intimidation, to the use of tear gas and rubber bullets, to beatings and arrests, to violent clashes with armed opponents, all the way to widespread conflict.

This repression cannot occur if the government is incapacitated because the elites or the military refuse to participate or actively oppose it. Thus, reactive repression requires that government supporters rally to the defense of the regime. Its costs are borne by the (behaviorally self-identified) opponents and, to the extent that these opponents can resist, by the regime supporters.<sup>7</sup> This repression also entails risks to the government: the opponents might prevail, the elites might engineer a palace coup in an attempt to preserve their standing, the military might intervene to prevent further instability (Dragu & Lupu, 2018). Even when it succeeds, the government might find that its handling of the crisis has sowed doubts about its ability to govern.

Despite these costs and risks, the government seems to have a compelling incentive to respond with repression when they seek to eliminate what they perceive to be a direct behavioral threat. The empirical regularity of reactive repression in face of mobilized dissent is so robust that it has been called the "law of coercive responsiveness" (Davenport, 2007, pp. 7-8).

This empirical regularity implies that potential dissidents should expect a vigorous state response, which in turn means that they should only mount a challenge when they have reasonable expectations of being able to overcome the repressive reaction (Pierskalla, 2010; Shadmehr, 2014). One crucial element of the government's capacity to respond is whether regime supporters would rally to its defense, which means that expectations about their behavior would shape the opponent's mobilization choices. The government can also directly target the incentives of potential organizers with measures designed to raise the costs of collective action and to disrupt the ability to coordinate effectively; that is, it can engage in prevention.

*Preventive repression* is the bread and butter of autocratic regimes. It involves restrictions of speech, prohibitions of assembly, controls of travel,

and selective application of laws. It is expressed in the routine harassment of real or suspected dissidents, the abuse of due process and administrative regulations to punish individuals, and the occasional purges of even regime loyalists (Dobson, 2012). At its extreme, it can escalate to incarceration, torture, disappearance, and extrajudicial killings. This repression aims to prevent threats to the regime from materializing by hindering collective action and coordination among active or potential dissenters, sowing fear and distrust among them, disrupting their organization, and even eliminating their leaders.<sup>8</sup>

Although its targets are sometimes identified through intense surveillance, often mere suspicion or indirect associations are sufficient. This creates a semilawless environment, where the agents of repression can pursue private goals, which expands the range of targets and can sometimes result in arbitrary or random victimization (Thornton, 1964). This repression, with its pervasive violations of political and civil rights, with its sporadic low-level directed coercion, and with its pervasive surveillance, is part of daily life in societies under authoritarian rule. It is diffuse (can affect people irrespective of their preferences for the regime) and designed to prevent mobilized dissent. It also appears to be quite effective in deterring challenges (Johnston, 2005; Osa & Corduneanu-Huci, 2003). Little wonder, then, that governments have been willing to bear the costs of an extensive internal security apparatus; costs that pile up over the years, and that could easily outweigh the costs of infrequent bursts of active repression of mass action (Shelley, 1996).

Ignoring preventive repression could introduce a selection bias (Ritter & Conrad, 2016). Opponents who manage to mobilize despite preventive repression might be very different from those that are deterred by it. They might be more resolute, or better resourced, or less vulnerable, each of which would make them harder to defeat, and thus more impervious to coercion. This might induce the government to negotiate or it might cause it to escalate dramatically to cope with the larger threat (Slantchev, 2011). Resolving some of the issues could help account for the “punishment puzzle”: the findings that repression sometimes quells dissent and sometimes aggravates it (Davenport, 2007, p. 8).

One conceptual problem is that we have no good theories about how the interaction between repression and dissent affects the probability of political survival (Escribá-Folch, 2013; Ritter, 2014). In fact, in her extensive review of the literature on repression, Earl (2011) does not even mention the possibility that increasing the probability of regime survival might be an intended effect. But such a mechanism is clearly necessary if one wishes to understand how it could be that repression often creates a backlash and seriously aggravates dissent while enhancing the chances of regime survival (Francisco,

2005). As our best theoretical models focus on the reaction to mobilized dissent, our goal in this article is to redirect attention to the government's initial preventive measures.

### *Private Truths, Public Lies, and Prevention*

Incorporating preventive repression into the mechanism presents some unique challenges. By definition, preventive repression is what the government does before the opponents have had the chance to act; indeed, its very purpose is to prevent them from acting. But if the dissidents have not conveniently revealed themselves to the government, then it is unclear how the government would know whom to target. The problem with broad preventive measures is that they might well hurt people who are indifferent to the regime (and so politically inactive—a good thing from an authoritarian perspective) and, even worse, fall upon people who support the regime.

However much one wants to pretend otherwise, many citizens of authoritarian regimes do not see them as evil or imposed on them against their will (Kuran, 1991; Yurchak, 2005, p. 31). The group of regime supporters includes hardened ideologues, people who benefit from the system, and people who believe that they would be worse off under the alternative government. In a world where not everyone is a secret opponent of the government, one must reckon with the reaction of all those who stand to lose from regime change. For regime opponents to succeed, regime supporters must fail.<sup>9</sup>

This is why governments prefer to target potential dissenters while providing benefits to genuine supporters and leaving the politically inert masses to their own devices.<sup>10</sup> The problem is that genuine supporters are not readily identifiable *a priori* because authoritarian regimes provide very strong incentives for preference falsification not merely in concealing one's opposition to the government (Kuran, 1995a), but also in feigning one's dedication to it. These governments have no magic way of peering into people's minds to uncover their true preferences. One might have been surprised by the abrupt collapse of communist regimes in Eastern Europe, but probably less so than the communist rulers amid the "spectacular miscalculation of the regimes' assessments of their own popularity" (Sharman, 2003, p. 129).

This difficulty persists even though authoritarian regimes spend such considerable resources on monitoring society that Oliver (2008) counts surveillance (along with deterrence and incapacitation) among the primary functions of repression. And yet, discriminating is no easy task because the authorities cannot distinguish genuine supporters from concealed opponents who might use the cover of seemingly legitimate action to identify each other. The authorities are also often loath to legitimize independent political action



because of the risk that this might inadvertently extend the principle to other, much more dangerous, actions. Moreover, there is no guarantee that citizens who learn to coordinate on an allowed action would not at a later date choose to use that capacity against the government.

One telling example of the problem of allowing even an ostensibly nonopposing political action is provided by the evolution of the environmental movement in Bulgaria during the 1980s. The avowed goal of that movement was apolitical—it sought to bring attention to the severe environmental degradation and urge government action to reverse it. The communist government, however, was well-aware that among the many “positivists”—those who genuinely only cared about the environment—there were also “negativists”—those who wanted to use the movement to express otherwise forbidden opposition to the government (Georgieva, 1992, p. 14). Ideally, the Party wanted to ban the movement entirely because of the inherent dangers the latter group posed, but in the context of *perestroika* and *glasnost*, it considered it necessary to allow some reform movement, especially one that focused attention away from reforming the regime itself. Compared to the people who wanted to press for human-rights, the environmental movement seemed the lesser of two evils. The government permitted the movement to stage rallies and even organize formally as *Ecoglasnost* in the spring of 1989. But its misgivings proved prophetic. The new organization provided the core of anti-government protests in October and November (especially after the authorities, in a belated attempt to handle rising discontent, beat up and arrested—in front of foreign diplomats—several of its activists), transformed itself into the political Green Party, became one of the most important members of the Union of Democratic Forces that successfully challenged the communist monopoly on power in the June 1990 elections (winning 36% of the seats in parliament to the newly re-branded socialists’ 47%), and provided both the mayor for Sofia and the Prime Minister in 1991.

This is not merely an isolated anecdotal example. Absent the electoral and free-speech channels to express their discontent, the public in an authoritarian regime can become dangerously frustrated with the regime without the government being aware of it. Lorentzen (2013) argues that this severe lack of information produces incentives to allow small localized public protests (more appropriately, riots) as information-gathering exercises. But his sophisticated model assumes that the government can perfectly discriminate between a “loyalist protest” that does not threaten the regime and “revolt” (that is much costlier to suppress), so that the government can respond with bribery to the first action and repression to the second. The Bulgarian example shows why this assumption can be very problematic, and the Chinese government itself is wary of large-scale political action even when it is

supposedly in its support, like the antforeign protests that have periodically erupted across the country. Although ostensibly nationalist and not a challenge to the ruling party, these protests have had a rocky relationship with the authorities who sometimes permit them, but sometimes nip them in the bud. As Weiss (2013) shows, it is precisely because they are potentially dangerous for the regime that the government can use them to signal credibly internationally by allowing them as the occasion demands. More often, however, it prevents them altogether despite cries that “Patriotism is not a crime!,” very much for the reasons the Bulgarian communists worried about with the supposed environmentalists.

And thus it is that authoritarian regimes remain fearful of dissidents and suspicious of loyalists. This is why autocrats are forever curbing the freedom of assembly, as the Soviet authorities had done (Ruebner, 1989), and as has been recently demonstrated by Putin in Russia (Demirjian, 2014), Yanukovich in Ukraine (Englund, 2014), and the military in Egypt (Kirkpatrick, 2013).<sup>11</sup>

To account for these tactics of suppression, we extend the concept of repression to include costs that are imposed on any political action irrespective of its ostensible purpose. One can think of this as applying Tilly’s (1978) definition of repression as “any action by another group which raises the contender’s cost of collective action” to a setting where the authorities are uncertain of the identity of the contender or the future intentions of self-identified supporters.

It is crucial to understand what this assumption means and what it does not, substantively speaking. It does *not* mean that the government cannot identify any dissidents or loyal supporters. As we pointed out, tremendous resources are usually spent precisely toward that end. Of course, *if* the government obtains useful information, *then* it would target its punishments and rewards properly. We assume that the government has already dealt with all those people accordingly—silencing the opponents and rewarding the loyalists. In the model, one can think of this as the “status quo,” represented by the power of the regime—its ability to survive a direct challenge. Obviously, there is a limit to what the government can accomplish in this way, and the vast majority of the population necessarily remains outside even the most intrusive surveillance. It is this mass of people that preventive measures target. Most of the people subjected to this repression are likely apolitical (not wishing to engage in any sort of political action), but many might not be, and *the government has no way of knowing this*. This means that when the government decides to relax preventive repression, it cannot be entirely sure which way this mass of citizens would break, and this is what this modeling choice captures.<sup>12</sup>

To focus on the interaction between repression and political action, we shall abstract away from intraelite conflicts, potential disloyalties of security forces, or possibilities for coups.<sup>13</sup> As we are interested in explaining the sudden collapse of repression as a choice, we shall bias the model a bit by assuming that repression is costless to the ruler, and that it is immediately effective. If we find that even under these conditions rulers sometimes prefer to abandon repression, our results would be more convincing.

## The Model

A ruler faces potential political action from two citizens,  $i \in \{1, 2\}$ .<sup>14</sup> Let  $t_i \in [0, 1]$  be citizen  $i$ 's preference for the regime, so that her preference against it is  $1 - t_i$ . We shall refer to a citizen with higher values of  $t_i$  as a regime *supporter*, and a citizen with a lower value of  $t_i$  as a regime *opponent*. Citizen  $i$ 's preferences are privately known only to herself; the ruler and citizen  $j$  both believe that  $t_i$  is distributed uniformly over the range of possible values.

Before the citizens can act, the ruler implements a level of *preventive* repression,  $k \in (0, 1)$ , which determines how costly any political action is going to be. For now, we shall assume that the ruler can choose any  $k$  he wishes. We shall introduce capacity constraints ( $k_L > 0$ , possibly arbitrarily close to zero, to indicate the smallest cost the ruler can ensure, and  $k_H \in (k_L, 1)$  to indicate the highest cost he can impose) after the unconstrained analysis reveals why they might matter. Because the ruler cannot reliably distinguish among supporters and opponents *ex ante*, preventive repressive measures that increase the cost of political action must be applied indiscriminately; that is, citizens must pay  $k$  if they choose to act irrespective of the content of that action, and can only avoid that cost by abstaining. These measures are observable by both citizens.

The citizens simultaneously choose whether to *support* the ruler, *oppose* the ruler, or *abstain* from any political action. Our fundamental assumption is that

**Assumption 1** (Status Quo Bias): The ruler remains in power with certainty unless actively opposed.

When some citizen opposes the ruler, the outcome depends on what the other citizen does. If she does not support him, the ruler is removed. If she does support him, *reactive* repression occurs, which results in conflict.<sup>15</sup>

In this conflict, the regime prevails with probability  $\pi \in (0, 1)$ , which is common knowledge. Conflict imposes an unconditional cost,  $c > 0$ , and a conditional cost,  $\theta > 0$ , on the citizens. The unconditional one reflects the

		Citizen 2		
		Oppose	Abstain	Support
Citizen 1	Oppose	$I - t_1 - k; I - t_2 - k$	$I - t_1 - k; I - t_2$	$W(t_1) - k; w(t_2) - k$
	Abstain	$I - t_1; I - t_2 - k$	$t_1; t_2$	$t_1; t_2 - k$
	Support	$w(t_1) - k; W(t_2) - k$	$t_1 - k; t_2$	$t_1 - k; t_2 - k$

**Figure 1.** The political action game.

fact that engaging in conflict is costlier than taking unopposed political action. Both citizens pay it. The conditional one reflects the fact that whereas a regime cannot punish or reward citizens based on their privately known preferences, it can certainly do so on the basis of their observable behavior. Only the citizen who ends up on the losing side in the conflict pays it.<sup>16</sup> The expected conflict payoff to citizen  $i$  is  $w(t_i) = \pi t_i + (1 - \pi)(1 - t_i - \theta) - c$  if she supports the ruler, and  $W(t_i) = \pi(t_i - \theta) + (1 - \pi)(I - t_i) - c$  if she opposes him. If even the most extreme regime supporter is unwilling to take a risk to prevent the certain victory of the opposition, then the analysis would not be very interesting, we rule that out with the following:

**Assumption 2:** If the most extreme regime supporter is certain that the other citizen will actively oppose the regime, then she prefers to engage in conflict than to abstain if the action is costless:  $\bar{w} \equiv w(1) > 0$ .

As  $\theta > 0$ , this assumption also requires that  $\pi > c$ . The overall game payoffs for the citizens are given in Figure 1.

The ruler only cares whether he stays in office or not irrespective of how this is achieved. We assume that the ruler pays neither the cost of conflict nor any of the costs he can impose on the citizens. Although one could argue that these assumptions are not unrealistic, we are content to note that introducing positive costs for the ruler will not alter our general results (we shall explain why), and will, therefore, merely clutter the analysis. The ruler simply maximizes the probability of political survival.

The solution concept is perfect Bayesian equilibrium.

## The Political Action Game

We now analyze the political action game played by the citizens. As the level of repression is already set, they take all parameters as given in Figure 1.

Let  $\lambda_i$  denote the probability with which citizen  $i$  opposes the regime, and  $\varphi_i$  denote the probability with which she supports it. All equilibria of this game take a particularly simple form: the type space for each citizen  $i$  is partitioned into at most three intervals by the cut-points  $t_L < 1/2$  and  $t_R > 1/2$ , and each type plays a pure strategy. Citizens with preferences very much opposed to the government,  $t_i < t_L$ , choose  $\lambda_i = 1$  (active dissidents), those very much favorable to the government,  $t_i > t_R$  choose  $\varphi_i = 1$  (active supporters), and those with lukewarm preferences,  $t_i \in [t_L, t_R]$ , choose  $\lambda_i = \varphi_i = 0$  (passive abstainers).<sup>17</sup> This is sufficient to establish the following:

**Lemma 1:** The regime opponents are active in every equilibrium:  $t_L > 0$ .

This result shows that the status quo bias in favor of the regime—nothing changes unless opponents take action—provides stronger incentives for political action to dissidents than it does to supporters. The intuition is that if no dissidents were active, then the status quo would persist even if nobody acts on behalf of the regime, and so regime supporters remain inactive. But if supporters were to remain inactive, then there would be a strong incentive for dissidents to act to avoid being saddled with the unpalatable status quo. Therefore, dissidents are always active with some (possibly small) probability.

Lemma 1 implies that the only possibilities we need to consider turn on whether someone would support the regime; that is, whether  $t_R < 1$  for at least one of the citizens.<sup>18</sup> We shall refer to an equilibrium where no citizen supports the ruler with positive probability as *despotic*, and to an equilibrium where someone could do so with positive probability as *anocratic*.

In a despotic equilibrium the least-committed opponent,  $t_L$ , must be indifferent between opposing the ruler and abstaining knowing that the other citizen will not support him ( $\varphi_{-i} = 0$ ). Thus,  $\lambda_i = Pr(t_i \leq t_L(\lambda_{-i}, 0)) = t_L(\lambda_{-i}, 0)$ , where the second equation follows from the uniform distribution assumption. A symmetric solution must, therefore, satisfy the following:

$$\lambda = t_L(\lambda, 0), \quad (1)$$

whose unique positive solution is

$$\lambda_D = \frac{3 - \sqrt{1 + 8k}}{4} < \frac{1}{2}. \quad (2)$$

This defines the equilibrium probability of opposition in the despotic equilibrium. To complete the characterization, we must ensure that no

supporter wants to be active:  $\varphi_i = 0$ . As this will be the case if, and only if,  $t_R(\lambda_{-i}) \geq 1 \Leftrightarrow k \geq \bar{w}\lambda_D$ , we obtain a necessary and sufficient condition for the despotic equilibrium:

$$k \geq \bar{w} \cdot h(\bar{w}) \equiv k^* \in \left(0, \frac{1}{2}\right), \quad (D)$$

with  $h(\bar{w}) = (3 + \bar{w} - \sqrt{(3 + \bar{w})^2 - 8}) / 4 \in (1 - \sqrt{1/2}, 1/2)$ .<sup>19</sup> We can now summarize our reasoning thus far as follows.

**Lemma 2:** In the unique despotic equilibrium, only the opponents of the regime are active with probability  $\lambda_D$  from Equation 2, and everyone else abstains. The equilibrium exists if, and only if,  $k \geq k^*$ .

What happens when condition (D) is violated? In this case, some regime supporters will have a strict incentive to become active. In a symmetric equilibrium, this means that  $\lambda = Pr(t \leq t_L(\lambda, \varphi)) = t_L(\lambda, \varphi)$  and  $\varphi = Pr(t > t_R(\lambda)) = 1 - t_R(\lambda)$  must obtain. This yields a system of two equations and two unknowns:

$$\begin{aligned} \lambda &= t_L(\lambda, \varphi) \\ \varphi &= 1 - t_R(\lambda) \end{aligned} \quad (3)$$

This system also has a unique solution,  $(\lambda_A, \varphi_A)$ , with both strictly less than  $1/2$  and positive if, and only if, (D) is not satisfied. This is established in the proof of the following claim.

**Lemma 3:** In the unique anocratic equilibrium, opponents are active with probability  $\lambda_A$ , supporters are active with probability  $\varphi_A$ , where  $(\lambda_A, \varphi_A)$  is the solution to Equation 3, and everyone else abstains. The equilibrium exists if, and only if,  $k < k^*$ .

We can now formally state the result that follows directly from lemmata 2 and 3.

**Proposition 1:** The political action game with incomplete information has a unique symmetric equilibrium that takes the anocratic form when  $k < k^*$  and the despotic form otherwise.

As it is tedious to write “equilibrium that takes the despotic (anocratic) form,” we shall simply refer to despotic (anocratic) equilibria.

### *Status Quo Bias and the Asymmetric Effect of Repression*

One might expect that preventive repression should deter opponents from political action, but we now show that this is not always the case, and that the reason for this has to do with the fact that the deterrent effect of repression is dominant for regime supporters:

**Lemma 4:** Increasing repression makes regime supporters less likely to be active in the anocratic equilibrium.

This result provides a crucial insight into the authoritarian dilemma of using preventive repression to deter political action: *repressive measures deter supporters from engaging in action on behalf of the regime*. This might not be problematic for the regime if they are even more effective in deterring opponents, as is the case in the despotic equilibrium:

$$\frac{d\lambda_D}{dk} = -\frac{1}{\sqrt{1+8k}} < 0. \quad (4)$$

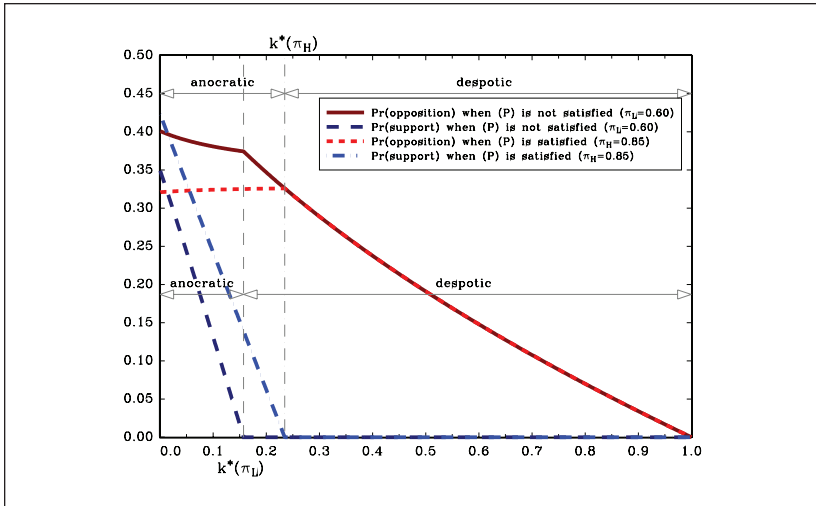
In the anocratic equilibrium, on the contrary, repression weakens the incentive for political participation by supporters and opponents alike, and whereas supporters get unequivocally deterred from action, the opponents might not.

**Lemma 5:** Increasing repression makes regime opponents more likely to be active in the anocratic equilibrium if, and only if, the following equation is satisfied.

$$\theta + \frac{c}{\pi} + \sqrt{1+8k^*} > 2 \quad (P)$$

Condition (P) is not very demanding. For instance,  $c > (1-\theta)\pi$ , which is satisfied for many parameter configurations, is sufficient for it to obtain. Figure 2 shows graphically the two possibilities identified in lemmata 4 and 5. We can summarize the implications as follows:

**Result 1:** Preventive repression has direct and indirect effects in the anocratic equilibrium. The direct effect is deterrent: it discourages regime supporters and dissidents alike from political action. The indirect effect is catalytic: it encourages dissidents to take political action. The status quo bias in favor of supporters gives dissidents a stronger overall incentive to act, and as a result, the catalytic effect can become dominant for them.



**Figure 2.** Repression and political action.  
 Parameters:  $c = 0.1, q = 0.2$  and,  $\pi_L = 0.60$  (weak regime) or  $\pi_H = 0.85$  (strong regime).  
 Condition (P) is satisfied for the strong regime but not for the weak one.

*The Opposing Incentives to Repress*

Turning now to the ruler, recall that he maximizes his probability of political survival and consider his initial choice of repression. In the despotic equilibrium, this probability is  $\Omega_D = (1 - \lambda_D)^2$ , that is, it is the likelihood that no citizen becomes an active dissident. It is immediately obvious from Figure 2 that repression is good for survival here because it suppresses opposition, the only relevant quantity.

In the anocratic equilibrium, however, things are not so simple. The probability of survival here is  $\Omega_A = (1 - \lambda_A)^2 + 2\lambda_A\phi_A \times \pi$ . The first term is the probability that the ruler remains in power unopposed, and the second is the probability that he survives the conflict when it occurs (which increases if supporters are more likely to be active). Figure 2 shows, and the following lemma proves, that repression makes rulers worse off in this equilibrium.

**Lemma 6:** Increasing repression increases the probability of survival in the despotic equilibrium, but decreases it in the anocratic equilibrium.

This leads us to our second fundamental result:



**Result 2:** The ruler's incentives to repress preventively go in opposite directions depending on what equilibrium he expects to induce among the citizens: he wants to decrease repression in the anocratic form, but increase it in the despotic form.

If the ruler expects the anocratic equilibrium, he will always choose the lowest feasible level of repression. Conversely, if he expects the despotic equilibrium, the ruler will always choose the highest feasible level of repression. Which equilibrium he expects depends on which one he is willing to induce, which in turn depends on the maximum level of repression he is capable of implementing. To establish this, we first note that any survival probability the ruler can attain in an anocratic equilibrium can be attained in a despotic equilibrium as well:

**Lemma 7:** For every anocratic repression,  $k < k^*$ , there exists a unique despotic equivalent repression,  $\Delta(k) \in (k^*, 1)$ , such that  $\Omega_A(k) = \Omega_D(\Delta(k))$ . The lower the anocratic repression, the higher its despotic equivalent.

Note the second claim of this lemma: the less repressive an anocratic ruler is, the more the equivalent despot has to repress to achieve the same probability of survival. Anything the ruler can do for political survival in an anocratic equilibrium can be had with more, sometimes a lot more, repression in a despotic equilibrium. The converse is not true: If the ruler can implement sufficiently high levels of repression, the survival probability in the despotic equilibrium will be strictly higher than anything he can attain in an anocratic equilibrium. We can now establish the central result of this article.

**Proposition 2 (Bang-Bang):** Let  $k_L \in (0, k^*)$  denote the lowest feasible cost of political action, let  $k_H \in (k_L, c)$  denote the maximum level of repression the regime is capable of. The optimal level of preventive repression takes one of these two extreme values: If  $k_H > \Delta(k_L)$ , then the ruler sets it to  $k_H$  and the equilibrium takes the despotic form; otherwise, the ruler sets it to  $k_L$  and the equilibrium takes the anocratic form.

If the ruler has sufficient capacity, he always prefers to repress any political action and induce the despotic equilibrium where he survives with high probability and no conflict occurs. If, however, his capacity is somehow constrained, he is strictly better off abandoning repression to make the authoritarian wager:

**Result 3:** The authoritarian wager is the gamble a ruler takes by opening up the regime to contestation when he abandons preventive repression.

When he reduces the costs of political action, the dissidents are encouraged to act, which threatens the status quo and provides an incentive to regime supporters to act in its defense. Thus, emboldening the opposition can, paradoxically, improve the ruler's chances of survival.

To understand the incentive behind the wager, it is useful to separate the anocratic outcomes into (a) *regime reassertion*: no dissidents are active, and the ruler stays in power peacefully; (b) *civil conflict*: both dissidents and supporters are active; and (c) *velvet revolution*: only dissidents are active, and the ruler is deposed peacefully. The most attractive outcome for the ruler is regime reassertion, and its probability depends on how repression affects dissidents. If relaxing repression makes dissidents less likely to be active, then abandoning repression increases the chances that the ruler will reassert his power (Lemma A). As the danger of a velvet revolution is minimized by abandoning repression as well (Lemma C), the ruler would opt to do so.

Things are a bit more involved when relaxing repression makes dissidents more likely to be active. In this case abandoning repression actually minimizes the chances that the ruler will reassert his power (Lemma A) and strictly increases the risk of civil conflict (Lemma B). Neither of these outcomes is particularly attractive to the ruler. However, as the probability of a velvet revolution is increasing with repression (Lemma C), the ruler can at least ensure the lowest possible chance of the worst possible outcome for him. In other words, by opening the system up for political contestation, the ruler is substituting the uncertainty of conflict for the risk of being overthrown in a velvet revolution. That he would do so even though it hurts the chances of outright reassertion of power indicates just how crucial the behavior of his supporters is.

The opening up to political contestation cannot be merely a sop to the dissidents that tries to fob them off with cosmetic changes in an attempt to provide a façade of popular legitimacy for the ruler.<sup>20</sup> It cannot work that way without offering a real, albeit not very large, prospect for change. But this very prospect creates a risk for regime beneficiaries, whose privileged position now comes under threat.

The wager entails risks to the ruler as well. If he has overestimated just how committed his opponents are, the gamble will pay off handsomely as it will merely reassert the ruler's authority. If he has overestimated how popular the regime is with the citizens, the ruler will be in for a terrible surprise when nobody turns out to defend him. This is how a velvet revolution could come to pass. Finally, if the citizens are sufficiently divided in their preferences

about the regime, the wager will bring costly conflict. In that conflict, the ruler could still be deposed but the odds are that he will survive this because the only rulers who take the bet are those who are sufficiently strong to prevail in that conflict with high probability.

The Cultural Revolution in China provides an interesting example of a ruler taking the wager and succeeding in a situation where the potential opponents came from within the party.<sup>21</sup> By the mid-1960s, Mao Zedong had begun to fear that the entrenched party elites were becoming unresponsive to his policy demands in Beijing. As he had no way of discerning who the loyalists were, and who commanded enough local support to be an effective agent for central policy demands, Mao unleashed a process designed to force supporters to flock to his banner. When the Red Guards movement threatened the party elites, they quickly found that they did not have the capacity to repress effectively. Their predicament was deliberately induced by Mao, who often refused to authorize repressive measures and left the elites to fend for themselves.

In Zhejiang province, for instance, this pitted the *southbound cadres*—who had come in 1949 as outsiders and were primarily drawn from the powerful Third Field Army—against the *guerilla cadres*—who had been local communists fighting during the Civil War without much assistance from the North-based party. With the support of the party center, the southbound cadres had come to dominate the provincial power structures, and constituted between 80% and 100% of the Provincial Party Standing Committee membership.<sup>22</sup> They had become the entrenched elite whose loyalties Mao now suspected.

With the collapse of repression orchestrated by Beijing, the local guerilla cadres seized the opportunity to come out in support of Chairman Mao against the southbound cadres. This is not the place to detail the complicated competition for power that ensued with the splintering of the rival movements, and their locally adapted mobilization strategies.<sup>23</sup> What is important is that one of these splinter groups, the Provincial United Headquarters, eventually obtained the backing of Beijing and overthrew the provincial leaderships under Jiang Hua in February 1967. This resulted in further shake-ups that reverberated all the way to Beijing, where Lin Biao—the patron of the “rebels”—became Mao’s comrade in arms, whereas others were expelled from the party (MacFarquhar & Schoenhals, 2006). Although the Cultural Revolution weakened the existing party structure and loosened the party’s grip on the localities, it served its purpose in consolidating Mao’s rule by shattering the entrenched elites who had begun to escape central control, and whose loyalties had become dubious.

## Power and the Structural Causes of the Authoritarian Wager

Consider now two regimes that are equivalent in every respect except that one is stronger than the other in the sense that it has a higher probability of prevailing in a conflict. It should come as no surprise that

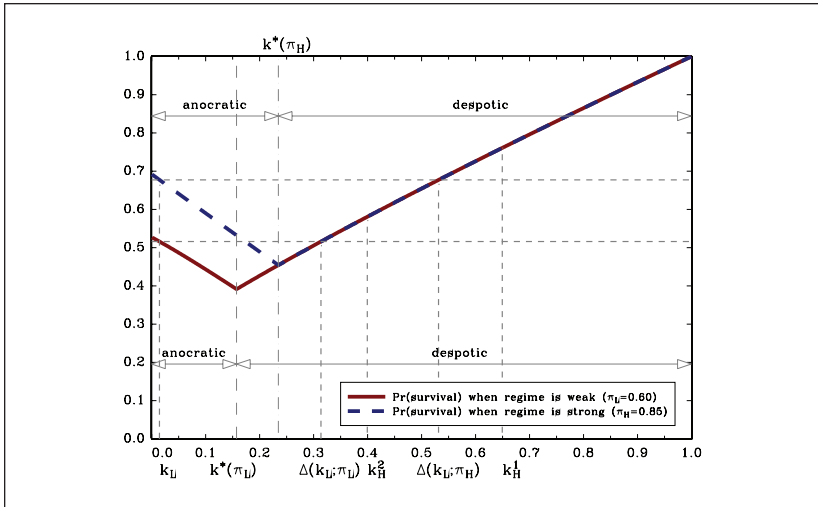
**Lemma 8:** Stronger regimes are as likely to survive as weaker ones in the despotic equilibrium, and more likely to do so in the anocratic equilibrium:  $\frac{d\Omega_D}{d\pi} = 0$  and  $\frac{d\Omega_A}{d\pi} > 0$ .

We expected this result because more powerful regimes have stronger incentives to reduce repression when they cannot ensure the fully despotic stability. What might be surprising is the implication this has for the structural causes of repression collapse. We begin by noting that the fact that stronger regimes have strictly higher expected probabilities of survival in an anocratic equilibrium (Lemma 8) means that they have strictly higher despotic equivalences too (Lemma B). But then Proposition 2 implies that *stronger regimes will be more sensitive to changes in repressive capacity* in the sense that a moderate degradation in that capacity can cause the ruler of a strong regime to abruptly abandon repression, whereas the ruler of a weak regime would respond by scaling repression down to the new maximum capacity.

Figure 3 illustrates this. The two regimes are equivalent except that the weak one's probability of winning the conflict is  $\pi_L$ , and the strong one's probability is  $\pi_H > \pi_L$ . Consider first the case where they both have high repressive capacity, say,  $k_H^1$ . This exceeds the despotic equivalents of  $k_L$  for both regimes, so they both repress at  $k_H^1$  and the despotic equilibrium prevails for both.

Suppose now that for some reason their capacity to repress drops to some moderate level, say  $k_H^2 < k_H^1$ . This is less than the repressive equivalent of  $k_L$  for the strong regime. This means that its ruler is strictly better off abandoning the despotic equilibrium and switching to low repression at  $k_L$  and taking his chances in the probable conflict in the resulting anocratic equilibrium. The moderate repressive capacity, however, still exceeds the despotic equivalent of  $k_L$  for the weak regime. This means that its ruler is strictly better off reducing repression to the new maximum capacity and maintaining the despotic equilibrium. The structural change in capacity will cause repression to collapse suddenly in the strong regime, but only to moderate a bit in the weaker regime.

What does this imply for the Velvet Revolutions? Some Eastern European leaders were not squeamish about unleashing the security forces on the populace in 1989, but they wanted the Soviet Union to backstop any repression



**Figure 3.** The sudden collapse of repression.

Parameters: as in Figure 2. For both regimes, the least cost of political action is at  $k_L = 0.015$ , and the repression constraint is either at  $k_H^1 = 0.65$  (high capacity) or  $k_H^2 = 0.40$  (moderate capacity).

under the Brezhnev Doctrine. When Gorbachev quashed all hopes of that, he effectively imposed an upper limit of what repression could accomplish in the satellites. Even though the more rash of rulers—GDR’s Honecker, for instance—pressed on with repression, most realized that opening up the political field to contestation might be a better bet. They disregarded the Tiananmen Square precedent—the Chinese government, after all, had not relied on external support to do its repression—and ordered the security forces to stand down (and, in GDR’s case, overruled the ruler). This is when the grim reality of communist rule was finally exposed: In most cases, nobody came to defend the regime. Even the regimes’ erstwhile power monopolists, the Communist parties, quickly sought to re-brand themselves following a belated realization of their massive unpopularity.

There is perhaps no better illustration of the depth of delusion than the outcome of the June elections in Poland. Just days prior, the Party’s Central Committee had discussed how the West would react if the opposition failed to gain a single seat in the system that only opened 35% of the seats in Sejm (and all 100 seats in the Senate) to contestation. Instead, the opposition took all seats in the Senate and all but one of the available seats in Sejm. Nobody came to defend the government although many abstained from any political

action (37% in the first round, and 75% in the second). Sovietologists might have been wrong in 1989 when they saw system continuity, but they had thought the regime would actually defend itself. It would have been a reckless forecast that predicted that Gorbachev would suddenly jettison 45 years of foreign policy for the whimsically named “Sinatra Doctrine” that left the satellite government to rule as best they could.<sup>24</sup>

This brings us full circle to the regime’s capacity to repress. Governments might decide to abandon repression when they fear that they would fail if they tried to use it. One naturally thinks of structural constraints that degrade that capacity but one must not forget that political action must be carried out by people, and that they must have incentives to engage in it. The regime’s capacity to repress consists of an “exogenous” component (resources) and an “endogenous” one (the willingness to defend the ruler). The model exposes a trade-off between the two: When the exogenous resource is insufficient to impose sufficiently severe repression—so the government is aware that trying it would lead to failure—the ruler wagers on energizing his supporters by exposing them to the threat of regime overthrow by emboldened opponents—so the government compensates for lack of resources with increased activity by its supporters. Because at the end of the day, the outcome is determined in part by resources and in part by the resulting actions, there exist circumstances under which the wager is a better bet than incomplete repression.

### *Differential Repression*

One might wonder whether our results depend on the assumption that the regime is completely incapable of distinguishing among supporters and opponents when applying preventive repression. The answer is that they do not. Consider an extension of the model, in which the regime has some capacity to differentiate among supporters and opponents, and so preventive repression is less likely to affect its supporters. Let  $\sigma \in (0, 1]$  be a scaling parameter that represents how effective the government is in distinguishing supporters from opponents. Action in support of the government now incurs  $\sigma k$  costs, whereas action against it incurs  $k$  as before.<sup>25</sup> The full analysis is presented in the Online Appendix; here, we summarize the results.

First, the equilibrium again takes an anocratic and a despotic form, with  $k^*(\sigma)$  as the level of repression where the switch occurs. As no supporters are active in the despotic equilibrium, everything that holds for it in the original model holds in the extension as well. All the anocratic equilibrium probabilities of support and opposition exhibit analogous dynamics as well. For instance, there exists a condition analogous to (*P*) that ensures that opponents are more likely to become active as  $k$  increases, and when that condition is

not satisfied, they become less likely to do so. The monotonicity of support is also preserved: As repression increases, supporters are less likely to be active. The more able the regime is to discriminate, the slower the drop off in active support and the faster the drop off in active opposition.

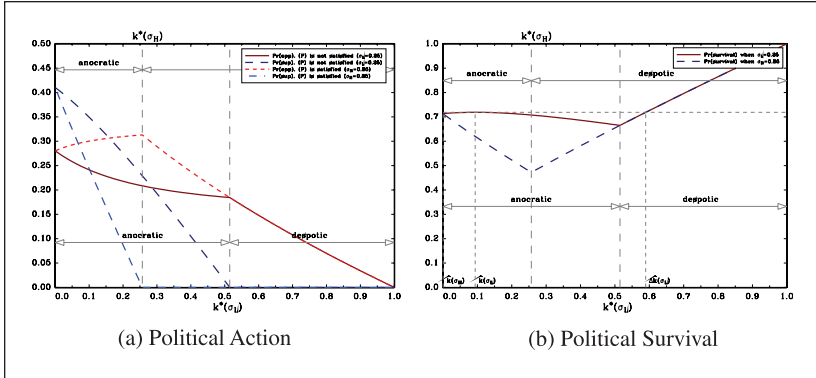
Second, the threshold for switching to the despotic form is higher in the extended model:  $k^*(\sigma) > k^*$ . This is so because with pro-government activities not paying the full cost of preventive repression, previously deterrent levels of repression can now incentivize supporters.

Third, the ability to discriminate has an unambiguous effect in the anocratic equilibrium: the overall probability of survival is strictly higher for all  $k < k^*(\sigma)$  in the extended model. As that probability is the same in the despotic equilibrium in both versions, the result implies that the wager is more attractive to rulers who can selectively target their preventive repression. In other words, small changes in the capacity to repress would make such rulers *more likely* to take the authoritarian wager and rely on their supporters to bail them out.

There is one notable difference in the extended model: As the government becomes better able to differentiate, its survival probability in the anocratic equilibrium is concave when the analog to condition (P) fails. Small increases in repression might increase that probability of survival although larger ones decrease it again. This implies that the expected reduction of repression as a result of the wager will be attenuated: instead of collapsing all the way down to the lowest feasible level, it will only be reduced to the new—still lower—optimal level.

Figure 4 shows the probabilities of political action and survival when the government has relatively high differentiation capacity (the chance of incorrectly repressing a supporter is  $\sigma_L = 0.25$ ) and a more limited one ( $\sigma_H = 0.85$ ). The low capacity case recovers the result from the original model. The high capacity case involves optimum low repression in the anocratic equilibrium ( $\hat{k}(\sigma_L) \approx 0.09$ ). The despotic equivalent to this requires fairly high repression (about  $\Delta\hat{k}(\sigma_L) \approx 0.59$ ). Thus, if repressive capacity were to fall below that level, the ruler will drastically lower repression to the interior optimum (provided it is feasible) and induce the anocratic equilibrium. The authoritarian wager still exists even when the government is relatively good at distinguishing supporters from opponents.

When the government becomes extremely good at differentiation, repression has almost no detrimental effect on the ruler's survival probability, causing the ruler to choose the highest feasible level. Simulations (in the Online Appendix) show that for the authoritarian wager to be attenuated so severely, however, the government's capacity to differentiate would have to be nearly perfect and its capacity to repress would have to fall rather drastically. Thus,



**Figure 4.** The effect of discriminatory capacity. Parameters:  $c = 0.1$ ,  $\theta = 0.35$ , and  $\pi = 0.85$ .

for reasonable settings, where there is still substantial doubt about the preferences of relevant political actors, our main result will persist.

### Conclusion

Research on the surprises of the Velvet Revolutions of 1989 and the Arab Spring of 2011 sometimes veers between two extremes: It either ascribes a decisive role to mass political action (Kuran, 1991) or explains why it is singularly unsuccessful (Stacher, 2012). In reviewing many of these studies, Howard and Walters (2014) complain that they just do not take popular mobilization seriously, and we tend to agree: The former group neglects the repressive capacity of the regime, and the latter overemphasizes it. We do not think, however, that the resolution to these disagreements will be found on studying “why previous assessments of public quiescence in the face of widespread oppression were so dramatically wrong” (p. 400). Instead, we argue that it is the government’s response to public opposition to the regime that needs further attention, and we show that repression truly can be a double-edged sword.

The fundamental problem for an authoritarian government is that it cannot reliably assess the preferences of its citizens and gauge the extent of support and opposition to the regime. Moreover, because the absence of overt political action against an authoritarian regime simply perpetuates its rule, there is a strong status quo bias that favors regime supporters, which tends to dampen their incentive to engage in costly political action in its defense. If the regime



has great repressive capacity, none of that matters: Its ruler becomes a despot and represses almost any political expression save the occasional low-probability outburst of opposition. If, however, the regime labors under some constraint that limits its ability to repress sufficiently harshly, then the differential incentives do matter: the ruler can be strictly better off abandoning repression altogether and allowing open political contestation. Even though he is forced to reduce the costs to political action for both dissidents and opponents because he cannot distinguish among them, and even though this might encourage the dissidents to engage against him with higher probability, it puts the well-being of regime supporters at risk, and gives them an incentive to come to his defense. The result might be serious social conflict and instability, but the ruler's wager is that he would remain in power. Thus, authoritarian rulers abandon repression because in expectation doing so increases their probability of retaining power.

We do not mean to provide a monocausal explanation of regime collapse or mass political action, only to highlight how repression interacts with other features of authoritarian regimes (preference falsification and status quo bias) in ways that make its use as a tool of power less straightforward. Our model shows that under the right conditions, all four mechanisms Tilly (2005, pp. 224-225) posits about possible interactions between repression and mobilization can be activated. The analysis demonstrates that preventive repression often decreases the mobilization of opponents, but it can also sometimes increase it. It also shows that the expectation of mobilization could increase the incentive to repress but can also sometimes decrease it. Whereas Tilly wishes us to study the interplay of mechanisms to figure out which of the four tendencies is realized, we stress that the four mechanisms are incomplete because each assumes a different response by the relevant actor instead of deriving it as part of the mechanism. Instead of arbitrating among the four mechanisms, we should study the endogeneity of the behaviors.

Popular mass actions might acquire momentum and might be contagious, but it is dangerous—for the participants more so than the scholars studying them—to mistake the cause of their success to be the pressure of the masses instead of the failure of the regime to stand firm. The Hungarians did not draw the right inferences from the Polish October in 1956 and ended up with a Soviet invasion. The Bahraini misread what happened in Egypt in 2011 and ended up repressed by their own government and the Saudis. It is not enough for people to take to the streets; the regime must decide not to disperse them. Otherwise, any political gains people make will be illusory and temporary.

## Appendix

### Proofs

**Lemma A:** Fix some  $(\lambda_{-i}, \varphi_{-i})$ , and define  $t_L(\lambda_{-i}, \varphi_{-i}) < 1/2 < t_R(\lambda_{-i})$  such that

$$t_L(\lambda_{-i}, \varphi_{-i}) = \frac{1}{2} - \frac{(\pi\theta + c)\varphi_{-i} + k}{2(1 - \lambda_{-i} - \pi\varphi_{-i})}$$

$$t_R(\lambda_{-i}) = \frac{1}{2} + \left( \frac{1}{2\pi} \right) \left[ (1 - \pi)\theta + c + \frac{k}{\lambda_{-i}} \right].$$

In every equilibrium, citizen  $i$  chooses  $\lambda_i = 1$ , if  $t_i < t_L(\lambda_{-i}, \varphi_{-i})$ ; chooses  $\lambda_i = \varphi_i = 0$ , if  $t_i \in [t_L(\lambda_{-i}, \varphi_{-i}), t_R(\lambda_{-i})]$ ; and chooses  $\varphi_i = 1$ , if  $t_i > t_R(\lambda_{-i})$ .

**Proof of Lemma A:** The payoffs for citizen  $i$  are as follows:

$$U_i(\text{Oppose}; t_i) = \varphi_{-i}(W(t_i) - k) + (1 - \varphi_{-i})(1 - t_i - k)$$

$$U(\text{Abstain}; t_i) = \lambda_{-i}(1 - t_i) + (1 - \lambda_{-i})t_i$$

$$U(\text{Support}; t_i) = \lambda_{-i}(w(t_i) - k) + (1 - \lambda_{-i})(t_i - k)$$

Any equilibrium must be in cut-point strategies:

- $t_i < t_L(\lambda_{-i}, \varphi_{-i}) \Rightarrow U(\text{Oppose}; t_i) > U(\text{Abstain}; t_i) > U(\text{Support}; t_i)$ , so play  $\lambda_i = 1$ ;
- $t_i \in (t_L(\lambda_{-i}, \varphi_{-i}), t_R(\lambda_{-i})) \Rightarrow U(\text{Abstain}; t_i) > U(\text{Oppose}; t_i)$  and  $U(\text{Abstain}; t_i) > U(\text{Support}; t_i)$ , so play  $\lambda_i = \varphi_i = 0$ ;
- $t_i > t_R(\lambda_{-i}) \Rightarrow U(\text{Support}; t_i) > U(\text{Abstain}; t_i) > U(\text{Oppose}; t_i)$ , so play  $\varphi_i = 1$ .

Type  $t_L(\lambda_{-i}, \varphi_{-i})$  is indifferent between Oppose and Abstain, and type  $t_R(\lambda_{-i})$  is indifferent between Support and Abstain. These types have measure zero, so it is immaterial which action they take.

To find an equilibrium, we need to partition the type space for each citizen such that type  $t_L(\lambda_{-i}, \varphi_{-i})$  is indifferent between opposing and abstaining, whereas type  $t_R(\lambda_{-i})$  is indifferent between supporting and abstaining, and the probabilities,  $(\lambda_{-i}, \varphi_{-i})$ , reflect where these types are cut-point-

strategies considerably simplifies this task because it implies that  $\lambda_{-i} = Pr(t_{-i} < t_L(\lambda_i, \varphi_i)) = \max(0, t_L(\lambda_i, \varphi_i))$  and that  $\varphi_{-i} = Pr(t_j > t_R(\lambda_i)) = \max(0, 1 - t_R(\lambda_i))$ .

**Proof of Lemma 1:** Suppose that in equilibrium  $\lambda_{-i} = 0 \Leftrightarrow t_L(\lambda_i, \varphi_i) \leq 0$ . This implies that  $U(A; t_i) = t_i > t_i - k = U(R; t_i)$ , which means that  $\varphi_i = 0$ , so

$$t_L(\lambda_i, 0) = \left(\frac{1}{2}\right) \left(1 - \frac{k}{1 - \lambda_i}\right) \leq 0 \Rightarrow \lambda_i \geq 1 - k > 0.$$

As  $\lambda_i = Pr(t_i \leq t_L(0, \varphi_{-i}))$ ,

$$t_L(0, \varphi_{-i}) \geq 1 - k \Leftrightarrow 2k - \frac{(c + \pi\theta)\varphi_{-i} + k}{1 - \pi\varphi_{-i}} \geq 1,$$

which cannot be because  $k < 1$ , a contradiction. Therefore,  $\lambda_{-i} = 0$  cannot occur in equilibrium.

**Proof of Lemma 2:** Equation 1 expands to following the quadratic:

$$\lambda = \frac{1}{2} - \frac{k}{2(1 - \lambda)},$$

but only the smaller root is a valid probability, which yields  $\lambda_D$  in Equation 2. Ensuring  $\varphi = 0$  requires  $t_R(\lambda_D) \geq 1 \Leftrightarrow k \geq \bar{w}\lambda_D$ . As the left-hand side is increasing in  $k$  and the right-hand side decreasing, there will be at most one unique  $k^*$ , defined in (D), for which this is satisfied with equality.

**Proof of Lemma 3:** Write Equation 3 as

$$3\lambda - 2\lambda^2 - 2\pi\lambda\varphi = 1 - k - \zeta\varphi \quad (5)$$

$$2\pi\lambda\varphi = \bar{w}\lambda - k \quad (6)$$

where  $\zeta \equiv (1 + \theta)\pi + c > \pi$ . Neither variable exceeds  $1/2$  at the solution. This system yields the cubic,

$$G(\lambda) = -2\lambda^3 + (3 - \bar{w})\lambda^2 - \left(1 - 2k - \frac{\bar{w}\zeta}{2\pi}\right)\lambda - \frac{k\zeta}{2\pi} = 0. \quad (7)$$

As the coefficient of the cubic term is negative, it follows that

$$\lim_{\lambda \rightarrow -\infty} G(\lambda) = +\infty \quad \text{and} \quad \lim_{\lambda \rightarrow +\infty} G(\lambda) = -\infty.$$

As  $G(0) < 0$ , these imply that Equation 7 must have at least one root,  $\lambda_1 < 0$ . Because the solution must be positive and cannot exceed  $1/2$ , we must show the existence of a real root,  $\lambda_2 \in (0, 1/2)$ , for which showing that  $G(1/2) > 0$  is sufficient. Suppose that  $k < \bar{w}\lambda_D$ , which implies that  $\bar{w} > 2k$  because  $\lambda_D < 1/2$ . But then

$$G\left(\frac{1}{2}\right) = \left(\frac{1}{4}\right) \left[ 2k + (\bar{w} - 2k) \left( \frac{\zeta}{\pi} - 1 \right) \right] > 0$$

follows because  $\zeta > \pi$  implies that the bracketed term is positive whenever  $\bar{w} > 2k$ . Thus, if (D) fails, then  $\lambda_A \in (0, 1/2)$  exists and is unique, which in turn means that  $\varphi_A < 1/2$  also exists and is unique. Showing that  $\varphi_A > 0$  only if (D) fails is straightforward and relegated to the Online Appendix.

**Proof of Lemma 4:** Consider the anocratic equilibrium. As both Equations 5 and 6 must hold in equilibrium, we differentiate both their sides with respect to  $k$ :

$$(3 - 4\lambda_A - 2\pi\varphi_A) \cdot \frac{d\lambda_A}{dk} + 1 = -(\zeta - 2\pi\lambda_A) \cdot \frac{d\varphi_A}{dk} \quad (8)$$

$$-(\bar{w} - 2\pi\varphi_A) \cdot \frac{d\lambda_A}{dk} + 1 = -2\pi\lambda_A \cdot \frac{d\varphi_A}{dk} \quad (9)$$

As  $3 - 4\lambda_A - 2\pi\varphi_A > 0$  and  $\zeta - 2\pi\lambda_A > 0$ , Equation 8 implies that

$$\frac{d\lambda_A}{dk} \geq 0 \Rightarrow \frac{d\varphi_A}{dk} < 0.$$

As Equation 6 tells us that  $\bar{w} - 2\pi\varphi_A > 0$ , Equation 9 further implies that

$$\frac{d\lambda_A}{dk} \leq 0 \Rightarrow \frac{d\varphi_A}{dk} < 0,$$

we conclude that  $\frac{d\varphi_A}{dk} < 0$ .

**Proof of Lemma 5:** Consider the anocratic equilibrium. We shall show that  $\lambda_A$  is monotonic. At the optimum,

$$\left. \frac{dG}{dk} \right|_{\lambda=\lambda_A} = \left. \frac{\partial G}{\partial \lambda} \right|_{\lambda=\lambda_A} \cdot \left. \frac{d\lambda}{dk} \right|_{\lambda=\lambda_A} + \left. \frac{\partial G}{\partial k} \right|_{\lambda=\lambda_A} = 0.$$

As

$$\frac{\partial G}{\partial \lambda} = -6\lambda^2 + 2(3 - \bar{w})\lambda - \left( 1 - 2k - \frac{\bar{w}\zeta}{2\pi} \right),$$

using the fact that Equation 7 holds at the optimum tells us that

$$\left. \frac{\partial G}{\partial \lambda} \right|_{\lambda=\lambda_A} = (3 - \bar{w} - 4\lambda_A)\lambda_A + \frac{k\zeta}{2\pi\lambda_A} > 0,$$

where the inequality follows from  $\bar{w} < \pi$  and  $\lambda_A < 1/2$ , which imply that

$3 - \bar{w} - 4\lambda_A > 3 - \pi - 2 > 0$ . Letting  $f(k) = \left. \frac{\partial G}{\partial k} \right|_{\lambda=\lambda_A}$ , we conclude that

$$\operatorname{sgn} \left( \left. \frac{d\lambda}{dk} \right|_{\lambda=\lambda_A} \right) = -\operatorname{sgn}(f(k)).$$

As

$$f(k) = 2\lambda_A - \frac{\zeta}{2\pi}, \tag{10}$$

we obtain

$$\frac{df}{dk} = 2 \cdot \left. \frac{d\lambda}{dk} \right|_{\lambda=\lambda_A} \Rightarrow \operatorname{sgn} \left( \frac{df}{dk} \right) = -\operatorname{sgn}(f(k)).$$

That is,  $f(k) > 0$  requires that  $f$  is decreasing, whereas  $f(k) < 0$  requires that it is increasing, which implies that  $f$  cannot change sign. We conclude that  $f$  is either always positive or always negative, which implies that

$\left. \frac{d\lambda}{dk} \right|_{\lambda=\lambda_A}$  must be monotonic as well.

We now use the fact that  $\lambda_A(k^*) = \lambda_D$  and examine  $f(k^*)$ : as  $f$  is monotonic, the sign at  $f(k^*)$  is going to tell us the sign everywhere. Now we obtain

$$f(k^*) = 2\lambda_D - \frac{\zeta}{2\pi} = \left( \frac{1}{2} \right) \left( 3 - \sqrt{1 + 8k^*} - \frac{\zeta}{\pi} \right) < 0.$$

Substituting for  $\zeta$  yields (P). Thus, if (P) is satisfied,  $f(k) < 0$ , so  $\lambda_A$  is increasing; otherwise, it is decreasing.<sup>26</sup>

**Proof of Lemma 6:** Using  $\Omega_D = (1 - \lambda_D)^2$ , we show that it is strictly increasing in repression:

$$\frac{d\Omega_D}{dk} = \frac{\partial\Omega_D}{\partial\lambda_D} \cdot \frac{d\lambda_D}{dk} = -2(1 - \lambda_D) \cdot \frac{d\lambda_D}{dk} > 0.$$

The survival probability in the anocratic equilibrium is  $\Omega_A = (1 - \lambda_A)^2 + 2\lambda_A\varphi_A \times \pi$ . As

$$\frac{d\Omega_A}{dk} = 2 \left[ \pi\lambda_A \cdot \frac{d\varphi_A}{dk} - (1 - \lambda_A - \pi\varphi_A) \cdot \frac{d\lambda_A}{dk} \right],$$

we need to show that

$$\pi\lambda_A \cdot \frac{d\varphi_A}{dk} < (1 - \lambda_A - \pi\varphi_A) \cdot \frac{d\lambda_A}{dk}.$$

We use Equations 8 and 9 to obtain

$$2\pi\gamma\lambda_A \cdot \frac{d\lambda_A}{dk} = \zeta - 4\pi\lambda_A,$$

$$2\pi\gamma\lambda_A \cdot \frac{d\varphi_A}{dk} = 4(\lambda_A + \pi\varphi_A) - 3 - \bar{w}$$

where

$$\gamma = 3 - 4\lambda_A - \bar{w} + \frac{(\bar{w} - 2\pi\varphi_A)\zeta}{2\pi\lambda_A} > 0. \quad (11)$$

Thus, we need to show that

$$\pi\lambda_A \left[ 4(\lambda_A + \pi\varphi_A) - 3 - \bar{w} \right] < (1 - \lambda_A - \pi\varphi_A)(\zeta - 4\pi\lambda_A). \quad (12)$$

We now decompose the left-hand side as follows:

$$\pi\lambda_A \left[ 4(\lambda_A + \pi\varphi_A) - 3 - \bar{w} \right] = (1 - \bar{w})\pi\lambda_A - 4\pi\lambda_A(1 - \lambda_A - \pi\varphi_A),$$

which allows us to simplify Equation 12 to

$$(1 - \bar{w})\pi\lambda_A < (1 - \lambda_A - \pi\varphi_A)\zeta,$$

which holds because  $\pi < \zeta$  and

$$(1 - \bar{w})\lambda_A < \frac{1}{2} - \frac{\bar{w}}{2} < \frac{1}{2} - \pi\varphi_A < 1 - \lambda_A - \pi\varphi_A,$$

where the first and third steps follow from  $\lambda_A < 1/2$ , and the second step from  $\bar{w} > 2\pi\varphi_A$ . Thus,  $\Omega_A$  is strictly decreasing in  $k$  in the anocratic equilibrium.

**Proof of Lemma 7:** Proposition 1 implies that the probability of survival is continuous at  $k^*$  where  $\Omega_A = \Omega_D$ . By Lemma 6, the probability is  $V$ -shaped in  $k$ . The claim follows from:

$$\lim_{k \rightarrow 1} \Omega_D = 1 > 1 - [2(1 - \pi\varphi_A) - \lambda_A]\lambda_A = \Omega_A.$$

Lemma 6 also implies that  $\Delta(k)$  is decreasing.

**Proof of Proposition 2:** Lemmata 6 and 7 guarantee that  $\Omega_A(k_L) > \Omega_A(k)$  for any  $k \in (k_L, k^*)$  and  $\Omega_A(k_L) > \Omega_D(k)$  for any  $k \in [k^*, \Delta(k_L)]$ , and that  $\Omega_D(k) > \Omega_A(k_L)$  for any  $k > \Delta(k_L)$ .

**Proof of Lemma 8:** For the first claim,

$$\frac{d\Omega_D}{d\pi} = -2(1 - \lambda_D) \cdot \frac{d\lambda_D}{d\pi} = 0.$$

For the second claim, differentiate Equations 5 and 6:

$$(3 - 4\lambda_A - 2\pi\varphi_A) \cdot \frac{d\lambda_A}{d\pi} + (1 + \theta - 2\lambda_A)\varphi_A = -(\zeta - 2\pi\lambda_A) \cdot \frac{d\varphi_A}{d\pi} \quad (13)$$

$$(\bar{w} - 2\pi\varphi_A) \cdot \frac{d\lambda_A}{d\pi} + (1 + \theta - 2\varphi_A)\lambda_A = 2\pi\lambda_A \cdot \frac{d\varphi_A}{d\pi} \quad (14)$$

which imply that

$$\frac{d\lambda_A}{d\pi} < 0. \quad (15)$$

To show that

$$\frac{d\Omega_A}{d\pi} = 2\lambda_A\varphi_A - 2(1 - \lambda_A - \pi\varphi_A) \cdot \frac{d\lambda_A}{d\pi} + 2\pi\lambda_A \cdot \frac{d\varphi_A}{d\pi} > 0,$$

simply it to

$$(1 + \theta)\lambda_A > [2(1 - \lambda_A) - \bar{w}] \cdot \frac{d\lambda_A}{d\pi},$$

which holds because  $2(1 - \lambda_A) - \bar{w} > 1 - \bar{w} > \pi - \bar{w} > 0$ , and so Equation 15 implies that the right-hand side is negative.

**Lemma B:** Stronger regimes have higher despotic equivalent repression levels.

**Proof of Lemma B:** Take any  $k < k^*(\pi)$  at some  $\pi$ , and consider some  $\hat{\pi} > \pi$ . As  $k^*$  is increasing in  $\pi$ , it follows that  $k < k^*(\hat{\pi}) < k^*(\pi)$ , so  $k$  induces the anocratic equilibrium under  $\hat{\pi}$  as well. Lemma 8 implies that  $\Omega_A(k; \hat{\pi}) > \Omega_A(k; \pi)$ . We need to show that  $\Delta(k; \hat{\pi}) > \Delta(k; \pi)$ .

If  $\Delta(k; \pi) < k^*(\hat{\pi})$ , then  $\Omega_D(\Delta(k; \pi); \hat{\pi}) = \Omega_A(\Delta(k; \pi); \hat{\pi}) > \Omega_D(k^*(\hat{\pi}); \hat{\pi}) = \Omega_D(k^*(\hat{\pi}); \pi) > \Omega_D(\Delta(k; \pi); \pi)$ . But then  $\Omega_A(k; \hat{\pi}) = \Omega_D(\Delta(k; \hat{\pi}); \hat{\pi}) > \Omega_D(\Delta(k; \pi); \hat{\pi})$ , where the inequality follows from Lemma 7 because  $k < \Delta(k; \pi)$ , yields the result.

If  $\Delta(k; \pi) > k^*(\hat{\pi})$ , then the fact that  $\Omega_A(k; \hat{\pi}) > \Omega_D(k^*(\hat{\pi}); \hat{\pi})$  and  $\Omega_D(k^*(\hat{\pi}); \hat{\pi}) < \Omega_D(\Delta(k; \pi); \hat{\pi}) = \Omega_D(\Delta(k; \pi); \pi)$  implies that there exists  $\tilde{k} \in (k, \Delta(k; \pi))$  such that  $\Omega_A(\tilde{k}; \hat{\pi}) = \Omega_A(k; \pi) = \Omega_D(\Delta(k; \pi); \pi) = \Omega_D(\pi(\tilde{k}; \hat{\pi}); \hat{\pi})$ . That is,  $\Delta(\tilde{k}; \hat{\pi}) = \Delta(k; \pi)$ . But then  $\Omega_A$  decreasing in  $k$  implies that  $\Omega_A(k; \hat{\pi}) > \Omega_A(\tilde{k}; \hat{\pi})$ , which, by Lemma 7, means that  $\Delta(k; \hat{\pi}) > \Delta(\tilde{k}; \hat{\pi}) = \Delta(k; \pi)$ , yielding the result.

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**Supplemental Material**

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**Notes**

1. For a sober assessment of what the Central Intelligence Agency did and did not predict, see MacEachin (1996). The declassified national intelligence estimates, including NIE 11/12-9-88, May 1988, *Soviet Policy Toward Eastern Europe Under Gorbachev*, are available in Fischer (1999).
2. Tullock (1987), Duvall and Stohl (1988), B. Bueno de Mesquita, Smith, Siverson, and Morrow (2003), Davenport (2007), and Ritter (2014).
3. Wintrobe (1998), Verdier, Acemoglu, and Robinson (2004), Gandhi and Przeworski (2006), Svoboda (2009), and Acemoglu and Robinson (2010).
4. Ginkel and Smith (1999) show how dissidents who are better informed about the power of the regime than the rest of the public could signal to the latter when it is appropriate to mobilize. E. Bueno de Mesquita (2010) provides a mechanism in which revolutionary vanguards use violence to coordinate the beliefs of potential protesters.
5. One cannot simply side-step this problem by arguing that cascades provide an explanation of mass political action instead of successful revolutions. The core of the mechanism relies on strength in numbers: the more people show up, the more likely is that they will prevail, which in turn encourages more to show up (DeNardo, 1985). If the correspondence between numbers and probability of success is broken, the mechanism falls apart.
6. Svoboda (2012), Lee (2015), and McMahon and Slantchev (2015) study how the government can provide incentives to the military to remain loyal, which can in turn affect whether it resorts to repression. They do not study the effectiveness of repression itself.
7. Zhou (2019) studies the possibility of collective punishment that involves not only the rebels but also people who simply failed to report the existence of an opposition.
8. Gurr (1970, Ch. 5-6); Dallin and Breslauer (1970); Tilly (1978); Duvall and Stohl (1988); Lichbach (1995); Moore (1998); Hafner-Burton, Hyde, and Jablonski (2013); Danneman and Ritter (2014).
9. Chong (1991) is among the few who model supporters in addition to dissidents and a ruling regime. His actors, however, have “propensities” for certain kinds of actions and make no deliberate choices.
10. Some governments might not care whom they repress. Randomness could be the essence of the strategy. The government targets indiscriminately because

unpredictability makes repression more terrifying as anyone could be a victim, which in turn contributes to anxiety (Thornton, 1964, p. 81). This atomizes society, increases everyone's suspicions of everyone else, and renders organized resistance extremely risky (Duvall & Stohl, 1988, p. 239). Stalin's purges certainly were of this kind (Dallin & Breslauer, 1970).

11. The right to assembly is a fundamental freedom to dissent (Inazu, 2012), and sometimes comes under attack even in liberal societies, as the "Citizens' Security Law" enacted in Spain on March 26, 2015 illustrates (Osterweil, 2015).
12. We discuss an extension where the government has some ability to discriminate among dissidents and loyalists in the last section.
13. See Casper and Tyson (2014) for a model of elite coordination following public protests, and Bove, Platteau, and Sekeris (2017) on targeting repression to both elites and masses. Incentivizing the repressive apparatus properly also has separate implications for preventive repression (Dragu & Przeworski, 2019).
14. We refer to an arbitrary citizen as "she" and the ruler as "he." Note that what we label as "citizens" could also refer to arbitrary politically relevant actors (e.g., the military, the elite, labor unions, and so on.)
15. Reactive repression is automatic provided the regime obtains active support. This is consistent with the "law of coercive responsiveness" while accounting for the fact that when the government might be uncertain *ex ante* whether it would be able to repress.
16. The conflict outcome is the only one that permits someone to be on the "wrong side" behaviorally. As we assume that the regime stays unless there is unchallenged opposition, there are no supporters that end up on the "wrong side" when it falls because of such action.
17. This result is formally stated in Lemma A in the Online Appendix, where all results referenced hereafter and various proofs can be found.
18. As the citizens are faced with a coordination problem and are assumed to be effectively anonymous (so cannot use pre-play communication), it is natural to restrict attention to symmetric equilibria. In particular, it is not reasonable to expect the citizens to coordinate expectations on precisely one of them supporting the regime with positive probability. We shall, therefore, require that  $t_R < 1$  is either true for both citizens or for neither.
19. To obtain the bounds on  $k^*$ , note that  $h(\bar{w})$  is decreasing and  $\bar{w} \in (0, 1)$ . This means that  $k^* < \bar{w}/2 < 1/2$ , yielding the upper bound on  $k^*$  reported in (D).
20. Magaloni (2006) and Schedler (2006), among others, have made this claim with respect to autocrats holding elections.
21. See the following section "Power and the Structural Causes of the Authoritarian Wager" for the Polish case, in which the government's wager failed spectacularly.
22. Data made available by Mingxing Liu and Dong Zhang, collected from various sources.
23. I thank Mingxing Liu and Wuyue You for writing up a most useful narrative of these events, and sending me their data analysis. See also Zhang, Liu, and Shih (2018).

24. Linz and Stepan (1996) attribute the simultaneity and success of the revolutions to the collapse of ideological confidence and will to use coercion in the USSR. See also Sharman (2003) and Collins (1995).
25. The original model has  $\sigma = 1$ , and a perfectly discriminating government would have  $\sigma = 0$ .
26. As  $\sqrt{1+8k^*} > 1$ , an easy sufficient condition for  $f(k^*) < 0$  is that  $\zeta > 2\pi$  (this can also easily be seen from Note 10 by observing that  $\lambda_A < 1/2$ ).

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