Elections in Non-Democracies*

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Abstract

Free and fair elections are the cornerstone of a democratic system, but elections are common in other regimes as well. Such an election might be a pure farce, with the incumbent getting close to 100% of the vote. In other instances, incumbents allow opposition candidates to participate and campaign and limit electoral fraud, all to make elections appear fair. In our model, the incumbent knows his popularity, and having a fair election signals his popularity to the people. After the election, heterogeneous citizens decide whether or not to protest, and they are more willing to do so if they expect others to protest as well. We demonstrate theoretically that regimes that have a high level of elite repression are less likely to have fair elections, but regimes with a high cost of protesting for ordinary citizens make fair elections more likely. These findings are consistent with empirical evidence we provide.

Keywords: non-democratic politics, dictatorship, elections, fraud, protests, revolutions, signaling.

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1 Introduction

In a non-democratic regime, having an election or not, allowing a serious opponent to take part or preventing opposition leaders from running, and choosing the extent to which the population is informed about the outcome are all parts of the incumbent's strategy set (Acemoglu and Robinson, 2006, Besley and Kudamatsu, 2008, B. Bueno de Mesquita et al., 2003, Svolik, 2008). At the same time, even winning an election does not guarantee staying in power as the incumbent may still be vulnerable to mass protests (E. Bueno de Mesquita, 2010, Edmond, 2013, Fearon, 2011, Shadmehr and Bernhardt, 2011). The non-democratic leader is interested not only in maximizing his chances to get more votes than his opponent, but in projecting strength, persuading the populace in his overwhelming support. The fact that the people can interpret not only the election outcome, but the leader's own decisions such as allowing opposition candidates to run, as signals of his strength or weakness, complicates the incumbent's problem.

This paper builds a theory of competitive elections in nondemocracies. We model an incumbent leader who faces possible mass protests and tries to minimize their scope. He might choose to run in a competitive election, which, even if not perfectly fair and fraudless, is informative about his relative popularity, or to run effectively unopposed. The problem is that to have competitive election one needs real opposition, which might be all but fledgling if the regime is sufficiently repressive (see Section 3 for anecdotal evidence). However, what is a problem for a popular dictator may be an opportunity for one that fears to show his unpopularity, because citizens would not necessarily interpret running unopposed as a sign of weakness, but possibly as a natural feature of a repressive regime where no one dares to challenge the dictator. Our question therefore is how the repressive nature of the regime affects the competitiveness and fairness of elections.

Our theory is based on information asymmetry between the dictator and citizens, and as such it is difficult to test directly, as the information possessed by the dictator (and possibly by citizens, if polls are unavailable, or citizens do not trust them) is unobservable. Fortunately, the theory yields comparative static results that can be tested, which we do to support our theory. Specifically, our theory predicts that the elite repression and oppression of common citizens affect elections in countervailing ways. In a *repressive* regime, where challenging the dictator is costlier, the citizens are less likely to view the dictator who runs unopposed as weak. As a result, the dictator will be under less pressure to have competitive elections to signal his strength or popularity, and therefore regimes that are repressive against the elites will have fewer competitive elections.

In contrast, in a *cruel* regime, where participation in mass protests is costlier for citizens, only citizens who are very skeptical about the dictator's chance of survival would be inclined to protest.

In other words, in such regimes, the dictator is likely more popular than the marginal protester thinks. In a game of dissuading the marginal protester, the incumbent is more likely to benefit from revealing his popularity in a cruel regime, and therefore cruel regimes will have more competitive elections. Both of our predictions are in line with the empirical results of Section 6.[1]

To understand *why autocrats have elections*, we seek to explain *why some autocrats allow relatively free elections, while others make them pure farce.* We believe that one cannot answer the former question without answering the latter, because the reasons to have a free election and a sham election must be very different. At the same time, our explanation for which type of election a dictator would choose conditional on having elections provides a straightforward answer to the question on why have elections at all. Namely, elections provide signaling opportunities that a dictator may or may not take, whereas canceling election is likely to send a strong signal of regime weakness: indeed, this would say that not only the dictator is afraid to run against a credible opponent in a free election, but also not strong enough to organize a sham election. Authoritarian regimes that inherited regular or semi-regular elections from previous regimes are likely to retain elections for signaling purposes. At the same time, nondemocratic regimes that did not have a democratic predecessor and countries that never had elections to the high office (e.g., China) would not be inclined to have elections, because there the absence of elections would be interpreted as a norm, not a weakness. Our theory suggests that such a regime would introduce elections only if the signaling value is very high, because after having a relatively free election once, not doing so the next time would send a strong negative signal and thus be dangerous to the regime. Thus, the theory contributes to our understanding why autocrats have elections at all.

The rest of the paper is organized as follows. Section 2 overviews the related literature. Section 3 discusses examples. Section 4 introduces the setup, and Section 5 analyzes the model. Section 6 discusses data and empirical evidence, while Section 7 concludes. The not-for-publication Appendix contains the proofs; the working paper version contains extensions.

[1] Our cross-country analysis in Section 6 demonstrates a robust correlation between elite repression and cruelty on the one hand and incidence of fair elections on the other. Reasonable objections could be raised about interpretation of variables, definition of fair elections, and quality of measurement. Most critically, our results establish correlation, not causation. While it is possible that the definition of fair elections is country-specific and changes over time, we partly alleviate this concern by using country and year fixed effects in most of our specifications.

2 Literature Review

There is a substantial literature that strives to explain elections held by autocrats (see Gandhi and Lust-Okar, 2009, Miller, 2010, and Gehlbach, Sonin, and Svolik, 2016, for recent surveys). Przeworski (2009) describes 'plebiscitary elections,' which the regime uses to demonstrate that it can "force everyone to appear in a particular place on a particular day and perform the act of throwing a piece of paper into a designated box" (Magaloni, 2006, and Blaydes, 2008, find evidence of this motive in Mexico and Egypt, respectively). Along a similar line, Simpser (2013) suggests that electoral fraud can be used to demonstrate strength by showing the capacity to organize fraud. In our view, this argument does not explain why signaling capacity by the regime must take the form of elections rather than, say, mass rallies or enforcing state-approved haircuts (as in North Korea). Another proposed role of elections is to define and enforce power-sharing or rent -sharing agreements among the elites (Londregan and Vindigni, 2006, Boix and Svolik, 2013, Gandhi and Przeworski, 2006, 2007, Geddes, 2006, 2009, Magaloni, 2006). This explanation is more plausible in countries with several major political forces, but arguably less applicable to regimes with few ethnic or factional cleavages. Furthermore, the regime would likely use parliamentary or gubernatorial elections to achieve power-sharing and rent-sharing, whereas our paper deals with elections to the high office, and our empirical results are strongest for such elections.

Another explanation deals with gathering information and learning about local issues through elections. Martinez-Bravo, Padró i Miquel, Qian, and Yao (2017) study the case of local (village-level) democracy in China to support this theory. Miller (2015) finds that a negative shock to the election results prompts autocracies to spend more on education and social welfare. A similar argument is used in Lorentzen (2013) to explain China's tolerance of local protests and in Egorov, Guriev, and Sonin (2009) to explain cross-country and cross-time variation of media freedom in non-democratic regimes. While this theory can explain local elections, it falls short of explaining national elections: a representative poll of relatively few people would be a cheaper and less risky instrument of information-gathering. More importantly, it is not consistent with our empirical results (Section 6): a more cruel regime has less need to be responsive to citizens' needs, which makes information gathering less important; in contrast, we see freer elections in crueler regimes.[2]

Our paper contributes to a broader and growing literature on mass protests in non-democratic regimes. Early models of protests and regime change include Acemoglu and Robinson (2006), which

[2] Another theory worth mentioning is that elections are done to appease the international community (see, e.g., Jeffrey, 1999, on elections in African countries post independence). Such as theory would predict both more repressive and crueler regimes to have more elections, which is inconsistent with the evidence we present.

assume that from time to time potential dissidents ('the poor') are able to overcome the collective action problem and coordinate on protests. In E. Bueno de Mesquita (2010), protests are modeled as a coordination game with multiple equilibria, and the vanguard of revolution moves first, thus altering the focal point for mass protesters (see also Shadmehr and Bernhardt, 2014, Kricheli, Livne, and Magaloni, 2011, Hollyer, Rosendorf, and Vreeland, 2015, and Barbera and Jackson, 2017). The vanguard, however, does not have any informational advantage over the mass followers, and as such has no information revelation or signaling motive. Shadmehr and Bernhardt (2011) model protests as a two-person coordination game and show that limiting public information available to citizens might increase the likelihood of protests as each individual citizen is forced to rely on others' information to a larger extent. Several papers study the role of information in protests using the global games approach (Edmond, 2013, Persson and Tabellini, 2009, Rundlett and Svolik, 2016), which assumes that citizens have private information on either the regime's strength or the common benefits from changing the regime. We assume that citizens' private information corresponds to their personal attitudes to the regime, which are not overridden by revelation of public information. This allows us to get a unique equilibrium for *any* public signal that the dictator may produce, which contrasts with the global games approach, where uniqueness of equilibrium is guaranteed only if the public signal has sufficiently high variance.

Several studies address the relationship between protests and elections in nondemocracies. In Edmond (2013), the dictator has a costly technology to jam the signal available to citizens who might want to protest; citizens do not participate in any elections prior to protests, and do not make any inference based on their results. Little (2013) studies electoral fraud with rational voters; the dictator does not possess superior information and his decisions do not have informational value to the citizens. In a model in which both fraud and protests are decisions made by unitary actors, Kuhn (2011) argues that protests are only possible if the election is won by the incumbent by a narrow margin and there is evidence of fraud. In Little, Tucker, and LaGatta (2015), the results of an election convey the same information to the dictator and the citizens, and the main question is whether or not the dictator agrees to step down voluntarily after losing. Gehlbach and Simpser (2014) study dictators' incentives to manipulate election results in a two-person 'sender-receiver' model. In this context, Rozenas (2016) is particularly interesting, as the main prediction is that a secure dictator would have an unfair election, whereas an insecure one would want to have a free election due to signaling value (see also Luo and Rozenas, 2018). This is complementary to our approach, but it also highlights the difference between popularity as perceived by the dictator, and security interpreted as the likelihood of protests absent new information. Fearon (2011) treats the threat of protests as the only means for the society to enforce regular elections, which are in turn critical for accountability and public goods provision. While studying closely related questions like fraud, none of these papers focuses on the reasons to have competitive and fair elections to the high office and generate predictions that our model does.

Finally, our paper is related to the literature on violence and political repressions in nondemocracies. Acemoglu, Robinson, and Verdier (2004) and Padró i Miquel (2007) show how the use of force and fear helps to extract rents; relatedly, Padró i Miquel and Yared (2012) analyze politics of indirect control under the threat of using violence. In Egorov and Sonin (2015) and Debs (2010), the winner of a power contest decides the fate of the loser and may execute the latter in order to prevent him from challenging his position again. At the same time, Guriev and Treisman (2015) suggest that violence is much less common in modern dictatorships than in the past, and analyze the impact of cooptation of elites and propaganda on dictator's popularity and economic performance. Our paper contributes to this literature by highlighting the differential role of elite repression and oppression of common citizens, and their effect on competitiveness of elections.

3 Examples

In authoritarian regimes, there is often a constitution that stipulates regular elections. Some are pure farce, but many are competitive, even if skewed in favor of the incumbent (Geddes, 2006, Simpser, 2013). In this Section, we discuss some typical examples, demonstrating the range of competitiveness in authoritarian elections. (See Section 6 for systematic evidence.)

Even unfair elections in nondemocracies have different shades. In 1987, 1993, and 1999, Hosni Mubarak, the president of Egypt, held 'elections' in which no other candidate was allowed to run; in 2005, he allowed some token opposition (Blaydes, 2008, Meital, 2006). In early 2011, Mubarak faced mass protests, and ended up under house arrest on corruption charges. A similar pattern of overwhelming victories at the polls followed by losing power as a result of mass protests was repeated in other 'Arab Spring' countries (see, e.g., Weeden, 2008, on 1999 presidential elections in Yemen). In Belarus, Alexander Lukashenko held sham elections in 2001 and 2006; in 2010, he allowed multiple opposition candidates to be on the ballot only to have most of them jailed on the election night; in 2015, main opponents were not allowed on the ballot again.

Yet, many autocrats strive to demonstrate their willingness to stand for reelection. Following the events of the Arab Spring, Nursultan Nazarbayev, Kazakhstan's ruler since independence in 1991, announced that he would run for re-election in 2011 even though his term from the 2005 elections would have expired in 2012; he won on April 3, 2011 with 95.5%. Vladimir Putin of Russia ran for his fourth term in 2018, and, despite barring the main opposition leader from running, made sure that a candidate from the communists (the largest opposition force in Russia since the 1990s) remained on the ballot, even despite direct violations of the law by the latter.[3]

Allowing some opposition candidates is a step forward from running unopposed, but it does not imply that the election was fair. Remarkably, however, some elections in nondemocratic countries pass the bar of 'free and fair' by the OECD observers.[4] In our dataset, which covers 70 non-democracies between 1990 and 2011, roughly a half (87 out of 181) are classified as fair (see Section 6 for a precise definition). These cases include, e.g., elections in Yemen in 1999 and 2006 (polity score = –2), where the incumbent Ali Abdullah Saleh won with 96% and 77% of the vote, respectively, and in Cameroon in 2004 and 2011 (polity score = –4), where the incumbent Paul Biya won with 71% and 78% of the vote, respectively. In Ukraine's election of 2010 (polity score = +6), the challenger Viktor Yanukovych took office; while free elections in a country with this polity score might not be surprising, it is worth noting that the elections of 1994, 1999, and 2004, when Ukraine had a similar or better policy score, were not perceived as fair by international observers.

Having an election, especially competitive one, may carry a significant risk to the incumbent. In 1986 in the Philippines, Ferdinand Marcos was announced the winner of the presidential elections with 75% of the vote, yet mass protests led to reconsideration of the result and Marcos fled the country, bringing his 20-year rule to an end. In Chile, where Augusto Pinochet had been a military dictator since 1973, escalating protests and international pressure forced him to have a referendum in October 1988. He stepped down in 1989, abiding by the results despite the small margin (Angell and Pollack, 1990). In 1994, Joaquín Balaguer, a long-time leader of the Dominican Republic, was announced the winner of the presidential elections by a narrow margin (less than 0.1 percent of the total vote), but pressure from domestic opposition and international community resulted in Balaguer stepping down. In Yugoslavia in 2000, the incumbent Slobodan Milosevic finished second in the first round with 39% of the vote; he resigned following the mass protests before the scheduled run-off. In late 2015, the opposition decisively won the Myanmar elections organized by the military junta, which was certain of their control of the electoral process.[5] However, for every dictator who was ousted as a result of an election or rather of events that followed, there is

[3] *The New York Times*, 1/25/2018, "Victory in Russia Election Assured, Putin Seeks High Turnout."

[4] In his book, Simpser (2013) examines 132 countries covering 1990-2007 and demonstrates that a significant number of elections in non-competitive or "hegemonic" autocracies were not "pure farce," but rather informative, even if manipulated.

[5] *The New York Times*, Nov. 15, 2015, "Victory by Aung San Suu Kyi's Party Catches One Group Off Guard: The Government"

someone like Hosni Mubarak of Egypt, Zine El Abidine Ben Ali of Tunisia, or Nicolae Ceausescu of Romania, who all faced mass protests unrelated to elections, and later house arrest, exile, and firing squad, respectively. Thus, minimizing the scope and danger of protests is a real concern for dictators, and our paper addresses precisely the question of using elections to achieve this goal.

One important aspect of nondemocratic politics is that for potential opposition, involvement in politics usually comes at a great personal cost. Capable potential opposition leaders may choose different occupations or face repression, assassination, or exile, and finding a credible opposition leader, or at least a sparring partner, may be a luxury not every dictator can afford even if it carries signaling benefits. Egorov and Sonin (2015) list dozens of potential contenders who were executed or killed on the incumbent's orders in the world since the 1950s; intimidation and harassment are even more wide-spread (see, Birch, 2012, for data on candidate intimidation among other types of electoral malpractice). In Malaysia, Anwar Ibrahim, a former deputy prime-minister and an opposition leader, was in and out of prison for nearly two decades, with accusation alternating between corruption and sodomy. In 2008, facing death threats, Zimbabwe's Morgan Tsvangirai had to withdraw from the second round of the presidential vote after getting 47.3% in the first round to long-term incumbent Robert Mugabe's 43.1%. In Philippines, Benigno Aquino Jr., an exiled leader of opposition to Ferdinand Marcos who negotiated his return with the government, was assassinated in the airport upon his return to the country in 1983; there was never a definitive investigation.

In Russia, Boris Nemtsov, a former popular governor, a first deputy prime-minister, and an opposition leader, was killed near the Kremlin in February 2015. A few months prior to that, Alexey Navalny, another opposition leader, had his brother jailed on trumped up charges, and he himself faced constant harassment from the government. Despite this harassment, and in another illustration of our modeling assumptions, he was not only allowed to run for mayor of Moscow in 2013; in fact, it was the incumbent mayor Sergey Sobyanin, the candidate supported by the regime, who directly helped Navalny get on the ballot.[6] However, with Navalny gaining steam, he was barred from running against Vladimir Putin in March 2018.[7]

The above examples allow to make several observations. While autocrats hardly ever lose elections, mass protests are a real threat which they face whether or not they have elections. Quite a few elections in non-democracies are perceived as free and fair, and dictators want elections to appear as such even more often. While repression against opponents is widespread, dictators sometimes want to run against real, rather than token, candidates, apparently to signal their popularity

[6] *The New York Times*, 9/6/2013, "Mayoral Run by Putin Critic Vexes Kremlin."

[7] *The New York Times,* 12/26/2017, "Putin May be Re-Election Shoo-in, but He's Taking No Chance."

and strength.

4 Theory

We consider a two-period model of political competition in a nondemocratic context. There are two politicians; one is the incumbent in the first period (D for dictator) and the other is the opposition leader (C for challenger), who would come to power if the dictator is ousted. There is a continuum of citizens who can replace the dictator with the challenger after the first period either at the ballot box (provided that C's name is on the ballot), or by protesting afterwards. The election can be either fair and competitive, with both the incumbent and the challenger on the ballot, or a pure farce, with the incumbent being the sole candidate.[8] The challenger's name may be absent from the ballot for two reasons. First, the incumbent might prevent the challenger from running. Second, if the regime is repressive enough, it is possible that a credible opposition leader would fail to emerge even without the dictator actively banning his participation, for example because potential challengers do not enter to politics or are barred by lower-level officials from participating in lower-level elections that could allow them to get national recognition. If either is true, the incumbent is the only candidate and gets 100% of the vote; conversely, if the challenger is able to run and the dictator allows him to, the election is fair and each citizen votes for either of the two candidates. We assume that if the incumbent loses election, he is out;[9] if the incumbent wins, each citizen decides whether or not to protest, and the number of protesters determines the chances of the incumbent to stay in power. There is no discounting, and each politician gets utility A every period he is in power.

Both politicians are characterized by their abilities, a_D and a_C, which are drawn from the same normal distribution $\mathcal{N}\left(a_0, \sigma_a^2\right)$,[10] and neither is observed by the citizens. However, citizens observe

[8] In reality, the incumbent would often put token opponents on the ballot, an option that we do not model explicitly along with other simplifications that we make. We should note, however, that such a move is very much in line with the spirit of the theory, as by doing so the dictator may hope to persuade at least some people that the election is competitive, and in particular that he did not shy away from the competition.

[9] We do not model the decision whether to acknowledge the result and step down or not, largely because the dictator in our model has enough information to predict the outcome of the election in advance, so he would never lose election on equilibrium path. However, the model is flexible with respect to the margin of loss that actually means that the dictator must step down.

[10] The assumption that abilities are drawn from the same distribution is not important; all results would go through

their personal economic well-being after period 1, which is a signal about the incumbent's ability: if in period $j \in \{1,2\}$ politician $P \in \{D,C\}$ is in office, citizen i gets payoff

$$r_i^P = a_P + \delta_i^P. \tag{1}$$

This specification captures several important features. First, citizens observe their own well-being, but not that of their fellow citizens. Thus, by the end of the first period, they hold heterogeneous beliefs about the dictator's ability a_D. Second, they expect their utility to remain the same as long as the incumbent stays in office: for each citizen, the individual shock δ_i^P depends on the politician in power, but not on the period;[11] all δ_i^P are assumed to be independent and distributed as $\mathcal{N}\left(0,\sigma_\delta^2\right)$. Third, citizens do not have any extra information about the challenger's ability a_C by the end of the first period. We denote the expected net gain of citizen i from regime change by b_i:

$$b_i = \mathbb{E}a_C - r_i^D = a_0 - a_D - \delta_i^D. \tag{2}$$

Citizen i benefits if the dictator is replaced with the challenger when $b_i > 0$, and is worse off otherwise.

The dictator knows his own competence and thus the actual distribution of people's attitudes. He decides whether to allow the challenger to be on the ballot or not; as discussed earlier, the challenger may be missing from the ballot for exogenous reasons as well. We let parameter k capture the repressiveness of the regime against other politicians (or more generally the elite), and we let the probability that the challenger will be able to get on the ballot if the dictator does not forbid him from running by $\eta = \eta(k) \in (0,1)$, with $\eta(k)$ decreasing in k.[12] Importantly, while citizens observe whether or not the challenger is absent from the ballot, they do not know the reason why he failed to qualify, namely whether it is due to the general repressiveness of the regime or because of an explicit decision by the incumbent.

if $a_D \sim \mathcal{N}\left(\mu_D,\sigma_D^2\right)$ and $a_C \sim \mathcal{N}\left(\mu_C,\sigma_C^2\right)$.

[11] This assumption captures the idea that each politician pursues policies which create winners and losers in the society. In the model, this creates a conflict of interest, which guides citizens' voting and protesting behavior (see E.Bueno de Mesquita, 2010). All the results will go through if instead of holding heterogeneous expectations about their payoffs should the incumbent stay in power, citizens receive heterogenous taste shocks which affect their decisions to vote and to protest.

[12] In Appendix B, we present a simple microfoundation of this negative relation between η and k. In a working paper version, we modeled repression as a strategic decision made by the incumbent, with similar results. The current setup is adopted as the simplest one that allows us to focus on testable comparative statics.

If the challenger is not on the ballot, the incumbent is re-elected unanimously. If both politicians are on the ballot, then citizens vote for either D or C; we will show that sincere voting, where i votes for the challenger if and only if $b_i > 0$, is part of an equilibrium. We assume that the incumbent wins the election if the share of votes he gets, τ, is at least $\tilde{\tau} \in (0,1)$, $\tilde{\tau} = \frac{1}{2}$ being the most natural threshold. In the main model, we assume that once the challenger is on the ballot, votes are counted fairly; in Appendix B, we discuss the case where the dictator cannot commit to fair counting and show that our results are robust to this extension.

After the election, if the dictator wins the vote, he may still lose power as a result of mass protests. We follow Persson and Tabellini (2009) in assuming that the probability of dictator leaving the office, π, equals the share of population protesting. Each individual in the society makes the decision to protest independently and simultaneously. A citizen who decided to protest gets a disutility of $-c$ (where $c > 0$); we expect c to be higher in more cruel regimes. At the same time, a citizen gets an extra "warm glow" utility, which reflects personal satisfaction from protesting against the hated regime and, for citizen i, is proportional to his economic dissatisfaction with the regime b_i introduced in (2). More precisely, if citizen i protests and the dictator leaves, i gets an extra utility of αb_i. Citizen i gets some part of this warm glow, γb_i with $\gamma < \alpha$, even if he protested unsuccessfully (e.g., the "Arab Spring" in Tunisia started with a young merchant self-immolating; there were similar episodes following the failure of the Prague Spring in 1968).[13] Clearly, these preferences and intuitions are reversed for a person who strongly supports the dictator (i.e., if b_i is negative and large in absolute value); such a person would never protest as there is no benefit from protesting.

The payoffs from protesting are summarized in the following matrix:

	Dictator leaves	Dictator stays
Citizen protests	$\alpha b_i - c$	$\gamma b_i - c$
Citizen stays home	0	0

(3)

We further make the following assumptions about the parameters in (3):

Assumption 1 *$c > 0$, $\alpha > \gamma > 0$.*

The assumption that $\gamma > 0$ is important: it implies that there is always an agent who protests (for b_is high enough, protesting is a dominant strategy). The second assumption, $\alpha > \gamma$, captures

[13] This is in line with the recent (and growing) literature about ethical actions and warm glow in voting (e.g., Feddersen, Gailmard, and Sandroni, 2009).

the increasing-differences intuition: If citizen i wants the dictator to leave ($b_i > 0$), his propensity to protest is higher if the dictator leaves than if the dictator stays. Indeed, this is equivalent to

$$\alpha b_i - c > \gamma b_i - c, \tag{4}$$

which simplifies to $\alpha > \gamma$.

Finally, we make the following assumption, which ensures the existence and uniqueness of an equilibrium. The assumption says that there is a sufficient variation in citizens' idiosyncratic payoffs from the incumbent's rule. In other words, an individual's attitude toward the dictator, b_i, is not a too good predictor of other citizens' attitudes.

Assumption 2 *The variance of individual taste shocks is sufficiently large:*

$$\sigma_\delta > \frac{1}{2\sqrt{2\ln 2}} \frac{c(\alpha - \gamma)}{\gamma^2}. \tag{5}$$

To summarize, the timing of the game is as follows.

1. The competencies of the incumbent and challenger, a_D and a_C, are realized.

2. Each citizen i gets utility r_i^D; the incumbent learns his competence a_D.

3. The challenger is available to run with probability $\eta(k)$, and if he is, the incumbent decides whether or not to allow him to do so.

4. If the challenger is not on the ballot, the game proceeds to Step 6.

5. Each citizen votes, the votes are counted, and the tally τ is announced. If $\tau < \tilde{\tau}$, the dictator is removed from office, and the game moves to Step 7 with the challenger in power for the second period.

6. Each citizen decides whether or not to protest with their payoffs given by (3).With probability π, where π is the share of those who protest, the challenger becomes the new leader, and with probability $1 - \pi$, the incumbent stays in power.

7. Each citizen i gets their second-period utility r_i^P, both politicians get their payoffs, and the game ends.

In this game, the dictator's strategy maps b into a binary decision whether or not to prevent the challenger from running. Citizen i acts in two stages: in the voting stage, his strategy maps b_i into a vote for D or for C, and in the protesting stage, his strategy maps (b_i, τ) into a binary decision to protest or not, with $b_i \in \mathbb{R}$ and $\tau \in [0,1] \cup \{\varnothing\}$, where we say that $\tau = \varnothing$ if the challenger was not on the ballot. We are interested in perfect Bayesian equilibria in pure strategies, where furthermore citizens vote sincerely (so those with $b_i < 0$ support the dictator and those with $b_i > 0$ support the challenger). We discuss below why such strategies are natural in this game where votes serve as a signal relevant for protests. Throughout the paper, F and f are the c.d.f. and p.d.f. of a standard normal distribution, respectively.

5 Analysis

Our analysis proceeds as follows. First, we study citizens' decisions. We start with the decision to revolt for any public information they may have at this stage and show that under Assumption 2 there exists a unique equilibrium which takes the threshold form: citizens with low b_i do not protest, and citizens with high b_i protest. This is true both in the case where citizens know the value of b and when they only know its distribution, regardless of what this distribution is. We then study citizens' voting decisions and show that sincere voting is an equilibrium. After that, we analyze the incumbent's decision whether or not to prevent the challenger from running. Finally, we formulate testable predictions.

Protesting

We start with characterizing individuals' decisions to protest. Denote $b = a_0 - a_D$ and $\delta_i = -\delta_i^D$; with this notation,

$$b_i = b + \delta_i, \tag{6}$$

where δ_i is distributed as $\mathcal{N}\left(0, \sigma_\delta^2\right)$. This represents b_i, which is known to citizen i, as a sum of the common component b and a zero-mean idiosyncratic shock δ_i. Suppose that by the time of protests (Stage 6), after taking all public information (whether or not the election was competitive and if so, its outcome τ) into account, b is believed to be taken from some distribution G. (This G will depend on the decisions of both the dictator and the challenger, but we keep the notation simple for now.) Thus, we study the decision of citizen i to protest if he thinks that b is taken from distribution G and he also observes his b_i. Notice that (6) implies that b_i is also a signal about b, which is relevant to citizen i because it determines the distribution of signals of other citizens, on which they base their decisions to protest; this, in turn, will determine the probability of success, and this is valuable information for citizen i making the decision.[14]

Each citizen i, knowing b_i, updates her priors on the distribution of b, thus getting distribution $G_{b_i} = G \mid b_i$.[15] Because of the simple equation (6) that links b and b_i, we prove (the formal statement and its proof are in the Appendix) that G_x first-order stochastically dominates G_y whenever $x > y$: for any $\xi \in \mathbb{R}$ such that $0 < G(\xi) < 1$, we have $G_x(\xi) < G_y(\xi)$.

In a pure-strategy equilibrium, each individual i decides whether or not to protest. Consider the set of protesters: let R_G denote the set of $x \in \mathbb{R}$ such that a citizen who got $b_i = x$ decides to protest. It is natural to expect (see the Appendix for the full proof) that this set takes a form $R_G = [z_G, +\infty)$, where individual i with $b_i = z_G$ is indifferent.[16] If so, the share of protesters, and thus the chance that the dictator loses office, equals

$$\hat{\pi}_G = \hat{\pi}_G(b) = \Pr(b + \delta_i > z_G) = 1 - F\left(\frac{z_G - b}{\sigma_\delta}\right). \tag{7}$$

However, someone who does not know b (e.g., citizen i with $b_i = x$) needs to integrate over all possible values of b; for this person, the perceived probability of success is

$$\pi_x = \Pr(b + \delta_j > z_G \mid b + \delta_i = x) = 1 - \int_{-\infty}^{+\infty} F\left(\frac{z_G - b}{\sigma_\delta}\right) dG_x(b). \tag{8}$$

(With a slight abuse of notation, we write π_x instead of π_{G_x}.) Lemma A1 implies that π_x is increasing in x, and so citizens who got a higher b_i become more optimistic about the size of protests, even though they are aware of a fixed threshold strategy that other citizens use. Intuitively, a high b_i serves as a signal of their individual (low) utility under the incumbent regime, and since it is also

[14] The protesting game has a lot in common with global games (Carlsson and van Damme, 1993), which are often used to get unique equilibria in games with strategic complementarities such as currency attacks or mass protests. In this paper, we make a departure from the standard approach. Technically, we assume that b_i is not merely a signal about the aggregate variable b; it is also a parameter that enters the payoff of citizen i directly. There are two reasons for this approach. First, we believe that citizens have heterogenous benefit from removing the dictator; their conflict of interests would not vanish if they met together and aggregated their signals, and thus it is realistic to think of b_i as a preference parameter which just happens to be informative of the whole distribution. Second, we are interested in a unique equilibrium even if there is no uncertainty about the underlying variable b, because in our model the dictator has the ability to reveal b by organizing fair competitive elections.

[15] More precisely, G_x is the probability distribution of b conditional on $b + \delta_i = x$, given by $G_x(y) = \Pr(b \leq y \mid b + \delta_i = x) = \frac{\int_{-\infty}^{y} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{-\infty}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}$.

[16] An open interval $R_G = (z_G, +\infty)$ is also possible, but we can just assume that the indifferent individuals protest without any loss of generality.

a signal of the aggregate, such citizen believes that many other people feel bad about the incumbent as well. Thus, more of them fall above the protest cutoff z_G, and therefore the share of protesters and the chance of success is higher.

For any individual i with $b_i = x$, the expected continuation utilities from protesting and staying at home are equal to

$$\mathbb{E}U_p(x) = \pi_x \alpha x + (1-\pi_x)\gamma x - c + [\pi_x a_0 + (1-\pi_x)x], \tag{9}$$

$$\mathbb{E}U_s(x) = [\pi_x a_0 + (1-\pi_x)x], \tag{10}$$

respectively. The terms in brackets reflect the second-period utility and are the same in both cases, as no single individual may affect the chance of success. The threshold citizen with $b_i = z_G$ must be indifferent between protesting and not. Consequently, the cutoff z_G must satisfy

$$z_G = \frac{c}{(\alpha-\gamma)\pi_{z_G} + \gamma}. \tag{11}$$

Taking into account (8), which must hold for $x = z_G$, we conclude that the equilibrium threshold z_G is defined by the following equation:

$$z_G = \frac{c}{(\alpha-\gamma)\int_{-\infty}^{+\infty} F\left(\frac{b-z_G}{\sigma_\delta}\right) dG_{z_G}(b) + \gamma}. \tag{12}$$

In the Appendix, we prove that for any distribution G of b, the threshold z_G exists and is unique.[17]

Proposition 1 *For any posterior distribution G of beliefs about the difference between politicians' competencies, $b = a_0 - a_D$, that is obtained by the time of protests using publicly available information, there exists a unique protest equilibrium. It is characterized by threshold $z = z_G$ given by* (12) *that determines which citizens (those with $b_i \geq z_G$) participate in the protest.*

This threshold z_G is increasing in c, the cost of protests, and decreasing in α and γ, the utilities that a citizen receives from participating in successful and unsuccessful protests, respectively. Moreover, if distribution G_1 first-order stochastically dominates G_2, then $z_{G_1} < z_{G_2}$. In particular, if the average attitude b is publicly known, then the participation threshold z_b is decreasing in b.

[17] Notice that the threshold z_G is known to both politicians and citizens, since function G is common knowledge. The probability of success, however, is in the eye of the beholder. The dictator D knows the true value of b and thus the true distribution of $\{b_j\}$, whereas citizens have heterogeneous beliefs, except for the case where G is degenerate and b is common knowledge.

While the detailed proof is relegated to the Appendix, it is instructive to see the work of our mechanism in the special case when the difference in abilities b is public information, and thus the posterior distribution G is an atom at b. Equation (12) then becomes

$$z_b = \frac{c}{(\alpha-\gamma)\, F\left(\frac{b-z_b}{\sigma_\delta}\right)+\gamma}, \tag{13}$$

where we again abuse notation and write z_b instead of z_G (likewise, we will use $\hat{\pi}_b$ instead of $\hat{\pi}_G$). Existence follows, since as left-hand side varies from $-\infty$ to $+\infty$, the right-hand side increases from $\frac{c}{\alpha}$ to $\frac{c}{\gamma}$. Uniqueness is less obvious as the right-hand side is also increasing in z. Intuitively, as the protest threshold z becomes higher, the success of protests become less likely, and thus fewer citizens are willing to protest. As a result, a citizen must hate the dictator very much to be willing to protest, which also raises the threshold. Thus, there is a potential for multiple thresholds due to the following strategic complementarity: more citizens protesting makes the success of a revolt more likely, and this encourages even more people to protest. However, uniqueness follows from Assumption 2; it ensures that the derivative of the right-hand side with respect to z is less than 1. The same Assumption 2 guarantees that there are no non-threshold equilibria.

If b is not known, then (12) exhibits an additional effect in the right-hand side as G_z becomes a different distribution as z changes. Specifically, as z increases, the threshold citizen updates on the distribution of b and becomes more confident in the success of the protests. This mitigates the effect that $F\left(\frac{b-z_G}{\sigma_\delta}\right)$ is decreasing in the threshold z, and thus the derivative of the right-hand side of (12) cannot exceed 1 in this case as well. In other words, a decrease of the threshold not only makes citizens more enthusiastic about the probability of success; it also has the opposite effect: the threshold citizen is more skeptical about the overall negative attitude towards the dictator as compared to the challenger, b. This alleviates the strategic complementarity effect described earlier, and makes uniqueness of equilibrium easier to obtain. Importantly, Proposition 1 does not impose any restrictions on the distribution G, which makes it applicable for any revelation strategy of the dictator.

The comparative statics is simple, but instructive. The threshold is lower, and thus the probability of success is higher, if protests are less costly (c is low), because for any fixed chance of success more people are willing to protest. Similarly, if a person who dislikes the dictator has a stronger incentive to protest (either α or γ is higher), more people will protest. Lastly, if for two distributions G_1 and G_2, the former dominates the latter, then the chance of success if all citizens above a certain threshold protest is higher under G_1 than under G_2; this, in turn, makes more people willing to protest in the former case. This last part has general implications: A dictator who is perceived to be incompetent or who faces an opponent believed to be competent will face a lower threshold z_G and thus larger-scale protests.

Voting

Consider citizens' voting behavior. Their preferences are simple: a citizen i with $b_i < 0$ wants the dictator to stay in office, while citizen with $b_i > 0$ wants to see him replaced. Thus, sincere voting strategies prescribe individuals to vote for the incumbent if and only if $b_i < 0$. This is indeed an equilibrium, for the simple reason that each citizen is infinitesimal. This also involves no dominated strategies; however, the standard reasoning for such voting behavior is not sufficient. In this game, not only the voting outcome matters, but also the protests that may follow, and the share of votes that the dictator gets will serve as a signal about b, which will in turn affect z_b, the protest threshold.

Fortunately, voting and signaling incentives of citizens are aligned. Suppose, for the sake of the argument, that citizen i controls a small but positive mass ε of votes, and other citizens vote sincerely. Suppose that he wants the dictator to stay ($b_i < 0$). If he deviated and voted against the dictator, it would have two effects. First, the dictator would lose elections with probability at least as high. Second, for any voting decisions of other citizens, the dictator's vote share will decrease. Thus, other citizens would believe that the share of those with $b_i > 0$ is higher, so b is higher than it actually is. This would decrease the protest threshold and increase the chance that the dictator loses the office, which is unambiguously bad for citizen i regardless of whether he protests or not. Hence, such a citizen would not want to deviate. Similarly, a citizen with $b_i > 0$ would not deviate because a deviation would increase the chance of the dictator winning elections, and also lead to smaller-scale protests.

Proposition 2 *Sincere voting strategies, where citizens with $b_i \leq 0$ vote for the incumbent dictator D and those with $b_i > 0$ vote for the challenger C, constitute a voting equilibrium in undominated strategies. In this equilibrium, the share of votes obtained by the dictator is*

$$\tau(b) = F\left(\frac{b}{\sigma_\delta}\right). \tag{14}$$

We thus restrict attention to equilibria where voters use sincere voting strategies.[18]

[18] We cannot claim that sincere voting is the only equilibrium in undominated strategies. Indeed, consider the opposite strategies: vote for the dictator if and only if $b_i > 0$, i.e., only if person i wants the dictator to lose elections. If such a person with $b_i > 0$ deviated and voted against the dictator (suppose again, for the sake of the argument,

Incumbent's decision

We now consider the dictator's decision to allow a fair election or prohibit the challenger from running. To understand the incumbent's decision, consider the perception of the threshold citizen with $b_i = z_G$ about the size of the protests. He believes that the share of protesters and the probability of success equal π_{z_G}, which may be less than π_G, the objective probability of success, or greater than that. If $\pi_{z_G} < \hat{\pi}_G$, the dictator expects larger-scale protests than the threshold citizen. For such a dictator, revealing the true value b to citizens would be dangerous: all citizens, including the threshold one, will update their beliefs and think that for the same protesting strategies (with threshold z_G), the share of protesters would be higher: $\hat{\pi}_G > \pi_{z_G}$. But in this case, the citizen who got $b_i = z_G$ would no longer be indifferent; he would strictly prefer to protest, as would citizens with slightly lower signals. This would make protests even bigger and overall, the threshold would decrease, further endangering the dictator. In case $\pi_{z_G} > \hat{\pi}_G$, the logic is the opposite. Here, the threshold citizen z_G is too optimistic about the chances to oust the dictator. Revealing true b would make him more skeptical, and he would then strictly prefer to stay at home. Thus, fewer people would protest, thus increasing the chance that the dictator survives. Consequently, we have the following result about the dictator's incentives to reveal the information he has on b in face of protests.

Let G denote the *ex ante* distribution of b. Ideally, the dictator would have elections if and only if $b < b_G^*$, where b_G^* solves $z_G = z_{b_G^*}$ (so the share of protesters are the same with and without elections; in the Appendix we show that this threshold exists and is unique). But he faces two problems. First, it is possible that the share of votes that the dictator receives, $\tau(b)$, satisfies $\tau(b_G^*) < \tilde{\tau}$, so there are dictators who would want to have fair elections because of their signaling value, but are afraid of losing. But even when this is not a constraint, there is a second problem: citizens know that a dictator who does not allow fair elections comes with b taken not from G, but

that he controls a small positive mass of votes), there would be two effects. First, the chance that the dictator loses elections would be higher. Second, in case he wins, he would get fewer votes. However, since the voting strategies in this candidate equilibrium are reversed, the change in vote tally would be interpreted by Bayesian citizens as more support for the dictator, not less, and this would reduce the share of protesters (see Proposition 1). Citizen i wants the dictator to lose power, and thus protests to be large-scale. Thus, if he believes that he is unlikely to be pivotal (which must be true if the dictator dared to have competitive elections), then deviation to sincere voting is not profitable because of signaling value that this vote carries. Such voting strategies will deliver the same results as sincere voting as everyone will update correctly.

from another distribution $H_{b_G^*}(\cdot)$, where for any y, $H_y(x)$ is defined as

$$H_y(x) = \begin{cases} \frac{(1-\eta)G(x)}{1-\eta G(y)} & \text{if } x < y \\ \frac{G(x)-\eta G(y)}{1-\eta G(y)} & \text{if } x \geq y \end{cases}. \tag{15}$$

This distribution first-order stochastically dominates G, and thus the protest threshold under $H_{b_G^*}$ would be $z_{H_{b_G^*}} < z_G = z_{b_G^*}$, and since the inequality is strict, $z_{H_{b_G^*}} < z_b$ for some $b > b_G^*$. If so, the dictator would be better off revealing such value of b. This argument suggests unraveling: Since dictators with sufficiently low b have elections, those who do not are believed to know that b is high, and the borderline ones have to have elections to reveal that b is not too high.

However, there is a limit to this unraveling, even if the constraint $\tau(b) \geq \tilde{\tau}$ is not binding. To see why, notice first that for any belief about the distribution of b for dictators who failed to have competitive elections, the dictator's best response must follow a threshold rule: have elections if and only if $b \leq y$. Then the posterior distribution of citizens' signals (before taking b_i into account) is given by H_y. Notice that this distribution converges to G in distribution both when $y \to -\infty$ and when $y \to +\infty$, but G first-order stochastically dominates H_y for any finite y, implying $z_{H_y} < z_G$. Thus, if y is very low, so elections are almost always pure farce, then some types of incumbents would be willing to reveal b. On the other hand, if y is sufficiently high, so almost every incumbent allows competitive elections whenever he can, then failure to do so would not be held against the dictator, and in particular would not be a strong signal about b. In this case, sufficiently unpopular dictators would not want to have fair elections. Ultimately, there is a threshold $y = b_E$, and it is unique; this threshold satisfies the condition $z_{H_y} = z_y$. The distribution H_y for $y = b_E$ is depicted on Figure 1.

[Figure 1 Goes Here]

We are now ready to formulate the main result of the paper, which establishes existence and uniqueness of equilibrium, as well as comparative statics.

Proposition 3 *There exists a unique threshold b_E such that the dictator chooses fair elections if and only if $b \leq b_E$. The threshold satisfies $\tau(b_E) \geq \tilde{\tau}$, but does not depend on $\tilde{\tau}$ otherwise. Furthermore, the threshold b_E is (weakly) increasing in c and in η, and thus decreasing in k (everywhere 'strictly' if $\tau(b_E) > \tilde{\tau}$), i.e., a repressiveness against the elite (high k / low η) makes fair elections less likely, while a cruel regime (high c) makes fair elections more likely.*

In equilibrium, both competitive elections and pure farce happen with positive probabilities. Existence follows quite naturally from the argument above. To show uniqueness, we use that function z_{H_y} is strictly quasi-convex, and its lowest point corresponds precisely to the equilibrium.[19] This is an interesting property in itself: it suggests that of all possible thresholds for having fair elections, the equilibrium b_E makes the dictators who choose to have the pure farce elections worse off, in that they are going to face protests of the largest scale.

To see the intuition for comparative statics, observe that in a repressive regime, the absence of an opposition leader from the ballot is not necessarily blamed on the dictator's unpopularity. Thus, more repressive regimes are less likely to have free elections, because citizens do not infer much if the election is not competitive. The effect of cruelty toward protesters (higher c) is only a bit more subtle. A higher cost of protests discourages participation in protests, both with and without fair elections. However, there is an additional effect: a lower number of protesters makes citizens more pessimistic about the success of an uprising, which further decreases participation in protests. The first effect is similar in size in both cases, but the second effect is more pronounced if citizens are better informed about the dictator's popularity. Intuitively, after an increase in c, only citizens who have very negative opinions about the dictator (have high b_i) would keep protesting. If they do not know the realization of b, they would think that other citizens are also negative about the dictator, because their high b_i are signals about higher b. In contrast, when b is known, citizens to not use their b_i to update on b. Consequently, a higher cost of protests c is more likely to deter citizens who know the true value of b, and this makes the dictator more willing to reveal his popularity by having fair elections.

6 Evidence

The model above makes two predictions that are testable using cross-country data. First, repressiveness of the regime against the opposition makes fair elections less likely. Second, cruelty of the regime towards protesters makes fair elections more likely. Our analysis below tests these hypotheses, and thus complements the anecdotal evidence discussed in Section 3.

[19] In other words, $y = b_E$ is the unique minimand of z_{H_y} over $\left(-\infty, \tilde{b}\right) \cap (\text{support of } G)$ and satisfies $0 < G(b_E) < 1$. Ostaszewski and Gietzmann (2008) prove as similar result in the context of a model of (non-)disclosure of information in Dye (1985) (see also Acharya, DeMarzo, and Kremer, 2011), and Shadmehr and Bernhardt (2015) do so in a model of state censorship.

Data

Our data set is a panel that covers 70 countries with observations ranging from 1990 to 2011 (totally 181 country-years listed in Table 1). We focus on elections to the high office in which the incumbent or his official successor was running; this information was obtained from NELDA dataset (Hyde and Marinov, 2012). The dependent variable is an indicator of election fairness, which is equal to 1 if OECD ('western') monitors were present and did not report significant vote fraud, and zero otherwise (also from Hyde and Marinov, 2012). The main explanatory variables are proxies for repression costs and costs of protesting. For costs of repression, we use the Political Terror Scale (Gibney, Cornett, Wood, Haschke, and Arnon, 2016) as an indicator of the spread and the extent of political terror. In most specifications, we use the index published by Amnesty International, but we also use the one by the U.S. Department of State as robustness check. For costs of protesting, we use the index of Physical Integrity Rights in The CIRI Human Rights Data set, "an additive index constructed from the Torture, Extrajudicial Killing, Political Imprisonment, and Disappearance indicators" (Cingranelli, Richards, and Clay, 2014). It ranges from 0 (no government respect for protection against torture, extrajudicial killing, political imprisonment, and disappearance) to 8 (full government respect). We normalize both indices, so repressiveness of the regime (from Political Terror Scale, corresponding to k in the model) ranges from 0 (few repressions) to 1 (many repressions), and cruelty of the regime also ranges from 0 (low cruelty, corresponding to low c in the model and high Physical Integrity Rights in CIRI) to 1 (high cruelty). Our controls include democracy and autocracy scores from Polity IV Project (Marshall, Gurr, and Jaggers, 2016), media freedom from Freedom House (inverted, so higher score corresponds to freer media) and standard economic data such as logarithm of GDP per capita and total population.

After merging the data sets, we removed OECD countries, given our focus on non-democracies. Then, we focused only on country-years where the country held an election to the high office (according to the definition in Hyde and Marinov, 2012) with the incumbent participating and that happened when the country's Polity IV democracy score was below 8; we use the full sample as a robustness check. Finally, we removed country-years in which one of our key variables or controls were missing. This resulted in an unbalanced panel that consists of 181 country-years with elections, spanning 70 countries and years between 1990 and 2011.[20] Of these, 94 elections are coded as 'not fair' and 87 elections as 'fair'. Table 1 presents the list of these country-years, with

[20] The upper bound 2011 is imposed on us by data availability (Hyde and Marinov, 2012). The lower bound of 1990 is chosen for two reasons: first, before that the set of countries was considerably different, and second, this allows to avoid the unrelated Cold War ramifications.

fair elections highlighted in bold, and shows the democracy and autocracy scores in parentheses. One can see that the polity score, defined as democracy minus autocracy, is far from a perfect predictor of fairness of elections.[21] E.g., Gambia (polity scores –6 or –5) had two fair elections in 2001 and 2006 and two unfair in 1996 and 2011, while Guyana (polity score +6) had fair elections in 1992, 2006 and 2011, but unfair in 2001. The summary statistics of all variables is presented in Table 2.

The three key variables are taken from different datasets compiled by different scholars, which decreases the chance of correlations driven by expert bias. The advantages and disadvantages of the PTS and CIRI indices of political terror have been discussed since the inception of the latter; see, in particular, Cingranelli and Richards (2010) and Wood and Gibney (2010). While CIRI focuses almost exclusively on violence committed by the government, PTS tends to incorporate political violence more generally This important difference, as well as the fact that the indices are not strongly correlated (the correlation coefficient is only 0.5), allows us to treat these indices as reflecting different aspects of political terror, and relate them to repressiveness k and cruelty c in our model. For citizens deciding to protest against the incumbent, the danger is violence from government-related actors; thus, we proxy cruelty with the index based on CIRI dataset. For potential politicians who decide whether or not to run for office, political violence is the main threat, so we use the PTS index to proxy for repressiveness. Of course, there might be numerous ways in which repressiveness correlates with less fair elections, so its negative effect on fairness is not a particularly strong test of the theory. However, the prediction that the regime's cruelty leads to fairer election is highly nontrivial and truly tests the theory.

Results

In Table 3, we present our main findings. Columns (1)-(8) are fixed-effects panel regressions, whereas columns (9)-(11) do not include country fixed effects; in all cases, year fixed effects are included and standard errors are clustered at the country level. In columns (1), (2), and (3), the Fair dummy variable is regressed on measures of repression and cruelty, separate and together. To put it in a perspective, column (1) shows that one standard deviation increase in repression decreases the probability of fair election by roughly one-quarter of a standard deviation; column (2) says that one standard deviation increase in cruelty increases the probability of fair election by roughly

[21] Other variables do not seem to adequately capture the difference between fair and sham elections either. For example, according to NELDA, opposition was allowed in 94% of elections in our sample (170 out of 181), so this variable clearly does not capture the difference between real and token opposition.

one-quarter of a standard deviation. Thus, these effects are not only statistically significant, but also sizeable and important. Columns (4)-(5) report the same regressions with basic time-varying controls (log of GDP per capita and log of population). Columns (7)-(8) add time-varying political controls, first democracy, autocracy, and executive constraints (from Polity IV) and then index of media freedom (from Freedom House); introduction of the latter reduces the sample considerably. In both columns, however, the two variables of interest, repression and cruelty, are significant at 5% level, the former having negative sign and the latter having positive one, as predicted.

The last three columns (9)-(11) replicate columns (6)-(8), but without country controls. The coefficients at repression and cruelty retain their signs, but not their statistical significance, except for cruelty in (10) and (11). We document these regressions for the sake of completeness, but the problem of omitted variables is likely too big to take these specifications seriously.

In Table 4, we take a deeper look into repression and cruelty variables. Specifications (1)-(5) use the same measure of repressions based on Amnesty International data as before, while (6)-(10) use the measure based on the U.S. Department of State data. In all specifications its effect is negative, though the latter measure is significant only in two out of five specifications. We attribute it to various political considerations that could contaminate the latter measure; this also highlights why the measure by Amnesty International is our preferred choice.[22] In Table 4, we also look at the four components of cruelty, i.e., extrajudicial killings, disappearances, torture, and political imprisonment, separately (our measure of cruelty is the arithmetic mean of these four measures). Specifications (1)-(4) and (6)-(9) present these components separately, while (5) and (10) introduce them together. 'Extrajudicial killings' is the most consistent in being statistically significant across specifications, followed by disappearances and then torture. Despite that the political prisoners component is never statistically different from zero, we decided to keep it as part of cruelty index mainly for consistency with Cingranelli, Richards, and Clay (2014). Our results would hold if we measure cruelty as average of extrajudicial killings, disappearances, and torture only.

Table 5 presents several robustness checks. In (1) and (2), we replace linear probability regression with logistic regression, with and without extended controls. In (3) and (4), we remove year fixed effects while keeping year as a control variable. In all these cases, the variables of interest are significant at 5% level. Specifications (5)-(10) are run on an extended data set. In (5)-(10), we consider countries (non-OECD) with all values of democracy (now including 8, 9, and 10), and notice that while all point estimates are closer to zero and some are not statistically significant,

[22] See also Qian and Yanagizawa-Drott (2009, 2017) for discussions on political determinants of discrepancies between Amnesty International and U.S. Department of State data on human rights violations.

the signs are consistent. Lastly, in (7)-(10) we again exclude democracies, but add country-years where the election was to the high office, but the incumbent was not running. Columns (7) and (8) produce consistent results, even though with smaller point estimates as compared to the corresponding regressions (6) and (7) in Table 3. Lastly, specifications (9) and (10) add interactions of the dummy whether the incumbent is running with repression and cruelty. Both interaction effects are significant in both specifications, and their signs suggest stronger effect of the respective variable (repression and cruelty) when the incumbent was running than when he was not. Overall, Table 5 suggests that our estimates are fairly robust to changes in specification and to considering alternative restrictions of the sample.

Lastly, Table 6 considers two kinds of 'placebo' specifications. First, we consider elections that are not necessarily to the high office (e.g., parliamentary elections in a country that is by constitution a presidential republic). In columns (1) and (2) we consider such elections exclusively, and see that neither of coefficients of interest is statistically significant, though they retain the sign. In (3)-(5), we consider both elections to the high office and not, and see that repression still has a negative and significant effect, while cruelty has a positive, but not significant one. This suggests that while repressive nature of the regime is still negatively correlated with fairness of elections, cruelty is less consequential in elections that are not to the high office. Second, instead of considering 'fair' as the dependent variable, in columns (6)-(10) we consider 'partly fair' variable, defined as having western observers; the difference with 'fair' is that here we allow for violations to be reported. In these specifications, neither of the variables of interest is significant. This suggests that our results are not driven by the presence of western observers or their willingness to monitor, but rather by whether or not these observers found major violations.

7 Conclusion

In this paper, we built a theory of elections in nondemocratic polities. The incumbent decides whether or not to have free and fair elections to signal his popularity. However, citizens do not know if the dictator runs unopposed (or with token opponents) because he prevented the credible ones from running, or because the regime is so repressive that credible challengers failed to emerge. We establish existence of a unique equilibrium with intuitive comparative statics. In equilibrium, a regime that is more repressive towards opposition leaders has a lower probability of free elections. A regime that is crueler towards common people – at least those who dare to protest – has a higher probability of free elections.

We take these predictions to the data and find support for both. The former finding is barely surprising and is consistent with multiple theories. In contrast, the latter is as a true test of our theory. The incentive of a more cruel regime to allow free elections makes is natural because of signaling nature of our model, but we are not aware of other formal models that can rationalize it. While our empirical results establish, essentially, correlations, and not causal links, they are robust to numerous alternative specifications and consistent with the theory.

Our paper models the incumbent's decision to have an election as one-shot, but it would be interesting to study having elections at different points of tenure as a dynamic problem for the dictator. It would be equally interesting to look closer at opposition leaders and study their decision to participate, coordinate on a single candidate, or boycott elections. Studying these and other related questions, both theoretically and empirically, are promising directions for future research.

[Table 1 Goes Here]

[Table 2 Goes Here]

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Appendix:

To prove the propositions, we start with several lemmas.

Lemma A1 *Suppose agent i got $b_i = x$ and agent j got $b_j = y$, and $x > y$. Then G_x first-order stochastically dominates G_y: For any $\xi \in \mathbb{R}$ such that $0 < G(\xi) < 1$, we have $G_x(\xi) < G_y(\xi)$.*

Proof of Lemma A1. Let us prove that for two values of b_i, x and y such that $x > y$, G_x first-order stochastically dominates G_y (wherever $G(z) \in (0,1)$).

We need to prove that $G_x(z)$ is decreasing in x for any fixed $z \in \mathbb{R}$ such that $G(z) \in (0,1)$. We have

$$G_x(z) = \frac{\int_{-\infty}^{z} \frac{1}{\sigma_\delta} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{-\infty}^{+\infty} \frac{1}{\sigma_\delta} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} = \frac{1}{1 + \frac{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}}.$$

This is decreasing in x if and only if

$$\ln\left(\frac{1}{G_x(z)} - 1\right) = \ln \int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi) - \ln \int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)$$

is increasing in x (for $0 < G_x(z) < 1$ the left-hand side is well-defined). Differentiating with respect to x, we get

$$\frac{\partial}{\partial x}\left[\ln\left(\frac{1}{G_x(z)} - 1\right)\right] = \frac{\int_{z}^{+\infty} \frac{1}{\sigma_\delta} f'\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} - \frac{\int_{-\infty}^{z} \frac{1}{\sigma_\delta} f'\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}.$$

But for normal distribution, $\frac{f'(a)}{f(a)}$ increasing in a, thus $\frac{f'\left(\frac{x-\xi}{\sigma_\delta}\right)}{f\left(\frac{x-\xi}{\sigma_\delta}\right)} > \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)}$ if $\xi > z$ and $\frac{f'\left(\frac{x-\xi}{\sigma_\delta}\right)}{f\left(\frac{x-\xi}{\sigma_\delta}\right)} < \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)}$ if $\xi < z$, and therefore

$$\frac{\int_{z}^{+\infty} f'\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} = \frac{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) \frac{f'\left(\frac{x-\xi}{\sigma_\delta}\right)}{f\left(\frac{x-\xi}{\sigma_\delta}\right)} dG(\xi)}{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} > \frac{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)} dG(\xi)}{\int_{z}^{+\infty} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} = \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)},$$

$$\frac{\int_{-\infty}^{z} f'\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)}{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} = \frac{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) \frac{f'\left(\frac{x-\xi}{\sigma_\delta}\right)}{f\left(\frac{x-\xi}{\sigma_\delta}\right)} dG(\xi)}{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} < \frac{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)} dG(\xi)}{\int_{-\infty}^{z} f\left(\frac{x-\xi}{\sigma_\delta}\right) dG(\xi)} = \frac{f'\left(\frac{x-z}{\sigma_\delta}\right)}{f\left(\frac{x-z}{\sigma_\delta}\right)}.$$

This proves that $\frac{\partial}{\partial x}\left[\ln\left(\frac{1}{G_x(z)} - 1\right)\right] > 0$, and thus $G_x(z)$ is decreasing in x for any z. ■

Lemma A2 *Suppose that it is public information that $b \sim G$, and citizens i protests if and only if $b_i \in R$, where R satisfies the following: If $x > \frac{c}{\gamma}$, then $x \in R$; if $x < \frac{c}{\alpha}$, then $x \notin R$. Then the probability of success as perceived by citizen i with $b_i = x$,*

$$\pi_{G_x} = \Pr\left(b + \delta_j \in R \mid b + \delta_i = x\right), \tag{A1}$$

is increasing in x (strictly if G is not degenerate).

Proof of Lemma A2. Consider the probability of success for a fixed and known value of b:

$$\hat{\pi}_R(b) = \Pr\left(b + \delta_j \in R\right) = \int_{x \in R} \frac{1}{\sigma_\delta} f\left(\frac{x-b}{\sigma_\delta}\right) dx. \tag{A2}$$

Take two citizens with values b_i equal to x and y with $x > y$; we have

$$\pi_{G_x} = \int_{-\infty}^{+\infty} \hat{\pi}_G(b)\, dG_x(b)$$

and, similarly, for y. By Lemma A1, G_x first-order stochastically dominates G_y. Therefore, to prove that $\pi_{G_x} \geq \pi_{G_y}$, with strict inequality if G is not degenerate, it suffices to prove that $\hat{\pi}_G(b)$ is increasing in b.

To do this, consider the following cases. Suppose first $b < \frac{c}{\alpha}$. We can rewrite (A2) as

$$\hat{\pi}_R(b) = 1 - F\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) + \frac{1}{\sigma_\delta} \int_{x \in R, \frac{c}{\alpha} < x < \frac{c}{\gamma}} f\left(\frac{x-b}{\sigma_\delta}\right) dx.$$

Since $b < \frac{c}{\alpha}$, then $x > b$ in the integral, thus $f\left(\frac{x-b}{\sigma_\delta}\right)$ is decreasing in its argument and thus increasing in b, and so $\hat{\pi}_R(b)$ is increasing in b.

Second, consider the case $b > \frac{c}{\gamma}$. Let us rewrite (A2) as

$$\begin{aligned} \hat{\pi}_R(b) &= 1 - \int_{x \notin R} \frac{1}{\sigma_\delta} f\left(\frac{x-b}{\sigma_\delta}\right) dx \\ &= 1 - F\left(\frac{\frac{c}{\alpha} - b}{\sigma_\delta}\right) - \frac{1}{\sigma_\delta} \int_{x \notin R, \frac{c}{\alpha} < x < \frac{c}{\gamma}} f\left(\frac{x-b}{\sigma_\delta}\right) dx. \end{aligned}$$

Here, $x < b$ in the integral, so $f\left(\frac{x-b}{\sigma_\delta}\right)$ is increasing in its argument, and thus decreasing in b; consequently, $\hat{\pi}_G$ is increasing in b in this case as well.

Finally, consider the case $\frac{c}{\alpha} < b < \frac{c}{\gamma}$. In this case, differentiating with respect to b under the integral (this is a valid operation here) yields

$$\begin{aligned}
\frac{d\hat{\pi}_R(b)}{db} &= \frac{d}{db}\left(1 - F\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) + \frac{1}{\sigma_\delta}\int_{x\in R, \frac{c}{\alpha}<x<\frac{c}{\gamma}} f\left(\frac{x-b}{\sigma_\delta}\right) dx\right) \\
&= \frac{1}{\sigma_\delta}\left(f\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) - \int_{x\in R, \frac{c}{\alpha}<x<\frac{c}{\gamma}} \frac{1}{\sigma_\delta} f'\left(\frac{x-b}{\sigma_\delta}\right) dx\right) \\
&= \frac{1}{\sigma_\delta}\left(f\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) - \int_{x\in R, \frac{c}{\alpha}<x<b} \frac{1}{\sigma_\delta} f'\left(\frac{x-b}{\sigma_\delta}\right) dx - \int_{x\in R, b<x<\frac{c}{\gamma}} \frac{1}{\sigma_\delta} f'\left(\frac{x-b}{\sigma_\delta}\right) dx\right) \\
&> \frac{1}{\sigma_\delta}\left(f\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) - \int_{\frac{c}{\alpha}}^{b} \frac{1}{\sigma_\delta} f'\left(\frac{x-b}{\sigma_\delta}\right) dx\right) \\
&= \frac{1}{\sigma_\delta}\left(f\left(\frac{\frac{c}{\gamma} - b}{\sigma_\delta}\right) + f\left(\frac{\frac{c}{\alpha} - b}{\sigma_\delta}\right) - f(0)\right).
\end{aligned}$$

The last term is obviously positive for $b = \frac{c}{\alpha}$ and $b = \frac{c}{\gamma}$, It is also positive for $b = \frac{1}{2}\left(\frac{c}{\alpha} + \frac{c}{\gamma}\right)$ by Assumption 2. Indeed, for such b, the last term is positive if and only if $2f\left(\frac{\frac{c}{\gamma} - \frac{c}{\alpha}}{2\sigma_\delta}\right) > f(0)$, which is equivalent to $\sigma_\delta > \frac{1}{2\sqrt{2\ln 2}} c\left(\frac{1}{\gamma} - \frac{1}{\alpha}\right) = \frac{1}{2\sqrt{2\ln 2}} \frac{c(\alpha-\gamma)}{\alpha\gamma}$. Since $\alpha > \gamma$, this follows from Assumption 2.

It remains to show that the last term in positive for $b \in \left(\frac{1}{2}\left(\frac{c}{\alpha} + \frac{c}{\gamma}\right), \frac{c}{\gamma}\right)$ (the case $b \in \left(\frac{c}{\alpha}, \frac{1}{2}\left(\frac{c}{\alpha} + \frac{c}{\gamma}\right)\right)$ is symmetric). Let $w = \frac{1}{2\sigma_\delta}\left(\frac{c}{\gamma} - \frac{c}{\alpha}\right)$ and $x = \frac{1}{\sigma_\delta}\left(\frac{1}{2}\left(\frac{c}{\alpha} + \frac{c}{\gamma}\right) - b\right)$. For a fixed w, consider the function $h(x) = f(x-w) + f(x+w)$. In terms of function h, we know that $h(0) > f(0)$ and $h(w) > f(0)$, and we need to show that $h(x) > f(0)$ for $x \in (0, w)$.

To do this, it suffices to show that h is quasiconcave on $(0, +\infty)$ for any w. We have

$$\begin{aligned}
\frac{d}{dx}h(x) &= \frac{1}{\sqrt{2\pi}}\left((w-x)e^{-\frac{(x-w)^2}{2}} - (w+x)e^{-\frac{(x+w)^2}{2}}\right); \\
\frac{d^2}{dx^2}h(x) &= \frac{1}{\sqrt{2\pi}}\left(\left((w-x)^2 - 1\right)e^{-\frac{(x-w)^2}{2}} + \left((w+x)^2 - 1\right)e^{-\frac{(x+w)^2}{2}}\right).
\end{aligned}$$

The derivative $\frac{d}{dx}h(x)$ equals zero if and only if

$$\frac{1-t}{1+t} - e^{-2w^2 t} = 0, \tag{A3}$$

where $t = \frac{x}{w}$. If $w \le 1$, the equation (A3) has a unique solution $t = 0$, so $x = 0$ is a global maximum and h is quasiconcave. If $w > 1$, (A3) has two nonnegative solutions: $t = 0$ corresponds to a local minimum $x = 0$ and another root $t = t^*$, to a global maximum $x = x^* = wt^*$; this proves the quasiconcavity of h on $(0, +\infty)$ in this case as well.[23]

[23] Indeed (A3) becomes 0 for $t = 0$ for any w. Differentiating the left-hand side yields

$$\frac{d}{dt}\left(\frac{1-t}{1+t} - e^{-2w^2 t}\right) = -\frac{2}{(1+t)^2} + 2w^2 e^{-2w^2 t},$$

We have thus shown that $h(x) > f(0)$ for $x \in (0, w)$, since this is true for $x = 0$ and $x = w$. This finishes the proof that $\frac{d\hat{\pi}_R(b)}{db} > 0$ for $b \in \left(\frac{c}{\alpha}, \frac{c}{\gamma}\right)$. Therefore, $\hat{\pi}_R(b)$ is strictly increasing in b on $b \in (-\infty, +\infty)$, and this completes the proof. ■

Proof of Proposition 1. Let us first consider the case of a degenerate distribution G, so assume b is known. In this case, citizens know $\hat{\pi}_G$, which equals π_{G_x} for any x. Thus, $\mathbb{E}U_p(b_i) \geq \mathbb{E}U_s(b_i)$ if and only if $b_i \geq \frac{c}{(\alpha-\gamma)\hat{\pi}_G+\gamma}$. Therefore, there must exist a threshold $z = z_b \in (-\infty, +\infty)$ such that citizens with $b_i \geq z_b$ protest and those with $b_i < z_b$ do not.

Since $\hat{\pi}_G$ is given by (7), this threshold $z = z_b$ constitutes an equilibrium if and only if $Q(z) = 0$, where

$$Q(z) = z - \frac{c}{(\alpha-\gamma)\left(1 - F\left(\frac{z-b}{\sigma_\delta}\right)\right) + \gamma}. \tag{A4}$$

By the Assumptions 1 and 2, $\frac{dQ(z)}{dz} > 0$, and thus $Q(z)$ is an increasing function of z. Indeed,

$$\frac{dQ(z)}{dz} = 1 - \frac{1}{\sigma_\delta} \frac{c(\alpha-\gamma) f\left(\frac{z-b}{\sigma_\delta}\right)}{\left((\alpha-\gamma)\left(1 - F\left(\frac{z-b}{\sigma_\delta}\right)\right) + \gamma\right)^2} > 1 - \frac{1}{\sigma_\delta} \frac{c(\alpha-\gamma)}{\gamma^2} \frac{1}{\sqrt{2\pi}} > 0,$$

because $\sqrt{2\pi} > 2\sqrt{2\ln 2}$. Moreover, $\lim_{z\to-\infty} Q(z) = -\infty$ and $\lim_{z\to+\infty} Q(z) = +\infty$. This means that there is exactly one value of $z = z_b$ such that $Q(z) = 0$. This proves that there exists a unique equilibrium.

Now consider the case where b is not an atom and is distributed with c.d.f. G. Let us show that the equilibrium must take the form of a threshold. Suppose that the set of values b_i such that citizens with these realizations protest in equilibrium is R_G. Citizen i protests if and only if

$$x \geq \frac{c}{(\alpha-\gamma)\pi_{G_x} + \gamma}. \tag{A5}$$

Since $\pi_{G_x} \in [0, 1]$, citizens with $b_i > \frac{c}{\gamma}$ must protest and citizens with $b_i < \frac{c}{\alpha}$ must not (these types have a dominant strategy), thus $\left\{x : x > \frac{c}{\gamma}\right\} \subset R_G$ and $\left\{x : x > \frac{c}{\gamma}\right\} \cap R_G = \varnothing$. Therefore,

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which equals zero if and only if $1+t = \frac{1}{w}e^{w^2 t}$; thus, the derivative has no positive roots if $w \leq 1$ and a unique positive root if $w > 1$. This proves that for $w \leq 1$, (A3) is a monotone function, and it is decreasing rather than increasing, because it is negative if t is large. This also proves that for $w > 1$, (A3) has a unique positive root. Indeed, it has root because the left-hand side is positive for small t (if $w > 1$) and is negative for large t. If it had two roots $0 < t_1 < t_2$, then the derivative would have to equal zero at some points $t_3 \in (0, t_1)$ and $t_4 \in (t_1, t_2)$, but we just showed that it has only one root. Thus, the root t^* is unique, and the function changes its sign from positive to negative, i.e., it is a global maximum on $(0, +\infty)$.

Lemma A2 is applicable, which implies that π_{G_x} is increasing in x. Since the left-hand side of (A5) is increasing in x and its right-hand side is decreasing in x, it must be that a citizen i protests if and only if $b_i \geq z_G$ for some z_G.

It remains to show that the equilibrium threshold exists and is unique. The threshold $z = z_G$ must satisfy $\tilde{Q}(z) = 0$, where

$$\tilde{Q}(z) = z - \frac{c}{(\alpha-\gamma)\left(1 - \int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b)\right) + \gamma}. \tag{A6}$$

Let us prove that

$$\frac{d}{dz}\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b) < \frac{1}{\sqrt{2\pi}\sigma_\delta}. \tag{A7}$$

Notice that the following identity holds, due to integration by parts:

$$\begin{aligned}\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b) &= F\left(\frac{z-b}{\sigma_\delta}\right) G_z(b)\Big|_{b=-\infty}^{b=+\infty} + \int_{-\infty}^{+\infty} G_z(b)\frac{1}{\sigma_\delta} f\left(\frac{z-b}{\sigma_\delta}\right) db \\ &= \int_{-\infty}^{+\infty} G_z(b)\frac{1}{\sigma_\delta} f\left(\frac{z-b}{\sigma_\delta}\right) db.\end{aligned}$$

Using this last formula to differentiate with respect to the second inclusion of z (in $G_z(b)$), we have

$$\begin{aligned}\frac{d}{dz}\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b) &= \int_{-\infty}^{+\infty} \frac{1}{\sigma_\delta} f\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b) + \int_{-\infty}^{+\infty}\left(\frac{\partial}{\partial z} G_z(b)\right)\frac{1}{\sigma_\delta} f\left(\frac{z-b}{\sigma_\delta}\right) db \\ &< \frac{1}{\sigma_\delta}\frac{1}{\sqrt{2\pi}} + 0 = \frac{1}{\sqrt{2\pi}\sigma_\delta},\end{aligned}$$

where we used the fact that $G_z(b)$ is decreasing in b, as proved in Lemma A1. This proves (A7), which we now use to substitute the numeraire in

$$\frac{d\tilde{Q}(z)}{dz} = 1 - \frac{c(\alpha-\gamma)\frac{d}{dz}\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b)}{\left((\alpha-\gamma)\left(1 - \int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) dG_z(b)\right) + \gamma\right)^2} > 1 - \frac{1}{\sigma_\delta}\frac{c(\alpha-\gamma)}{\gamma^2}\frac{1}{\sqrt{2\pi}} > 0.$$

This shows that $\tilde{Q}(z)$ is strictly increasing in z and the equilibrium threshold $z = z_G$ is unique. Its existence follows, as before, from that $\lim_{z\to-\infty}\tilde{Q}(z) = -\infty$ and $\lim_{z\to+\infty}\tilde{Q}(z) = +\infty$. Consequently, there is a unique equilibrium threshold z_G for any distribution G.

Let us now prove the comparative statics results. If b is fixed, then treating Q (from (A4)) as a function of z, c, γ, α, b, we get

$$\begin{aligned}\frac{\partial Q}{\partial c} &= -\frac{1}{(\alpha-\gamma)\left(1 - F\left(\frac{z-b}{\sigma_\delta}\right)\right) + \gamma} < 0, \\ \frac{\partial Q}{\partial \alpha} &= \frac{c\left(1 - F\left(\frac{z-b}{\sigma_\delta}\right)\right)}{\left((\alpha-\gamma)\left(1 - F\left(\frac{z-b}{\sigma_\delta}\right)\right) + \gamma\right)^2} > 0,\end{aligned}$$

$$
\begin{aligned}
\frac{\partial Q}{\partial \gamma} &= \frac{cF\left(\frac{z-b}{\sigma_\delta}\right)}{\left((\alpha-\gamma)\left(1-F\left(\frac{z-b}{\sigma_\delta}\right)\right)+\gamma\right)^2} > 0, \\
\frac{\partial Q}{db} &= \frac{1}{\sigma_\delta}\frac{cf\left(\frac{z-b}{\sigma_\delta}\right)}{\left((\alpha-\gamma)\left(1-F\left(\frac{z-b}{\sigma_\delta}\right)\right)+\gamma\right)^2} > 0.
\end{aligned}
$$

Moreover, we already showed that $\frac{\partial Q}{\partial z} > 0$. Consequently, $\frac{\partial z_b}{\partial c} > 0$, $\frac{\partial z_b}{\partial \gamma} < 0$, $\frac{\partial z_b}{\partial \alpha} > 0$, $\frac{\partial z_b}{\partial b} < 0$. If b is not known but is distributed as G, the same comparative statics with respect to c, α, γ follows by differentiating $\tilde{Q}$ (from (A6))with respect to these variables (this is analogous) and using $\frac{\partial \tilde{Q}}{dz} > 0$, also established above.

Finally, consider two distributions of b, G_1 and G_2, such that G_1 first-order stochastically dominates G_2. Then we have

$$
\begin{aligned}
1-\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) d\left(G_1\right)_z(b) &= \int_{-\infty}^{+\infty}\left(1-F\left(\frac{z-b}{\sigma_\delta}\right)\right) d\left(G_1\right)_z(b) \\
&> \int_{-\infty}^{+\infty}\left(1-F\left(\frac{z-b}{\sigma_\delta}\right)\right) d\left(G_2\right)_z(b) = 1-\int_{-\infty}^{+\infty} F\left(\frac{z-b}{\sigma_\delta}\right) d\left(G_2\right)_z(b),
\end{aligned}
$$

because $1-F\left(\frac{z-b}{\sigma_\delta}\right)$ is a monotonically increasing function of b. We thus have $\tilde{Q}\left(z_1; G_2\right) < \tilde{Q}\left(z_1; G_1\right) = 0$. But $\tilde{Q}\left(z_2; G_2\right) = 0 > \tilde{Q}\left(z_1; G_2\right)$, and this implies $z_2 > z_1$. ■

Proof of Proposition 2. If such strategies are followed, then the share of votes that the dictator gets is given by (14). Consider a citizen with $b_i < 0$ who in equilibrium votes for the dictator, and suppose that he deviates to voting for C. For a citizen with an infinitesimal share of votes ε, this deviation will result in the dictator getting $\tau' = \tau(b) - \varepsilon$ votes, and other citizens observing τ' and conclusing that the value of b is $b' = \sigma_\delta F^{-1}(\tau') > b$. As a result, the dictator gets fewer votes and this weakly decreases his chance of winning elections (weakly because he could, in principle, only have elections where he would win by a wide margin, and if citizens knew that this is his strategy, then a deviation by an infinitesimalo citizen had zero chance to prevent him from winning). At the same time, all citizens except for the one who deviated choose strategies based on the cutoff $z_{b'}$ rather than z_b. Since $b' > b$, $z_b > z_{b'}$, and hence strictly more people participate in protests as a result of this deviation. Consequently, such a deviation by a citizen with $b_i < 0$ increases the chance that the dictator will leave office. It also does not affect this citizen's payoff from protesting, because he would not protest in any case. Hence, such deviation is not profitable.

If we consider a citizen with $b_i \geq 0$, we can similarly show that his deviation to voting for the dictator may only help the dictator win, and if the dictator wins, it makes citizen believe that b equals to $b' < b$ rather than the true value. Thus, fewer citizens protest, and this also reduces the likelihood that the dictator is removed from office. The deviating citizen may only switch from protesting to staying home, but not the other way around. In any case, this deviation is not profitable. Hence, this is an equilibrium.

Since in all cases except $b_i = 0$ a deviation made the citizen strictly worse off, and for $b_i = 0$, the citizen is indifferent, this equilibrium is in undominated strategies. ■

Lemma A3 *For any distribution G without atoms, there is a unique threshold b_G^* such that if the average attitude toward the dictator $b < b_G^*$, the protest threshold is lower than the protest threshold conditional on b being public: $z_G < z_b$, and thus the dictator is better off by revealing b. Moreover, $\pi_{z_G} > \hat{\pi}_G(b) > \hat{\pi}_b$, so the chance of success perceived by the threshold citizen with $b_i = z_G$ is higher than that perceived by dictator, which is in turn higher than the chance of success if b were revealed. For $b > b_G^*$, the situation is reversed: $z_G > z_b$, and the dictator is better off not revealing the average attitude to him (in this case, $\pi_{z_G} < \hat{\pi}_G(b) < \hat{\pi}_b$). This threshold b_G^* satisfies $G(b_G^*) \in (0,1)$, i.e., there is a positive mass of b on both sides of b_G^*.*

Proof of Lemma A3. As shown in the proof of Proposition 1, the distribution G uniquely determines the threshold z_G and the probability of success $\hat{\pi}_G$, as well as perceived probabilities of success for all citizens, π_{G_x} for $b_i = x$. Let us show that there is a unique value b such that $z_b = z_G$. We know that z_G solves $\tilde{Q}(z_G) = 0$ and z_b solves $Q(z_b) = 0$; so z_G does not depend on b whereas z_b is decreasing in b by Proposition 1. Therefore, the is at most one value b such that $z_b = z_G$. Moreover, $\frac{c}{\alpha} < z_G < \frac{c}{\gamma}$: indeed, we have $\frac{c}{\alpha} \leq z_G \leq \frac{c}{\gamma}$ because citizens with $b_i < \frac{c}{\alpha}$ never protest and those with $b_i > \frac{c}{\gamma}$ always protest, since both parts contain a positive mass of citizens, it must be that $0 < \hat{\pi}_{G_b} < 1$ for any b, but this means that citizens with $b_i = \frac{c}{\alpha}$ and $b_i = \frac{c}{\gamma}$ are no longer indifferent and the inequalities are strict. From (A4) it is easy to see that the function mapping b to solution z_b maps $(-\infty, +\infty)$ onto the entire interval $\left(\frac{c}{\alpha}, \frac{c}{\gamma}\right)$, and thus there exists a unique b such that $z_b = z_G$. Denote this value b_G^*. In what follows, we let $Q(z; b)$ be the value of function $Q(z)$ for a given value of b; by definition of b_G^*, $Q(z_G; b_G^*) = 0$.

For $b = b_G^*$, we have $\hat{\pi}_G(b_G^*) = \hat{\pi}_{b_G^*}(b_G^*) \equiv \hat{\pi}_{b_G^*}$; this follows immediately follows from (7). Furthermore, $Q(z_G; b_G^*) = 0 = \tilde{Q}(z_G)$, and from (A4) and (A6) it follows that

$$\int_{-\infty}^{+\infty} F\left(\frac{z_G - \xi}{\sigma_\delta}\right) dG_{z_G}(\xi) = F\left(\frac{z_G - b_G^*}{\sigma_\delta}\right). \tag{A8}$$

Therefore, from (7) and (8), we have

$$\hat{\pi}_G(b_G^*) = \hat{\pi}_{b_G^*} = 1 - F\left(\frac{z_G - b_G^*}{\sigma_\delta}\right) = 1 - \int_{-\infty}^{+\infty} F\left(\frac{z_G - \xi}{\sigma_\delta}\right) dG_{z_G}(\xi) = \pi_{z_G},$$

so $\pi_{z_G} = \hat{\pi}_G(b_G^*)$; in other words, the objective probabilities of success $\hat{\pi}_G(b_G^*) = \hat{\pi}_{b_G^*}$ indeed coincide with the belief of a citizen with $b_i = z_G$ if b were not revealed.

Take $b < b_G^*$. For such values of b, $z_b > z_G$, because z_b is decreasing in b. We then have

$$\hat{\pi}_G(b) = 1 - F\left(\frac{z_G - b}{\sigma_\delta}\right) > 1 - F\left(\frac{z_b - b}{\sigma_\delta}\right) = \hat{\pi}_b.$$

This means that for such b, the dictator would be better off if b is revealed. It remains to prove that $\pi_{z_G} > \hat{\pi}_G(b)$. Notice that $Q(z_G; b_G^*) = 0$ and $b < b_G^*$ imply $Q(z_G; b) < 0$ (this follows from the proof of Proposition 1); since $\tilde{Q}(z_G) = 0$, we have

$$\int_{-\infty}^{+\infty} F\left(\frac{z_G - \xi}{\sigma_\delta}\right) dG_{z_G}(\xi) > F\left(\frac{z_G - b}{\sigma_\delta}\right)$$

and thus

$$\hat{\pi}_G(b) = 1 - F\left(\frac{z_G - b}{\sigma_\delta}\right) < 1 - \int_{-\infty}^{+\infty} F\left(\frac{z_G - \xi}{\sigma_\delta}\right) dG_{z_G}(\xi) = \pi_{z_G},$$

so $\pi_{z_G} > \hat{\pi}_G(b)$.

If $b > b_G^*$, then, analogously, we get that $z_b < z_G$ and $\hat{\pi}_G(b) < \hat{\pi}_b$, so the dictator is better off concealing b, and $\pi_{z_G} < \hat{\pi}_G(b)$.

It remains to prove that $G(b_G^*) \in (0,1)$. Suppose not; consider the case $G(b_G^*) = 0$ (the case $G(b_G^*) = 1$ is analogous). This means that $b \geq b_G^*$ in the support of the distribution G and thus in the support of the conditional distribution G_{z_G}, and consequently,

$$\int_{-\infty}^{+\infty} F\left(\frac{z_G - \xi}{\sigma_\delta}\right) dG_{z_G}(\xi) < \int_{-\infty}^{+\infty} F\left(\frac{z_G - b_G^*}{\sigma_\delta}\right) dG_{z_G}(\xi) = F\left(\frac{z_G - b_G^*}{\sigma_\delta}\right)$$

(the inequality is strict, because G is assumed to have no atoms and is therefore nondegenerate). But this contradicts (A8), and the contradiction completes the proof. ■

Proof of Proposition 3. Suppose that without competitive elections, b is distributed according to some distribution H^*. Then there is a protest threshold $z_{H^*} \in \left(\frac{c}{\alpha}, \frac{c}{\gamma}\right)$ and, by Lemma A3, the dictator would prefer to have elections if and only if b satisfies $z_b \geq z_{H^*}$, i.e., when $b \leq y$ for some y. Consequently, the equilibrium decision to have elections must take the form of a threshold. Moreover, this threshold y must satisfy $\tau(y) \geq \tilde{\tau}$, because the opposite would imply that some dictators with b satisfying $\tau(b) < \tilde{\tau}$ have competitive elections and lose; this cannot happen in equilibrium because canceling elections yields strictly higher utility.

Consider the distribution $H_y(x)$ given by (15) for different y. Clearly, as $y \to -\infty$ or $y \to +\infty$, $H_y(x)$ pointwisely converges to the same distribution $G(x)$. Consider the function $s_y = z_{H_y}$; this function maps $[-\infty, +\infty]$ to $\left(\frac{c}{\alpha}, \frac{c}{\gamma}\right)$ and is continuous, therefore, its image is compact. In what follows, we show that it is strictly quasiconvex on the support of G and has a unique minimum which is interior.

It is straightforward to see that y such that $\tau(y) \geq \tilde{\tau}$ is an equilibrium threshold if and only if $z_y = z_{H_y}$: sufficiency follows from Lemma A3 and necessity follows immediately from continuity of all functions involved. Since the function $y \mapsto z_y$ maps $(-\infty, +\infty)$ onto $\left(\frac{c}{\alpha}, \frac{\gamma}{\alpha}\right)$, we have $z_y < s_y$ for y high enough and $z_y > s_y$ for y low enough. Therefore, there exists y for which $z_y = s_y = z_{H_y}$, therefore, there is an equilibrium (provided that there is such y satisfying $\tau(y) \geq \tilde{\tau}$). If for all such y, $\tau(y) < \tilde{\tau}$, then $\tilde{b}$ satisfying $\tau\left(\tilde{b}\right) = \tilde{\tau}$ is an equilibrium, because for all $b \leq \tilde{b}$, $z_y > s_y = z_{H_y}$, and thus the dictator prefers to have elections. Therefore, an equilibrium exists, and moreover, in the latter case, it is unique.

Take some value y for which $z_y = s_y$, and let us prove that s_y is quasiconvex with minimum achieved at y. First, take $y' > y$, and consider the distribution H' given by

$$H'(x) = \begin{cases} 0 & \text{if } x \leq y \\ \frac{G(x)-G(y)}{G(y')-G(y)} & \text{if } y < x \leq y' \\ 1 & \text{if } x > y' \end{cases}.$$

It is straightforward to verify that $H_y \equiv pH' + (1-p)H_{y'}$, where $p = \left(G\left(y'\right) - G\left(y\right)\right) / \left(1 - G\left(y\right)\right)$, and since $y' > y$, $p \in (0,1)$. Now, we know that $z_{H_y} = z_y$. Now, the distribution H' first-order stochastically dominates the degenerate distribution concentrated in y, and by Proposition 1, $z_{H'} < z_y$. From this it follows that $z_{H_{y'}} > z_y$. Indeed, suppose, to obtain a contradiction, that $z_{H_{y'}} \leq z_y$. Then using the function $\tilde{Q}(z)$ defined by A6, we have $\tilde{Q}(z_y; H_y) = 0$, and also $\tilde{Q}\left(z_{H_{y'}}; H_{y'}\right) = 0$ and $\tilde{Q}(z_{H'}; H') = 0$, and thus $\tilde{Q}\left(z_y; H_{y'}\right) \geq 0$ and $\tilde{Q}(z_y; H') > 0$. This implies that from the standpoint of person with signal z_y, $\pi_{\left(H_{y'}\right)_{z_y}} \geq \pi_{(H_y)_{z_y}}$ and $\pi_{(H')_{z_y}} > \pi_{(H_y)_{z_y}}$. At the same time, for a given threshold z_y, $\pi_{G_{z_y}} = 1 - \int_{-\infty}^{+\infty} F\left(\frac{z_y - \xi}{\sigma_\delta}\right) dG_{z_y}(\xi)$ is linear in the distribution function, and thus satisfies $\pi_{(H_y)_{z_y}} = p\pi_{(H')_{z_y}} + (1-p)\,\pi_{\left(H_{y'}\right)_{z_y}}$, a contradiction. Thus, $z_{H_{y'}} > z_y$.

In the case $y' < y$, let H'' be given by

$$H''(x) = \begin{cases} 0 & \text{if } x \leq y' \\ \frac{G(x)-G(y')}{G(y)-G(y')} & \text{if } y' < x \leq y \\ 1 & \text{if } x > y \end{cases}.$$

It is straightforward to verify that $H_{y'} \equiv pH'' + (1-p)H_y$, where $p = \left(G\left(y\right) - G\left(y'\right)\right) / \left(1 - G\left(y'\right)\right)$, and since $y > y'$, $p \in (0,1)$. As before $z_{H_y} = z_y$. The degenerate distribution with an atom in y

first-order stochastically dominates H'', and by Proposition 1, $z_{H''} > z_y$. From this it follows that $z_{H_{y'}} > z_y$. Indeed, suppose, to obtain a contradiction, that $z_{H_{y'}} \leq z_y$. From Proposition 1, we have $\tilde{Q}(z_y; H_y) = 0$, and also $\tilde{Q}\left(z_{H_{y'}}; H_{y'}\right) = 0$ and $\tilde{Q}(z_{H''}; H'') = 0$, and thus $\tilde{Q}\left(z_y; H_{y'}\right) \geq 0$ and $\tilde{Q}(z_y; H'') < 0$. This implies that from the standpoint of person with signal z_y, $\pi_{\left(H_{y'}\right)_{z_y}} \geq \pi_{(H_y)_{z_y}}$ and $\pi_{(H'')_{z_y}} < \pi_{(H_y)_{z_y}}$. But since $\pi_{G_{z_y}}$is linear in G, we have $\pi_{\left(H_{y'}\right)_{z_y}} = p\pi_{(H'')_{z_y}} + (1-p)\,\pi_{(H_y)_{z_y}}$, a contradiction. Thus, $z_{H_{y'}} > z_y$ in this case as well.

We have proven that any y such that $z_y = s_y$ is a unique global minimum of s_y, which proves uniqueness of such y. It is straightforward to see that $G(y) \in (0,1)$; indeed, if $G(y) = 0$, then H_y first-order stochastically dominates the atom in y, and thus $s_y = z_{H_y} < z_y$, and if $G(y) = 1$, then, similarly, $s_y > z_y$; in either case $s_y \neq z_y$, a contradiction.

Let us prove that s_y is indeed quasiconvex; this would prove the result that s_{b_e} minimizes s_y over $\left(-\infty, \tilde{b}\right) \cap (\text{support of } G)$ even if $\tau(y) \geq \tilde{\tau}$ constraint is binding. Take $y' > \tilde{y} > y$ and let us show that $s_{y'} > s_{\tilde{y}}$. Since the equation $s_y = z_y$ has exactly one solution, we must have $z_{\tilde{y}} < s_{\tilde{y}}$. Consequently, $s_{\tilde{y}} = z_{\tilde{y}'}$ for some $\tilde{y}' < \tilde{y}$. Thus, in some vicinity of $\tilde{y}$, we have $y' > \tilde{y}'$. We then can use the same argument as before: for example, if $y' > \tilde{y}$, take H''' given by

$$H'''(x) = \begin{cases} 0 & \text{if } x \leq \tilde{y} \\ \frac{G(x)-G(\tilde{y})}{G(y')-G(\tilde{y})} & \text{if } \tilde{y} < x \leq y' \\ 1 & \text{if } x > y' \end{cases}.$$

As before, $H_{\tilde{y}} \equiv pH''' + (1-p)H_{y'}$, where $p = (G(y') - G(\tilde{y}))\,/\,(1 - G(\tilde{y}))$, and $p \in (0,1)$. Now, we know that $z_{H_{\tilde{y}}} = s_{\tilde{y}'} = z_{\tilde{y}'}$. Now, the distribution H''' first-order stochastically dominates the degenerate distribution concentrated in $\tilde{y}'$, and by Proposition 1, $z_{H'''} < z_{\tilde{y}'} = z_{H_{\tilde{y}}}$. Suppose, to obtain a contradiction, that $z_{H_{y'}} \leq z_{\tilde{y}'} = z_{H_{\tilde{y}}}$. Consequently, $\tilde{Q}\left(z_{\tilde{y}'}; H_{\tilde{y}}\right) = 0$, and also $\tilde{Q}\left(z_{H_{y'}}; H_{y'}\right) = 0$ and $\tilde{Q}(z_{H'''}; H''') = 0$, and thus $\tilde{Q}\left(z_{\tilde{y}'}; H_{y'}\right) \geq 0$ and $\tilde{Q}\left(z_{\tilde{y}'}; H'\right) > 0$. Then, as before, from the standpoint of person with signal $z_{\tilde{y}'}$, $\pi_{\left(H_{y'}\right)_{z_{\tilde{y}'}}} \geq \pi_{\left(H_{\tilde{y}}\right)_{z_{\tilde{y}'}}}$ and $\pi_{(H''')_{z_{\tilde{y}'}}} > \pi_{(H_y)_{z_{\tilde{y}'}}}$. At the same time, we can again show that $\pi_{\left(H_{\tilde{y}}\right)_{z_{\tilde{y}'}}} = p\pi_{(H''')_{z_{\tilde{y}'}}} + (1-p)\,\pi_{\left(H_{y'}\right)_{z_{\tilde{y}'}}}$, a contradiction. Thus, $z_{H_{y'}} > z_{\tilde{y}'} = z_{H_{\tilde{y}}}$, and so $s_{y'} > s_{\tilde{y}}$. The case $y' < \tilde{y} < y$ is considered similarly, and this proves quasiconvexity.

Finally, let us prove the comparative statics results. First, notice that for any y, z_y does not depend on η (η does not enter equation (A4)). Let us show that for any y, z_{H_y} is decreasing in η. It suffices to prove that $H_{y;\eta}$ first-order stochastically dominates $H_{y;\eta'}$ if $\eta > \eta'$, i.e., that for any

x, $H_{y;\eta}(x)$ is decreasing in η. Differentiating, we get

$$\begin{aligned}\frac{dH_{y;\eta}(x)}{d\eta} &= \frac{-G(x)(1-\eta G(y))+(1-\eta)G(x)G(y)}{(1-\eta G(y))^2} \\ &= \frac{G(x)(G(y)-1)}{(1-\eta G(y))^2}<0.\end{aligned}$$

if $x<y$, and, similarly,

$$\begin{aligned}\frac{dH_{y;\rho}(x)}{dt} &= \frac{-G(y)(1-\eta G(y))+(G(x)-\eta G(y))G(y)}{(1-\eta G(y))^2} \\ &= \frac{G(y)(G(x)-1)}{(1-\eta G(y))^2}<0\end{aligned}$$

if $x \geq y$. This shows that if η increases, then z_{H_y} decreases. This means that, since b_E satisfied $z_{b_E}=s_{b_E}$, then after η increases to η', we have $z'_{b_E}=z_{b_E}=s_{b_E}>s'_{b_E}$. This means that under η', the equilibrium threshold that satisfies $z'_{b'_E}=s'_{b'_E}$, must also satisfy $b'_E>b_E$. Consequently, b_E is increasing in η.

To show that b_E satisfies $\tau(b_E)=\tilde{\tau}$ if η is close to 1, suppose not; then there is a limit point $\bar{b}=\lim_{\eta\to 1} b_E$. Then the distributions $H_{\bar{b};\eta}$ converge, in distribution, to a distribution with support on $\left(-\infty,\bar{b}\right]$. But at the same time, the degenerate distributions with atoms in b_E converge, in distribution, to one with atom in $\bar{b}$, which first-order stochastically dominates the former limit. This means that in the limit, $z_{\bar{b}}<z_{H_{\bar{b};\eta=1}}$, and this contradicts that $z_{b_E}=z_{H_{b_E(\eta);\eta}}$ for all η. This contradiction proves that $\tau(b_E)=\tilde{\tau}$ (i.e., $b_E=\tilde{b}$) for η sufficiently close to 1.

Conversely, if η approaches 0, then $b_E(\eta)$ is decreasing, and converges to some point b'. In this case, distributions $H_{y;\eta}$ converge G for any fixed y. This means that distributions $H_{b_E(\eta);\eta}$ converge to G, and thus $z_{H_{b_E(\eta);\eta}}$ converges to z_G. Similarly, $z_{b_E(\eta)}$ converge to $z_{b'}$. But $z_G=z_{b^*_G}$ by definition of b^*_G; thus, $z_{b^*_G}=z_{b'}$. This implies that $\lim_{\eta\to 0} b_E(\eta)=b'=b^*_G$.

To demonstrate the comparative statics result with respect to c, take any c, and suppose that b_E is the threshold. At this threshold, $z_{b_E;c}=z_{H_{b_E};c}$. Now suppose that c increases, say, to $c'>c$. Then, for a given b_E, both z_{b_E} and $z_{H_{b_E}}$ increase (see Proposition 1). However, $z_{H_{b_E}}$ will increase by a lower margin than z_{b_E}. Indeed, at b_E, $\frac{\partial Q(z)}{dc}=\frac{\partial \tilde{Q}(z)}{dc}$, but $\frac{\partial Q}{dz}<\frac{\partial \tilde{Q}}{dz}$, as follows from the proof of Proposition 1. Therefore, $\frac{\partial z_{b_E}}{\partial c}>\frac{\partial z_{H_{b_E}}}{\partial c}$, and this implies that $z_{b_E;c'}>z_{H_{b_E};c'}$ for $c'>c$. Thus, the equilibrium threshold under c', b'_E which satisfies $z_{b'_E;c'}>z_{H_{b'_E};c'}$, must satisfy $b'_E>b_E$. ■

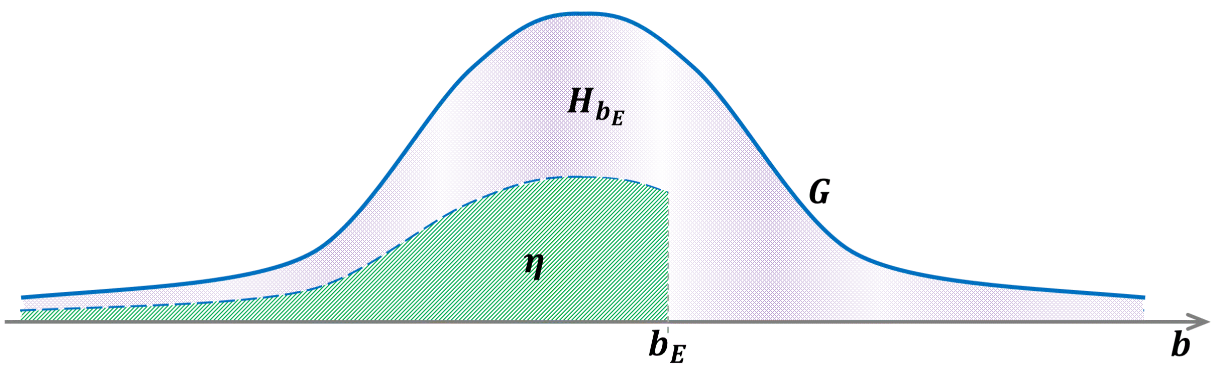

Figure 1: The distribution H_y for $y = b_E$. The dictator opts for fair election if $b < b_E$, and the challenger runs with probability η.

Table 1. Free elections in nondemocracies

Albania	**1991 (3-2)**, **1992 (6-1)**, 1996 (3-3), **1997 (6-1)**, **2001 (6-1)**	Lebanon	**2005 (6-0)**
Algeria	**1995 (1-4)**, **2004 (3-1)**, 2009 (3-1)	Liberia	**2011 (7-1)**
Argentina	1995 (7-0)	Malawi	**1994 (6-0)**, **2004 (7-1)**, **2009 (6-0)**
Armenia	1996 (0-6), 1998 (6-1), 2003 (5-0), **2008 (5-0)**	Malaysia	**1990 (5-1)**, 1995 (4-1), 1999 (4-1), 2004 (4-1), 2008 (6-0)
Azerbaijan	1993 (1-4), 1998 (0-7), 2003 (0-7), 2008 (0-7)	Mali	1997 (6-0), 2007 (7-0)
Bangladesh	1996 (6-0)	Mauritania	1992 (0-6), 1997 (0-6), 2003 (0-6)
Belarus	2001 (0-7), 2006 (0-7), 2010 (0-7)	Mexico	1994 (4-0)
Benin	1991 (6-0), **2011 (7-0)**	Mozambique	**1994 (5-0)**, **1999 (5-0)**, **2004 (5-0)**, 2009 (5-0)
Burkina Faso	**1991 (0-5)**, **1998 (0-4)**, 2010 (2-2)	Myanmar (Burma)	1990 (0-7)
Burundi	**2010 (7-1)**	Namibia	**1999 (6-0)**, 2004 (6-0), **2009 (6-0)**
Cambodia	**1993 (3-2)**, **1998 (3-1)**, **2003 (3-1)**, **2008 (3-1)**	Nepal	**1991 (5-0)**, **1994 (5-0)**, **1999 (7-1)**, 2008 (7-1)
Cameroon	1992 (1-5), **2004 (1-5)**, **2011 (1-5)**	Nicaragua	**1990 (6-0)**
Central African Rep	**1993 (5-0)**, **2005 (1-2)**, 2011 (1-2)	Niger	1996 (0-6), **2004 (7-1)**
Chad	**1996 (1-3)**, **2001 (1-3)**, 2006 (1-3), 2011 (1-3)	Nigeria	2003 (4-0), 2007 (4-0), **2011 (4-0)**
Colombia	1998 (7-0), **2002 (7-0)**, **2006 (7-0)**, **2010 (7-0)**	Papua New Guinea	**1997 (4-0)**, **2002 (4-0)**, **2007 (4-0)**
Congo Brazzaville	**1992 (6-1)**, **2002 (0-4)**, 2009 (0-4)	Paraguay	**1993 (7-0)**, **2000 (7-0)**
Croatia	**1992 (1-4)**, 1997 (0-5)	Peru	**1995 (3-2)**
Cuba	1993 (0-7), 1998 (0-7), 2003 (0-7)	Poland	1990 (5-0)
Dominican Rep	**1990 (6-0)**, 1994 (5-0)	Romania	**1992 (5-0)**
Ecuador	**2009 (5-0)**	Rwanda	2003 (0-3), 2010 (0-4)
Egypt	**1993 (0-6)**, 2005 (1-4)	Senegal	1993 (2-3)
El Salvador	1994 (7-0), **1999 (7-0)**, **2004 (7-0)**	Sierra Leone	**2002 (5-0)**
Estonia	**1995 (7-1)**	Sri Lanka	1999 (6-1), 2010 (4-1)
Ethiopia	**1995 (3-2)**, **2000 (3-2)**, 2005 (1-4)	Sudan	**1996 (0-7)**, 2000 (0-7), 2010 (1-3)
Fiji	**2001 (6-1)**	Tajikistan	1994 (0-6), 1999 (2-3), 2006 (1-4)
Gambia	1996 (0-6), **2001 (0-5)**, **2006 (0-5)**, 2011 (0-5)	Thailand	2006 (0-5), 2011 (7-0)
Georgia	**1992 (5-1)**, **1995 (6-1)**, 2000 (5-0), 2008 (7-1)	Togo	**1993 (1-3)**, 1998 (1-3), **2003 (1-3)**, **2005 (1-5)**, **2010 (1-3)**
Ghana	1992 (1-2), **1996 (3-1)**	Tunisia	1994 (1-4), 1999 (1-4), 2004 (1-5), 2009 (1-5)
Guatemala	**1990 (4-1)**, **1991 (4-1)**	Turkmenistan	1992 (0-9), 2007 (0-9)
Guinea-Bissau	**1994 (5-0)**, **2000 (5-0)**	Uganda	**1996 (0-4)**, 2001 (0-4), 2006 (1-2), **2011 (1-2)**
Guyana	**1992 (6-0)**, 2001 (6-0), **2006 (6-0)**, **2011 (6-0)**	Ukraine	1994 (7-0), 1999 (7-0), 2004 (6-0), **2010 (6-0)**
Haiti	**1995 (7-0)**, 2000 (1-3)	Uzbekistan	2000 (0-9), 2007 (0-9)
Iraq	1995 (0-9)	Yemen	**1999 (1-3)**, **2006 (1-3)**
Kazakhstan	1995 (1-5), 1999 (1-5), 2005 (0-6), 2011 (0-6)	Zambia	**1991 (6-0)**, 1996 (3-2), 2001 (5-0), **2006 (5-0)**
Kenya	1992 (0-5), 1997 (2-4), 2007 (7-0)	Zimbabwe	**1990 (0-6)**, 1996 (0-6), 2002 (1-5), 2008 (1-5)

The table lists country-years where democracy score was below 8 and there were elections to the high office where the incumbent participated. OECD countries are excluded. Country-years where election was fair according to our definition are in bold. Democracy and autocracy scores (polity measure is defined as their difference) are in parentheses.

Table 2. Summary Statistics

	Source	Mean	Std Deviation	Min	Max	Observations
Democracy	Polity IV	3.18	2.65	0	7	181
Autocracy	Polity IV	2.48	2.59	0	9	181
Media freedom	Freedom House	0.38	0.18	0	0.77	157
Population (millions)	WDI	18.6	24.8	0.72	164	181
GDP per capita (1000s of 2005USD)	WDI	1.48	1.49	0.13	7.61	178
Extrajudicial killings	CIRI	0.51	0.35	0	1	181
Disappearances	CIRI	0.24	0.36	0	1	181
Torture	CIRI	0.80	0.29	0	1	181
Political prisoners	CIRI	0.60	0.37	0	1	181
Cruelty	CIRI	0.54	0.23	0	1	181
Repression (Amnesty International)	Amnesty Intl.	0.47	0.25	0	1	181
Repression (Dept. of State)	US Dept. of State	0.51	0.23	0	1	181
Observers	NELDA	0.87	0.34	0	1	181
Western observers	NELDA	0.89	0.32	0	1	161
Violations reported	NELDA	0.34	0.47	0	1	146
Partly fair = Obs. & W.Obs.	our definition	0.77	0.42	0	1	181
Fair = Partly fair & not(Violations)	our definition	0.48	0.50	0	1	181
Year		2000	6.43	1990	2011	181

Table 3. Main evidence

	Dependent variable: Election is fair										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Repression	-0.47*		-0.77***	-0.60**		-0.83***	-0.72**	-0.54*	-0.07	-0.20	-0.18
	[0.24]		[0.24]	[0.27]		[0.25]	[0.27]	[0.28]	[0.20]	[0.17]	[0.20]
Cruelty		0.47**	0.75***		0.39	0.65**	0.74***	0.50**	0.24	0.59***	0.52***
		[0.22]	[0.22]		[0.25]	[0.25]	[0.28]	[0.24]	[0.23]	[0.20]	[0.19]
Log(GDP per capita)				-0.29	-0.20	-0.28	-0.28	-0.30	-0.11**	-0.10***	-0.11***
				[0.22]	[0.25]	[0.22]	[0.20]	[0.19]	[0.04]	[0.04]	[0.04]
Log(population)				-0.93	-0.73	-0.88	-0.83	-2.40***	-0.10***	-0.12***	-0.11***
				[0.70]	[0.66]	[0.63]	[0.64]	[0.66]	[0.03]	[0.03]	[0.03]
Democracy							0.05	0.03		0.02	0.02
							[0.07]	[0.08]		[0.04]	[0.04]
Autocracy							-0.02	0.03		-0.07**	-0.06*
							[0.07]	[0.07]		[0.03]	[0.03]
Executive constraitns							-0.00	0.15		-0.02	-0.02
							[0.14]	[0.15]		[0.06]	[0.07]
Media freedom								-0.21			0.19
								[0.65]			[0.31]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	70	70	70	69	69	69	69	65	69	69	65
Observations	181	181	181	178	178	178	178	156	178	178	156

Note: The unit of observation is an election. The dependent variable is a dummy variable that equals 1 if election was fair and zero otherwise. Standard errors clustered at the country level in parentheses. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Repression and cruelty

	Dependent variable: Election is fair									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Repression (Amnesty Int'l)	-0.73***	-0.71***	-0.66**	-0.59**	-0.79***					
	[0.25]	[0.27]	[0.27]	[0.27]	[0.25]					
Repression (US. Dept. of State)						-0.45*	-0.33	-0.28	-0.17	-0.61**
						[0.27]	[0.27]	[0.25]	[0.25]	[0.28]
Extrajudicial killings	0.41**				0.33*	0.44**				0.39*
	[0.17]				[0.20]	[0.20]				[0.21]
Disappearances		0.27**			0.20		0.25*			0.23
		[0.12]			[0.13]		[0.14]			[0.14]
Torture			0.29		0.15			0.28		0.17
			[0.21]		[0.21]			[0.22]		[0.21]
Political prisoners				-0.00	-0.08				-0.08	-0.19
				[0.15]	[0.13]				[0.15]	[0.12]
Log(GDP per capita)	-0.39*	-0.24	-0.30	-0.29	-0.36	-0.34	-0.19	-0.25	-0.25	-0.33
	[0.22]	[0.23]	[0.22]	[0.23]	[0.25]	[0.23]	[0.25]	[0.23]	[0.24]	[0.26]
Log(population)	-1.15*	-0.82	-0.88	-0.93	-1.01	-1.07*	-0.72	-0.77	-0.85	-0.99
	[0.58]	[0.71]	[0.69]	[0.70]	[0.64]	[0.58]	[0.68]	[0.67]	[0.70]	[0.63]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	69	69	69	69	69	69	69	65	69	65
Observations	178	178	178	178	178	178	178	156	178	156

Note: The unit of observation is an election. The dependent variable is a dummy variable that equals 1 if election was fair and zero otherwise. Standard errors clustered at the country level in parentheses. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Robustness

	Dependent variable: Election is fair									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Logistic regression		No year fixed effects		All values of democracy		Incumbent running or not			
Repression	-11.01**	-11.40**	-0.66***	-0.58**	-0.38*	-0.34*	-0.50***	-0.47**	0.46	0.39
	[4.97]	[5.28]	[0.22]	[0.22]	[0.20]	[0.19]	[0.19]	[0.19]	[0.30]	[0.30]
Cruelty	11.21**	15.28**	0.73***	-0.78**	0.26	0.38**	0.41*	0.47*	-0.56	-0.30
	[5.19]	[7.14]	[0.25]	[0.24]	[0.23]	[0.24]	[0.23]	[0.25]	[0.55]	[0.57]
Incumbent running									-1.13	-0.05
									[0.33]	[0.33]
Repression * Incumbent running									-1.21***	-1.13***
									[0.41]	[0.41]
Cruelty * Incumbent running									1.10**	0.87*
									[0.52]	[0.52]
Log(GDP per capita)	-4.50	-7.77	-1.18	-0.19	-0.11	-0.09	-0.21	-0.19	-0.23	-0.22
	[2.98]	[5.16]	[0.25]	[0.25]	[0.21]	[0.21]	[0.21]	[0.20]	[0.20]	[0.20]
Log(population)	-16.57**	-22.36**	-0.55	-0.57	-0.50	-0.31	-0.76	-0.74	-0.72	-0.70
	[7.40]	[10.02]	[0.67]	[0.69]	[0.55]	[0.55]	[0.58]	[0.60]	[0.61]	[0.62]
Democracy		0.56		0.05		0.13**		0.04		-0.02
		[0.80]		[0.07]		[0.06]		[0.06]		[0.06]
Autocracy		-1.62		-0.01		0.02		-0.00		-0.02
		[1.20]		[0.06]		[0.06]		[0.04]		[0.04]
Executive constraitns		-2.67		0.03		-0.14		0.00		-0.01
		[1.99]		[0.13]		[0.11]		[0.09]		[0.09]
Year			0.01	0.00						
			[0.02]	[0.02]						
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Countries	30	30	69	69	94	94	71	71	71	71
Observations	103	103	178	178	300	300	208	208	208	208

Note: The unit of observation is an election. The dependent variable is a dummy variable that equals 1 if election was fair and zero otherwise. Standard errors clustered at the country level in parentheses. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6. Alternative specifications

	Dependent variable: Election is fair					Dependent variable: Election is partly fair				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Not to high office		High office and not							
Repression	-0.33	-0.27	-0.32**	-0.43*	-0.43**	0.07		-0.02	-0.09	-0.01
	[0.37]	[0.33]	[0.15]	[0.22]	[0.21]	[0.21]		[0.24]	[0.24]	[0.24]
Cruelty	0.34	0.34	0.21	0.06	0.09		0.20	0.21	0.20	0.32
	[0.28]	[0.38]	[0.17]	[0.24]	[0.24]		[020]	[0.22]	[0.23]	[0.23]
High office				-0.20	-0.30**					
				[0.16]	[0.15]					
Repression * High office				0.13	0.15					
				[0.23]	[0.20]					
Cruelty * High office				0.31	0.44					
				[0.27]	[0.28]					
Log(GDP per capita)	-0.36	-1.18	-1.16	-0.14	-0.14				-0.21	-0.19
	[0.29]	[0.27]	[0.18]	[0.19]	[0.18]				[0.23]	[0.24]
Log(population)	-1.12	-1.22	-0.53	-0.56	-0.76				-1.12**	-1.00*
	[1.20]	[1.00]	[0.59]	[0.58]	[0.54]				[0.51]	[0.52]
Democracy		0.05			0.03					0.09
		[0.13]			[0.05]					[0.05]
Autocracy		-0.06			-0.04					-0.05
		[0.07]			[0.03]					[0.05]
Executive constraitns		0.05			0.04					-0.11
		[0.19]			[0.07]					[0.11]
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Countries	51	51	77	77	77	70	70	70	69	69
Observations	132	132	340	340	340	181	181	181	178	178

Note: The unit of observation is an election. The dependent variable is a dummy variable that equals 1 if election was fair and zero otherwise. Standard errors clustered at the country level in parentheses. *significant at 10%; ** significant at 5%; *** significant at 1%.