Taking to the Streets
Protests and Regime Survival [*]

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Abstract

In recent decades, citizens all over the world took to the streets to oppose predatory autocracies. In this paper, we examine both theoretically and empirically the conditions that facilitate civil uprisings against autocratic regimes and the determinants of their success. We provide a signaling model of protest wherein, when deciding whether to protest or not, citizens face the critical challenge of knowing their fellow citizens' preferences and hence the size of the potential opposition rather than the nature of the regime. We ask whether, in equilibrium, a critical mass of citizens will make the first move and take to the streets to signal dissatisfaction even if they know they will not be numerous enough to topple the regime. We generate two testable hypotheses from our theory: more repressive autocratic regimes are in principle more stable, in part because they are better able to deter civil opposition. However, protest that takes place in a more repressive autocratic regime reaches its maximum information revealing potential and hence is more likely to cascade into a successful uprising. We provide evidence in support of these two conclusions using data from contemporary regimes from $1950 - 2000$.

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1. Introduction

In recent decades, citizens all over the world took to the streets to protest against predatory regimes. Some paramount cases include the 2004 Orange Revolution in Ukraine, Georgia's Rose Revolution in 2005, Burma's Saffron Revolution in 2007, Iran's Green Revolution in 2009, and the Arab Spring. The willingness of (mostly) unarmed demonstrators to risk their lives to oppose fraudulent elections, economic hardships, corruption, and lasting repression underscores the dangers of citizen opposition and protests for autocratic rule.

These protests also suggest that despite significant collective action problems, ordinary citizens are often able to coordinate to oppose predatory rule. In the case of the Arab Spring, the dynamics of mass protest also highlight that small acts of defiance have the potential to cascade into mass revolutions that can even travel across borders. In December 2010, one man acting alone, 26-year old Tunisian street vendor set off the most significant wave of anti-authoritarian protest in more than two decades after. After police confiscated the scales Mohammed Bouazizi used to weigh the fruits and vegetables he sold, he set himself on fire. A first set of riots in Bouaziz's rural hometown set off a chain of events that led to the unseating, or at the very least, unsettling, of dictators across the region.

Not enough is known about the conditions under which mass protests are likely to spread and succeed in ousting autocratic rule. A dominant stream in the political economy literature on authoritarian regimes has tended to overlook the critical importance of the masses for the survival of autocratic regimes. Starting with Tullock (2005), who argued that genuine popular uprisings are "rare, not only in my own opinion but in that of most people who have seriously looked into the matter" (p. 44), the political economy literature has stressed that autocrats' most dangerous challengers come from their own ruling coalition—from their security forces, their party, or their royal families.

Some of the most prominent examples include Bueno de Mesquita et al's (2003) selectorate theory, which argues that dictators face a threat from a politically relevant subset of the elite called the "selectorate." Haber (2006) argues that the principal danger to dictators comes from the dictator's "launching organization" or from political entrepreneurs who lead organized groups. In Geddes (2003, 2006, 2008), the main danger to dictators comes from divisions within the ruling elite, especially from the military. In Guriev and Sonin (2009), Boix and Svolik (2010), Egorov and Sonin (2011), and Svolik (2013), the principal threat comes from members of the ruling party or coalition. In a similar manner, in North, Wallis and Weingast (2009) and in Acemoglu, Egorov and Sonin (2009), dictators have to gain the support of an elite-based ruling coalition in order to stay in power.

One reason to focus on elite threats is that coordinating mass uprisings is a much harder task. Contrary to elites, citizens do not control weapons, personnel, or other political resources. Citizens' power stems exclusively from their numbers (DeNardo 1985). This means that in order to viably threaten the regime, citizens need to coordinate and overcome collective action problems.

Well aware of the dangers of mobilization, autocratic regimes actively obstruct certain types of communication. Recent evidence from China, for instance, suggests that the regime censors internet communication that fosters social mobilization (King et al. 2013). Because the regime is likely to persecute, imprison, or impose economic sanctions on protesters, citizens would be willing to take to the streets only when they expect that a sufficiently large group of citizens will do the same. At the same time, if they know that others will bear the costs of protesting, citizens also have an incentive to free ride, not to turn out, and enjoy the fruits of others' protest (Olson 1965).

Despite these challenges, in the past decades, hundreds of thousands of citizens have taken to the streets to protest autocratic rule. These massive acts of civil protest across the globe led some scholars to argue that the "fourth wave" of democratization is different from previous, more elite-driven, transitions analyzed precisely because of the critical role played by the masses in challenging autocratic rule (McFaul, 2002). Yet not enough is known about the conditions under which mass protests are likely to succeed in ousting repressive governments.

In this paper we examine, both theoretically and empirically, the conditions that facilitate civil uprisings against autocratic regimes and the determinants of their success. We develop a signaling model that describes how protests can escalate into mass civil disobedience. Following Kuran (1991a,b), we argue that to mount a civil uprising, citizens in autocratic regimes face challenges to coordinate: incomplete information about the "true" preferences of other citizens reduce an individual's willingness to risk the likely imprisonment, injury or even death associated with participation in unsuccessful protests. Yet, the acts of early protest participants—like those residents of Sidi Bouzid—can determine the long-term success or failure of a protest movement.

Our model suggests that although protests are significantly less likely to take place in highly repressive regimes, small acts of defiance have higher capacity to escalate into mass revolts when the regime is more repressive and does not allow for the expression of any form of dissent. Under these conditions, protests have maximum information-revealing potential about underlying levels of dissatisfaction with the regime that can encourage many more citizens to take to the streets. By contrast, when protests are tolerated and even become a

normal part of an autocratic regime, the model suggests that protests are less dangerous for regime survival.

We generate two testable hypotheses: more repressive regimes are, in principle, more stable because they are better able to deter civil opposition through a credible threat of repression. However, when protest does take place in a more repressive regime it is more likely to cascade into a mass uprising and to topple the regime. Using data on regime breakdowns from $1950 - 2011$, we provide empirical evidence in support of these two hypotheses.

The paper is organized as follows. In the following section, we review the existing theories regarding the relationship between repression and authoritarian survival. The third section presents our theoretical approach. The fourth section presents our data. The fifth section develops our empirical analysis. We end up with a conclusion.

2. Existing Theories

Theories of regime dynamics propose that autocratic regimes use repression to dissuade mass rebellion (see, e.g., Acemoglu and Robinson 2001, 2006; Boix 2003; Besley and Persson 2011; Svolik 2013). While staging revolutions poses a formidable challenge for citizens, free communication among them can facilitate their coordination (Barbera and Jackson 2018). Under repressive autocratic regimes, orchestrating mass protests is significantly harder—phones are likely to be intervened, conversations spied, the mass media controlled, citizens interrogated, jailed and tortured.

Among autocratic regimes there is significant variation in the degree to which citizens are allowed to express dissatisfaction. Some autocratic regimes strictly prohibit citizens from openly expressing opposition, including through public demonstrations. Highly repressive autocratic regimes hold power through the use of strong social control strategies of domination, prohibit citizens to openly voice opposing views or to organize collectively into opposition movements.

Some of the most tyrannical regimes, as Wedeen explains for the case of Syria, even force citizens "to provide external evidence of their allegiance to a cult whose rituals of obeisance are often transparently phony" (1998: 503). These requirements of public adherence to an ideology through the use of rituals and public spectacles were also prominent trait of many Communist dictatorships. Havel (1992) discusses how citizens in communist Czechoslovakia were compelled to publicly comply with rituals and rhetoric even if in reality nobody truly adhered to these with the use of an example of a vegetable seller who daily needs to decide whether to hang a slogan on his stores window that says "workers of the world unite".

Reflecting on why the vegetable seller puts the slogan, Havel (1992) reveals that citizens opted to follow the public discourse even when they found it absurd. The reason for their obedience was that citizens feared the consequences of defiance, which could range from failing to get fresh vegetables every morning, losing a job, not getting access to food, or in the most extreme cases imprisonment.

In this types of highly repressive regimes, citizens rarely deviate from the official rituals, let alone protest against the regime, because even small acts of disobedience can be brutally subjugated. The collective tragedy brought by individual obedience is that each citizen helps the other to be obedient. In following the regime's commands, each citizen discourages collective action.

Chwe's (2013) rational choice account of rituals helps explain why these types of rituals, slogans, and imaginary representing citizens idealized connection to an ideology, party, or ruler discourage collective action. In order to coordinate its actions, a group of people must form "common knowledge". Citizens in these types of highly repressive autocratic regimes face a central dilemma, namely that opposing views are private knowledge, often revealed imperfectly through jokes, sarcasm, and tales, as Blaydes (2018) argues for the case of Iraq.

What is common knowledge is that all citizens comply with the regimes slogans, rituals and commands even when everyone knows that citizens might privately dislike the ruler or the party. To participate in a collective revolt, members must have knowledge of each others preferences, knowledge of that knowledge, knowledge of the knowledge of such knowledge and so on.

Well aware of the dangers of information, many autocratic regimes actively obstruct certain types of communication. Despite the fact that free media is an anathema for any dictator, Egorov et al. (2009) show that among autocracies there is significant variation in the degree of media freedom. The authors argue that dictators face a trade-off between the need to have free flow of information in order to provide proper incentives to subordinates and implement economic reforms, and the need to censor the media to prevent citizens from overcoming coordination problems in organizing a revolt.

Similarly, autocratic regimes vary in their tolerance to protest. For instance, in contemporary China protests have grown exponentially since the 1990s and have become semi-institutionalized into what is known as "rightful resistance" (O'Brien and Lianjiang, 2006). Lorenzen (2014) argues that the autocrats in China permit some form of local-level protests to gather information that can be used to discipline lower level state officials and identify which groups have become dangerously discontent.

Other autocratic regimes are also quite tolerant to protests. In Mexico, during the

long-lasting rule by the Institutional Revolutionary Party (PRI), workers, teachers, debtors, or victims of natural catastrophes, to name some examples, continuously negotiated with the autocrats using protests to voice their demands. Protests under the PRI were semi-institutionalized: citizens were required to pre-announce their protest and authorities even cleared the streets to let them voice their demands. It is important to underscore that although the PRI tolerated protests, the regime reacted brutally against acts of defiance that challenged certain boundaries, as with the 1968 student massacre of Tlatelolco.

Similarly, Hugo Chávez's regime in Venezuela tolerated protests. While he was in power from 1999 until his death in 2013, he transformed his countrys political and economic landscape by nationalizing industries and funneling enormous amounts of government money into social programs. Chávez was quite popular among the poor, but he sparked ferocious opposition among the elites and many in the middle class, who routinely took to the streets to protest against what they claimed were fraudulent elections, through which Chávez gradually gained enough power to transform the existing institutions and perpetuate himself in office. Nicolás Maduro has turned to more tyrannical measures as Venezuela batters with an unprecedented economic crisis, tossing political opponents in prison and cracking down on street protests with lethal force.

The use of repression, as attractive as it may seem to struggling regimes, is a double-edge sword: on the one hand, it allows rulers to dissuade citizens from protesting and voicing opposition; on the other hand, repression can backfire, making acts of civic resistance significantly more dangerous.

There are two alternative theories that explain why repression can make protests more dangerous to the regime. The first argues that repression conveys information that shifts peoples actual beliefs in ways that encourage them to join the protests—for example, they disseminate information about the type of regime—malignant or benign (Lohman 1994a,b; Shadmehr and Boleslavsky 2015).

A second line of thinking argues that repression makes some people angry and that these emotional responses—rage, empathy, a sense of injustice—encourage more citizens to join the protests (Pearlman 2013; Della Porta 2013; Jasper 2014; Passarelli and Tabellini 2017). Ayata et al. (2017) offer evidence using survey experiments for the case of contemporary Turkey that repression provokes a moral and emotional reaction from bystanders, and these emotional reactions are mobilizing.

In the dynamics of protests, both mechanisms are likely to be at play and, as argued by Ayata at al. (2017), the degree to which one dominates over the other might be context specific. First, information-revealing processes might be more relevant in autocratic regimes,

where citizens have limited information about each others preferences. Second, in more open societies that normally tolerate dissent, emotional rage likely plays a stronger role in encouraging more citizens join the protests.

Our theory focuses on how citizens can overcome their collective action dilemmas to overthrow autocratic regimes. Where citizens face significant risks of being jailed, tortured, or killed if they protest, our theory suggests that protests are less likely to occur. However, once a protest erupts, even a small group of first movers can unchain a mass revolution because that act of defiance constitutes a more powerful signal about the strength of anti-government sentiment and the underlying weakness of the regime. Below we explicate our theory.

3.   A model of protest

Our signaling model departs from Kuran (1991 a,b) in that citizens in autocratic regimes have limited information about how other citizens truly feel about the autocrats. But unlike his account, in our model citizens' decisions to protest are driven by strategic considerations about how their protest will influence others to join in the revolution and the likelihood that the regime will fall.[1].
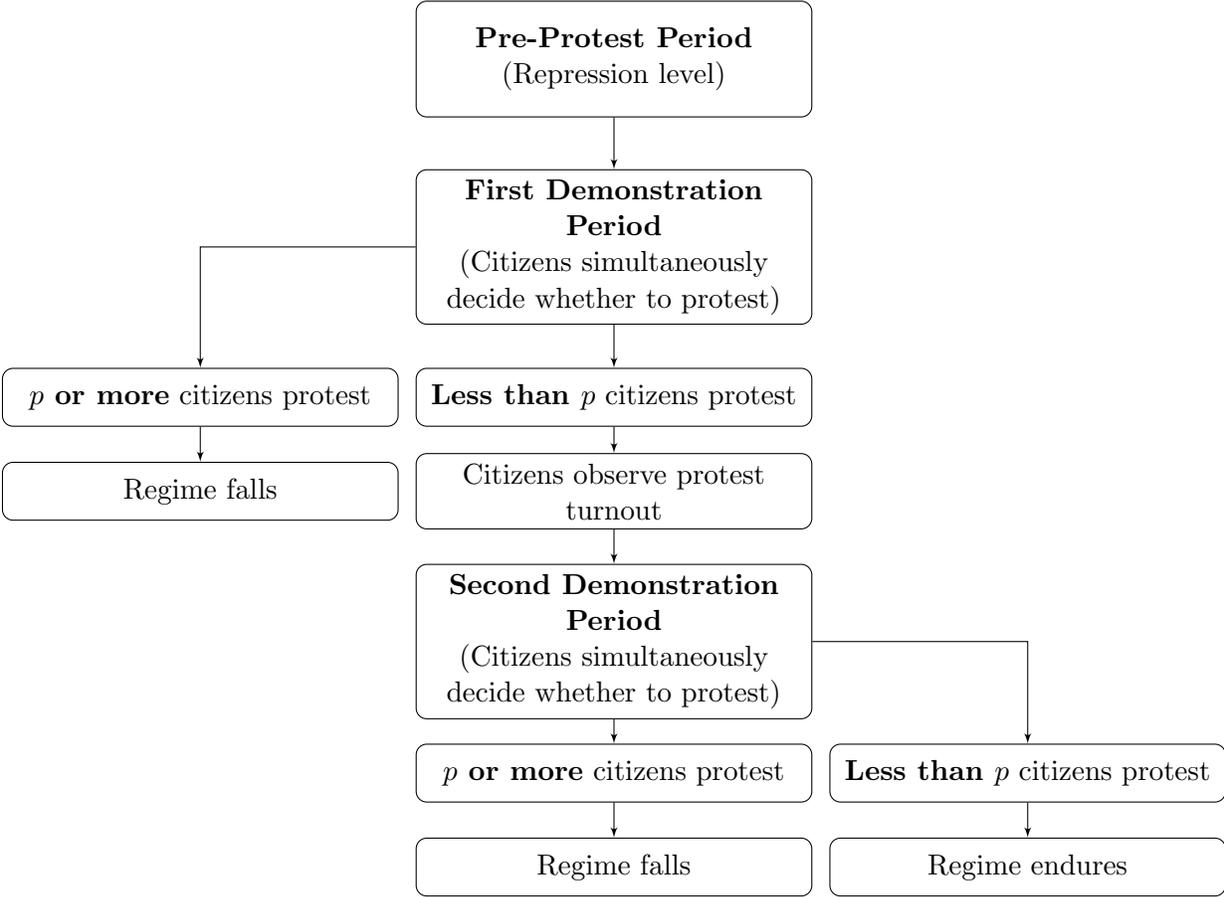
Similar to Lohmann (1994a,b), our theory examines the role of information in mass mobilization and how costly political action can serve as an informative signal. In Lohmann's (1994a,b) analysis, however, the underlying uncertainty driving political action relates to the type of the regime, while the size of the opposition is common knowledge. In our case citizens have limited information about how many other citizens share their dissatisfaction with the autocrats.

Citizens' political preferences are private information. Political preferences are dependent in the sense that in every possible realization of preferences, there exist "hard-liners", who, relative to other citizens, support the regime; "extremists", who, relative to other citizens, oppose the regime; and "moderates", who are in between. Because of mutual dependence, one's personal ideal point can be informative about the ideal points of others. The structure of preferences in the model entails that citizens with extreme preferences will have more information about other citizens.

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[1]In Kuran's model, citizens protest to denounce a repressive or repugnant government without considering the likelihood that their protesting will succeed in toppling the regime. More aggrieved citizens move first because they have lower "tolerance thresholds." Once a sufficient number of aggrieved individuals openly criticize the government, the individual cost of dissent begins to drop and more citizens feel that they can express dissent. When the cost of dissent drops sufficiently, the result is a bandwagon of dissent

The game has two periods. Specifically, in the first period, citizens simultaneously decide whether or not to protest. If a sufficient number of individuals $p \in \mathbb{N}$ protests, then the protest is successful, the regime is overthrown, and the game ends. If, on the on the other hand, less than p citizens protest in the first period, all citizens observe the number of protesters in the first period, and thus turnout becomes common knowledge among them. Then, in the second period, citizens simultaneously decide again whether or not to protest. Here too, p citizens are needed for a successful overthrow. If the protest is successful, the regime is overthrown and the game ends; otherwise, it remains in power and the game ends. The timeline of the game is presented graphically in Figure 1.

Figure 1: Timing of the Game

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                    ┌─────────────────────┐
                    │  Pre-Protest Period │
                    │  (Repression level) │
                    └─────────────────────┘
                               │
                    ┌─────────────────────┐
                    │ First Demonstration │
                    │       Period        │
                    │ (Citizens simultaneously
                    │ decide whether to protest)
                    └─────────────────────┘
          ┌────────────────────┤
          │                    │
┌───────────────────┐  ┌─────────────────────┐
│ p or more citizens│  │ Less than p citizens│
│      protest      │  │      protest        │
└───────────────────┘  └─────────────────────┘
          │                    │
┌───────────────────┐  ┌─────────────────────┐
│   Regime falls    │  │ Citizens observe protest
│                   │  │       turnout       │
└───────────────────┘  └─────────────────────┘
                               │
                    ┌─────────────────────┐
                    │ Second Demonstration│
                    │       Period        │
                    │ (Citizens simultaneously
                    │ decide whether to protest)
                    └─────────────────────┘
          ┌────────────────────┼──────────────────────┐
          │                                            │
┌───────────────────┐                    ┌─────────────────────┐
│ p or more citizens│                    │ Less than p citizens│
│      protest      │                    │      protest        │
└───────────────────┘                    └─────────────────────┘
          │                                            │
┌───────────────────┐                    ┌─────────────────────┐
│   Regime falls    │                    │   Regime endures    │
└───────────────────┘                    └─────────────────────┘
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The threshold p can be arbitrarily large, but the key assumption is that when a sufficiently large number of citizens protests, they can overthrow the regime. This captures the idea that when protesters are numerous enough, they can completely destabilize the regime, as

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was suggested by the chief of Eastern German police, Erich Mielke, in a remark made to the party leader, Erich Hoenecker, in the aftermath of a mass-demonstration in the last days of the GDR: "Erich, we cannot beat up hundreds of thousands of people" (Przeworski 1991).

Importantly, we do not assume any specific mechanism linking civil protests and political change. Civil protests can cascade to mass civil revolutions, where that can force a dictator to peacefully step down and hold elections, as was the case in Serbia in 2000. Protests can also induce the elite to take over the regime in a coup and establish a new autocracy, as was the case in Cote D'Ivoire in 1999. The masses can overthrow a dictator and establish a democracy that later becomes destabilized, as was the case in the 1989 revolutions in East Europe, the Rose Revolution in Georgia, or the Orange Revolution in Ukraine. An even in these cases, other factors might be at play in the overthrow of the autocracies—for example, during the Rose and Orange Revolutions "transitions came as a result of "civil revolutions" where massive street protests triggered the defection of the military and other elite insiders" (Magaloni, 2010: 760).

In the model, the cost to protesting c is non-negligible, in the sense that it is comparable to the possible benefits from the regime being overthrown (for the lowest possible type that strictly prefers the removal of the government). A citizen who protests in period $1 \leq t \leq 2$ suffers a cost c per period in which she protests and the regime is not overthrown. This cost represents the risk a citizen bears of being beaten, shot, arrested or refused material benefits by the regime during or after a protest.

In addition, citizen i gets a benefit equal to her ideal point x_i if the regime is overthrown. We assume that citizens have linear utility functions and that they gain or lose utility only from the political outcome and the personal costs of protesting. We ask whether, in equilibrium, the number of people who protest in the first period can serve as an informative signal of the degree of dissatisfaction with the regime. We show that citizens use protest as a way to signal their preferences and thereby facilitate successful overthrows in the future.

Following these simple assumptions, civil protest in authoritarian regimes can take one of three possible dynamics: In the first one, citizens stage a relatively small protest in the first period. Citizens are repressed and no mass revolution cascades. This reveals that the population is not sufficiently opposed to the regime to be able to orchestrate its overthrow, and the protest dies out.

In the second path, a critical mass is reached in the first period and citizens become convinced that political change is possible in the future. Citizens take to the streets again in the second period, but the magnitude of this protest does not suffice to topple the regime. In the third possible path, the first-period protest reaches the necessary critical mass to induce

a second-period protest, in which enough citizens take to the streets and successfully topple the regime. It is important to point out that right after the first-period protest, the second and third paths are indistinguishable from the standpoint of a citizen or an outside observer who does not know the distribution of preferences in society—in both trajectories, the first-period protest exactly reaches its critical size. Thus, uncertainty regarding the ability of protests to facilitate political change is inherent to the dynamics of protest in equilibrium.

The appendix to this paper develops the model formally. Here we discuss its main results. First, the higher the underlying costs of expressing dissent, the more autocratic regimes are able to dissuade citizens from protesting. Second, given a successful first period protest the probability of a regime being overthrown is increasing with respect to existing levels of repression. The intuition behind these results is that a more repressive regime manages to deter citizens from staging an initial protest. However, if citizens dare taking to the streets, their action becomes a more informative signal about the intensity of their opposition to the regime, since those willing to protest under a more repressive regime must be more radically opposed to the regime. Thus, a first period protest under a more repressive government will lead to a second period political change with a higher probability.

Paradoxically, the more oppressive a regime is, the more it has to fear civil protest. Our results parallel DeNardo's (1985)[2] intuition that repression is a double-edge sword that may endanger the regime's survival.[3]

An important element missing from our model is the government's response to civil protest. Our current model focuses on the information flows between citizens to citizens, ignoring the information that might follow from the government's reaction (as the cost of protesting does not change between periods), yet future work can extend the model to take these considerations under account.

Governments might respond to civil protests by increasing or decreasing repression. Aside from its direct effects, this reaction might signal to the citizens that the government is weak (or that it is powerful), which in turn might influence citizens' willingness to protest (Lorentzen 2008; Pierskalla 2010).

Walter (2006), for example, argues that states wage costly wars against separatist movements to develop a reputation for toughness and discourage future challengers. In Pierskalla

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[2]Although Lohmann does not provide comparative statics on repression, section B of the mathematical appendix in Lohmann (1994a) shortly attempts a synthesis between the DeNardo model and her own.

[3]Note that these two predictions further distance our theory from Kuran's and Lohmann's analyses. Kuran's (1991a) model does not generate similar predictions about how repression can backfire. In Lohmann (1994), the maximum degree of information revelation is associated with the degree of group heterogeneity, whereas we highlight, instead, that protest reaches its highest information revealing role in more repressive regimes.

(2010) governments opt for repression, because they worry that challengers will view the decision to accommodate protesters as a sign of weakness. According to these models, governments might exercise restraint only to the extent that repression is costly: policing requires equipment and personnel, and governments have finite budgets.

Other scholars argue that governments might exercise restrain because of the possibility that repression will actually inflame dissent, pushing other, previously docile citizens to openly oppose the government. This arguments are consistent with physiological theories of protest that highlight how repression causes anger, encouraging bystanders to join the protest. According to Opp and Roehl (1990, p. 524), "repression may thus be regarded as immoral, and individuals who are exposed to repression or who know about it may feel a moral obligation to support a movements cause and even to regard violence as justified."

Siegel (2011) provides an appealing account of the effects of repression on the dynamics of protest. He claims through the use of a computational model that repression will backfire when the target of repression has many social ties beyond his or her village. In his theory, repression causes anger that can ignite a backlash against the regime.

Along this lines, Christensen and Garfias (2018) explicitly explore the tradeoff between deterrence and escalation that governments face when employing repression. They develop a theoretical model to illustrate why cell phones and social media enable collective action focusing on two mechanisms: first, by enabling communication among would-be protesters, cellphones lower the costs of coordination; second, these technologies broadcast information about whether protest is repressed. In their view, governments will refrain from squashing demonstration when they know that a large audience will witness, and may be enraged by repression. But if state violence is targeted and carried out in obscurity through selective imprisonment, torture, and murder of a select group of dissidents, repression is not likely to have the effect of igniting a mass rebellion.

Unlike these works, our model presupposes that the level of repression is determined by the nature of underlying political institutions that can be characterized along a continuum, from highly repressive regimes that do not allow any expression of dissent, to less repressive regimes that tolerate certain forms of protests. The main empirical implications of our model, that we test in subsequent sections, are that more repressive autocratic regimes should experience significantly fewer protests but that these are more likely to topple the regime.

4. Data and Variables

This section presents evidence of our theory using data on civil protest and political break-downs from 163 countries from $1950 - 2011$.

Data. We use two datasets at different levels of aggregation to test our hypotheses. The first is composed of 7712 country-year observations from 163 countries in the $1950 - 2011$ period. This dataset is based on Arthur S. Banks's Cross-Sectional Time Series Data Archive, which has a yearly variable for the incidence of anti-government demonstrations and riots.

There are, of course, other datasets we could have used to test our hypotheses. To make sure that our results were not a result of our choice of measure of civil protests we also repeated our analysis using more temporally disaggregated protest data from the Global Database of Events, Location, and Tone (GDELT). From this source, we construct a dataset with month to month information from 176 countries in the 1979-2011 period. This level of temporal disaggregation, while allowing us to more closely examinate the effects of protest, limits the availability of relevant controls.

Civil Protests. To measure civil protests we use two variables, from different sources. First, we code a dummy variable, *Protest*, based on Banks' (2008) measure of anti-government demonstrations worldwide. *Protest* is coded as 1 in every country-year observation in which an anti-government demonstration—an opposition peaceful public gathering of at least 100 people—took place and as 0 otherwise. A second variable is based on GDELT. This source uses tools from text analysis to machine code events from news sources (Leetaru and Schrodt 2013). It equals 1 in every country-month observation where any type of protest took place in and 0 otherwise. While GDELT is known to contain more false positives than other event datasets, comparisons with alternative measures suggest that *changes* in protest activity are reliably captured (Ward et al. 2013; Steinart-Threlkeld 2014). We note that our reseach design leverages within-country changes in protest activity.

Repression of Dissent. We code two different variables to measure repression. The first, *Dissent Repression*, is coded based on the citizens' ability to freely criticize their government, based on Whitten-Woodring and Van Belle's (2014) assessment of countries' media environment. It equals 0 when the country is classified as having a "free" or "imperfectly free" media environment, and public criticism of the government is possible even in the face of social, legal and economic costs. It takes a value of 1 when a country is deemed "not free",

and it is not possible to safely criticize the government. The second variable, *Repression of Opposition*, is coded based on a country's competitiveness of participation from Polity IV (2014). This variable equals 1 when the country's oppositional activity is deemed to be "Repressed" or "Suppressed". These regimes completely repress or severely limit political activity that occurs outside of the the ranks of the regime and ruling party. A repressive regime, as measured by these variables, reflects a polity that is non-accommodating to public dissent, either through the costs it imposes on public expressions of dissent or through the restrictiveness of political participation.

Note that these two variables measure how repressive the regime is rather than whether the regime actually responds with violence to realized protest events. Since our theory highlights the underlying costs of expressing dissent, not the government's observed responses to protest, these measures of repression, rather than the actual use of violence, are appropriate. Observed repression is problematic because it is only observed when protest takes place, and not when it is effective in deterring protest (i.e., when repression would have occurred had protest materialized.) By employing a measure of the underlying repressive environment in which dissent is expressed, we can set aside the thorny selection concerns of observed repression.[4]

Importantly, our two measures of repressiveness vary even within autocratic regimes. This allows us to examine whether, as our theory predicts, protests are more dangerous for comparatively closed autocracies.

Regime Breakdown. To measure regime breakdown both at the country-year and month levels, we use the Autocracies of the World, 1950-2012 dataset by Magaloni, Min and Chu (2013). Following Geddes (2003), the data classifies autocratic political regimes in the world into various types: monarchies, single-party, hegemonic party, military, and it also provides measures for regime transitions and regime durability, among others.

The dataset defines regime breakdown looking not only at transitions from democracy to autocracy or vice versa but also at transitions from one form of autocratic regime to another. The later were the most common transitions in the world during that period. To define a regime breakdown, we simultaneously take into account transitions from and to different regime types as well as changes in political leaders (Bueno de Mesquita et al 2003; Gandhi and Przeworski 2007; Gandhi 2008).

Examples of transitions from one from of autocratic regime to another are when a single-party regime is supplanted by a military regime, or when a military regime creates parties, or

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[4]See Christensen and Garfias (2018) for a discussion about this selection problem.

when a single-party regime allows multi-party elections. Importantly, an autocratic regime transition is only defined as a form of regime breakdown if the former dictator actually steps down. This criterion allows us to discount as regime breakdowns cosmetic transformations or institutional reforms that allow a current dictator to perpetuate his hold of power.

We therefore code our main dependent variable, regime breakdown, as follows: Regime Breakdown equals 1 when an autocratic regime transits to a different autocratic regime and the former dictators steps down from office, and when an autocratic regime transforms into a democratic one or vice-versa. There are no instances in the dataset when there is a transition to democracy without the former dictator being deposed.

We code the last year/month before a regime breakdown as having value 1 (instead of coding the year of the change as having value 1) in order to overcome potential endogeneity problems of regime breakdown. By doing so, we make sure that the level of protest in a country-year observation, for instance, is not a response to the regime breakdown occurring in the country in the same year. This strategy is analogous to using all the independent variables in their lagged form.

Regime Types. In order to distinguish between democracies and types of autocracies, we disaggregate party regimes into single- and multi-party and identify monarchies, all of which have been shown in the literature to be relatively stable, and also control for military regimes, usually deemed less stable (Geddes 2006, 2008; Gandhi and Przeworski 2007; Cox 2008; Magaloni 2008; Gandhi 2008). We use Magaloni, Chu and Min's (2013) regime type classification, which enables disaggregation into both country-year and month levels.

We include democracies in the analysis; the reason is twofold: First, many countries transitioned back and forth between democratic and authoritarian regimes during the relevant time period. This suggests that excluding democracies from the analysis would require us to exclude some, but not all, the observations for these countries. Second, with the increase in the number of hybrid regimes in the recent decades, the distinction between democracies and autocracies has become more and more ambiguous.

Coup Attempt. To control for elite-driven threats to authoritarian stability, we coded a dummy variable, *Coup*, equaling 1 when a coup attempt occurred in the country based on the Marshall and Marshall (2014) coup d'etat dataset. This is the last measure available both at the country-year and month levels.

Economic Indicators   Because the state of the economy can potentially influence both citizens' disposition to protest against the regime and the stability of the regime, we control for the economic conditions as measured by the (logged) real GDP per capita (Heston, Summers and Aten 2009).

Population Size.   Because the size of population in the country can influence the potential for political protest as well as the regime's ability to repress political protest, we control for general population size and urban population size. To do so, we use the Penn World Tables' (Heston, Summers and Aten 2009) measures of population (in millions), *Pop* and the World Development Indicators' (World Bank 2009) measure of urban population (in millions), *Urban Pop.*

Social Characteristics.   Because the social and religious characteristics of a country might influence both the tendency of citizens to turn out and protest and the stability levels the regime enjoys, we control for some social and religious characteristics. First, we use Fearon and Laitin's (2003) measure of percentage of Muslims. Second, we use their cross-sectional measure of ethnic fractionalization, based on *Atlas Narodov Mira 1964.*

Geographic Characteristics.   To control for the possible regional tendencies influencing both regime stability and civil protest we use Fearon and Laitin's (2003) regional dummies. As a measure of rough terrain, which might also affect both the likelihood of regime breakdown and protest activity, we use estimated proportions of mountainous terrain by country.

Oil.   To control for the possible dependencies of repression levels and regime stability on the availability of oil we control for total oil income per capita, from Haber and Menaldo (2013).

Tables 1 and 2 present some descriptive statistics of our data. In each table, panel A includes standard descriptives of all the variables, while panel B presents descriptive by our two measures of repression. These reveal substantive variation within repressive regimes both in terms of the type of autocracy and in the levels of civil protest (for both measures of repression). Although protest tends to happen more often in relatively open regimes, it is still quite prevalent in more closed ones. Furthermore, Magaloni, Chu and Min's (2013) regime categories also vary with levels of repressiveness, with single and hegemonic-party autocracies, military dictatorships, and monarchies in both categories.

Table 1: Descriptive Statistics, Country Year Data, 1950-2011

Panel A. Basic Descriptives

	count	mean	sd	min	p25	p50	p75	max
Regime Breakdown	7714	0.030	0.17	0	0	0	0	1
Protest (Banks)	7714	0.21	0.41	0	0	0	0	1
Dissent Repression	7714	0.54	0.50	0	0	1	1	1
Democracy	7714	0.41	0.49	0	0	0	1	1
Military	7714	0.16	0.37	0	0	0	0	1
Monarchy	7714	0.081	0.27	0	0	0	0	1
Single Party	7714	0.16	0.36	0	0	0	0	1
GDP pc (log)	6670	8.30	1.20	5.03	7.32	8.26	9.24	11.7
Population (log)	6671	16.0	1.58	11.8	15.0	15.9	17.0	21.0
Urban Population (%)	6077	0.22	0.17	0	0.11	0.20	0.31	1
Oil revenue pc (log)	6754	2.03	2.74	0	0	0.020	3.81	11.3
Attempted coup	7714	0.033	0.18	0	0	0	0	1
Ethnic Fractionalization	7432	0.40	0.28	0.0010	0.13	0.36	0.68	0.93
Mountainous Terrain (%)	7432	0.18	0.22	0	0.017	0.094	0.28	0.94

Panel B. Descriptives by Dissent Repression

	dissent repression	mean	sd	min	max
Protest (Banks)	0	0.24	0.43	0	1
Protest (Banks)	1	0.18	0.38	0	1
Military	0	0.041	0.20	0	1
Military	1	0.27	0.44	0	1
Monarchy	0	0.013	0.11	0	1
Monarchy	1	0.14	0.35	0	1
Single Party	0	0.015	0.12	0	1
Single Party	1	0.28	0.45	0	1
Hegemonic Party	0	0.14	0.34	0	1
Hegemonic Party	1	0.22	0.42	0	1
Democracy	0	0.80	0.40	0	1
Democracy	1	0.090	0.29	0	1

Table 2: Descriptive Statistics, Country Month Data, 1979-2011

Panel A. Basic Descriptives

	count	mean	sd	min	p25	p50	p75	max
Regime Breakdown	63867	0.0024	0.049	0	0	0	0	1
Protest (GDELT)	63867	0.63	0.48	0	0	1	1	1
Repression of Opposition	63867	0.37	0.48	0	0	0	1	1
Democracy	63867	0.44	0.50	0	0	0	1	1
Military	63867	0.15	0.36	0	0	0	0	1
Monarchy	63867	0.062	0.24	0	0	0	0	1
Single Party	63867	0.15	0.35	0	0	0	0	1
Attempted coup	63867	0.0026	0.051	0	0	0	0	1

Panel B. Descriptives by Repression of Opposition

	repression of opposition	mean	sd	min	max
Protest (GDELT)	0	0.71	0.45	0	1
Protest (GDELT)	1	0.48	0.50	0	1
Military	0	0.059	0.23	0	1
Military	1	0.32	0.46	0	1
Monarchy	0	0.0092	0.095	0	1
Monarchy	1	0.15	0.36	0	1
Single Party	0	0.028	0.16	0	1
Single Party	1	0.35	0.48	0	1
Hegemonic Party	0	0.22	0.42	0	1
Hegemonic Party	1	0.16	0.37	0	1
Democracy	0	0.68	0.47	0	1
Democracy	1	0.011	0.10	0	1

4.1. Empirical model and results

Our theoretical predictions suggest that higher repression levels increase regime stability but that protest is more detrimental to induce breakdown when the regime is more repressive.

As a first look at the data, Figure 2 presents the Kaplan-Meier estimates of regime survival from 1950-2011. The data is divided into three types of observations: observations with no civil protests, observations with civil protests in politically repressive autocracies, and observations with protests in politically open regimes.

Figure 2: Kaplan-Meier Estimates, 1950-2011

Based on dissent repression.
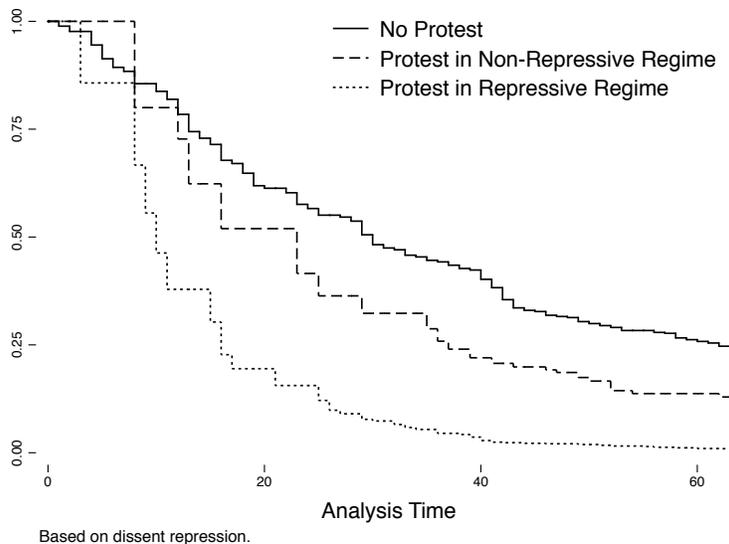
The figure provide some preliminary evidence in support of our theory. It suggests that civil protests are more dangerous to political stability in closed regimes. The probability of political survival decreases in the face of civil protest. But the magnitude of this decrease depends on political repression: closed regimes have a lower survival probability when they face civil protest, compared to non repressive regimes.

To test our two hypotheses more rigorously, we estimate equation (1). We estimate the effect of the repression of dissent, civil protests, and the interaction between them in a simple linear model.

The estimating equation is:

$$y_{it} = \beta_1 Protest_{it} + \beta_2 Repression_{it} + \beta_3 Repression_{it} \times Protest_{it}$$
$$+ \gamma X_{it} + \phi_t \times X_i + \lambda_i + \delta_t + \varepsilon_{it} \qquad (1)$$

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where y_{it} is an indicator for regime breakdown in country i at time t, X_{it} is a vector time-varying of control variables, X_i a vector of cross-sectional controls, λ_i and δ_t are country and year-specific intercepts, respectively.

In this equation, β_1 captures the effect of protests on the probability of regime breakdown, β_2 the effect of changes in the level of dissent repression, and β_3 the effect of protests conditional on a given level of repression. Therefore, our two main theoretical results can be translated into the following to hypotheses:

$H_1 : \beta_2 < 0$

$H_2 : \beta_3 > 0$

These hypotheses entail, first, that the effect of political repression on the hazard rate is negative, so that more dissent repressive regimes are less likely to collapse (H_1), and second, that the effect of the interaction between repression and civil protests on the hazard rate is positive, so that civil protests are more detrimental to more dissent repressive regimes compared to less repressive ones (H_2).

To ensure that our results are robust, we also estimate a fixed-effects logit model, as well as a Cox survival model. Cox hazard models examine the long-term effects of the independent variables, conditioned on other controls, on the probability that a certain event occurs. In our setting, the relevant event is political change or regime breakdown; and the relevant independent variables are repression levels, civil protests, and their interaction.

The estimating equation is analogous to (1). Specifically, we estimate:

$$h_i(t) = h_0(t) \times \exp \big(\alpha_1 Protest_{it} + \alpha_2 Repression_{it}$$
$$+ \alpha_3 Repression_{it} \times Protest_{it} + \eta X_{it} + \psi X_i \big) \qquad (2)$$

where h_0 is the baseline hazard function (the hazard rate when all the explanatory variables are equal to zero), and $h_i(t)$ is the hazard or the regime failure rate at time t of country i. Here too, we expect the coefficient of Repression (α_2, the expected proportional change in the hazard rate resulting from a change in protest) to be negative and the coefficient of the interaction term between Repression and Protest (α_3, the expected proportional change in the hazard rate resulting from a change in protest, conditional on repression) to be positive.

Table 3 presents the main results. The table has eight columns, four for each protest measure. Each column presents a estimation in which the dependent variable is *Regime Breakdown*. In the first two models we present the coefficients of a linear probability model, while the next two correspond to a fixed effects logit estimation.[5]

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[5]The fixed effects logit, unlike other non-linear models, does not suffer from the incidental parameters

Table 3: Linear Probability Model and Fixed Effects Logit Analysis

Dependent Variable: *Regime Breakdown*

	(1) OLS	(2) OLS	(3) FE Logit	(4) FE Logit	(5) OLS	(6) OLS	(7) FE Logit	(8) FE Logit
main								
Dissent Repression	-0.019**	-0.043***	-0.35*	-0.92***				
	(0.0093)	(0.015)	(0.20)	(0.26)				
Protest (Banks)	0.0069	0.019*	0.18	0.42				
	(0.0070)	(0.011)	(0.25)	(0.29)				
Protest (Banks) × Dissent Repression	0.044***	0.025*	0.99***	0.83**				
	(0.011)	(0.015)	(0.31)	(0.36)				
Repression of Opposition					-0.0043***	-0.014***	-0.89***	-3.07***
					(0.0012)	(0.0022)	(0.32)	(0.38)
Protest (GDELT)					0.00063	0.00018	-0.18	0.072
					(0.00080)	(0.00083)	(0.24)	(0.26)
Protest (GDELT) × Repression of Opposition					0.0019*	0.0027**	0.76*	0.89**
					(0.00099)	(0.0012)	(0.39)	(0.41)
GDP pc (log)		-0.0024		-0.12				
		(0.011)		(0.25)				
Population (log)		-0.019		-0.88				
		(0.039)		(0.88)				
Oil revenue pc (log)		-0.0056**		-0.035				
		(0.0024)		(0.096)				
Attempted coup		0.045*		0.66**		-0.0012		-0.35
		(0.025)		(0.26)		(0.0060)		(1.02)
Democracy		-0.081***		-1.61***		-0.0096***		-1.83***
		(0.019)		(0.29)		(0.0017)		(0.34)
Military		-0.030		-0.43*		0.0090***		1.32***
		(0.020)		(0.25)		(0.0022)		(0.30)
Monarchy		-0.0080		-0.037		0.023		3.94
		(0.039)		(0.88)		(0.016)		(3.57)
Single Party		0.036**		0.36		0.010***		2.44***
		(0.018)		(0.32)		(0.0023)		(0.40)
Protest + Protest × Repression	0.051	0.044			0.0025	0.0029		
Std. error	0.0094	0.013			0.00092	0.0010		
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No	No	No
Month FE	No	No	No	No	Yes	Yes	No	No
Region-year FE	No	Yes	No	No	No	Yes	No	No
Cross-sectional controls interacted with year FE	No	Yes	No	No	No	No	No	No
Linear time effect	No	No	No	Yes	No	No	No	Yes
Mean of within-country DV	0.030	0.034	0.048	0.054	0.0024	0.0024	0.0046	0.0046
SD of within-country DV	0.13	0.13	0.20	0.22	0.033	0.033	0.065	0.065
R sq.	0.058	0.17			0.013	0.018		
Observations	7712	5005	4832	3409	63867	63867	32647	32647
Number of countries	163	137	91	74	176	176	84	84

Standard errors (clustered at the country level) in parentheses for OLS models.
Cross-sectional controls: Ethnic fractionalization, % muslim, % mountainous terrain.

The results support our two hypotheses. Consistent with H_1, the coefficient on repressive regimes, β_2, is negative and statistically significant in all models, regardless of the measure we use. This implies that, as suggested by our theory, transitioning to a repressive regime in fact leads to more stability. The size of the effect is quite large: controlling for other variables, a transition from a non-dissent repressive regime to a dissent-repressive one translates to a decrease in the likelihood of breakdown of between 2-4 percentage points. Compared to the average within-country probability of regime breakdown (of 3%), this is a substantively important effect. Similarly, at the country-month level, transitioning from a regime that does not repress the opposition to one that does leads to a decrease in the likelihood of regime collapse that bounds the within-country mean.

Consistent with H_2, the coefficient of the interaction term between civil protest and dissent repressive regimes, β_3, is positive and statistically significant in all the models. This implies, in turn, that civil protests are more dangerous to repressive regimes, as predicted by our theory. These coefficients also suggest that the effect of this interaction term is quite large: Controlling for other variables, the occurrence of a civil protest at the country-year level is associated with a modest increase in the risk of regime breakdown when the regime is non-repressive (ranging from no effect to a 2 percentage point increase), but with a large increase in the probability of regime collapse when the regime is dissent repressive (a 4-5 percentage point increase). At the country-month level, the effect of protests is not distinguishable from zero in open regimes, but induces a large and significant increase on the probability of breakdown in repressive ones.

The effects of our control variables are consistent with the previous literature on authoritarian stability. In our country-year models, coup attempts increase the hazard of regime breakdown, supporting previous findings about coup traps and systematic instability (e.g., Londregan and Poole. 1990; O'Kane 1993; McGowan 2003). While not significant, the effect of the rate of growth of per capita GDP is, as expected, negative, supporting the argument that high economic performance decrease the hazard ratio of regime breakdown (e.g., Haggard, Kaufman, and Evans 1992; Haggard and Kaufman 1997; Cox 2008; Geddes 2008; Magaloni and Wallace 2008). In general, oil has a negative impact on regime breakdown (e.g., Smith 2004; Andersen and Aslaksen 2013; Wright, Frantz and Geddes 2013).

The fixed effects logit results also support our theory. Consistent with H_1, the coefficient of dissent repressive regimes is negative in all the models and is statistically significant. Consistent with H_2, the coefficient of the interaction term between protest and repressive

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problem. While we can account for country-specific effects, we cannot flexibly control for time effects. We attempt to capture the effect of time linearly instead.

regime is positive in all and statistically significant in all models.

Table 4: Survival Analysis

Dependent Variable: *Regime Breakdown* Cox Survival Model				
	(1)	(2)	(3)	(4)
Dissent Repression	0.12 (0.21)	-0.57** (0.29)		
Protest (Banks)	0.40 (0.26)	0.46* (0.27)		
Protest (Banks) × Dissent Repression	0.68** (0.29)	0.60** (0.29)		
Repression of Opposition			-0.62** (0.28)	-1.71*** (0.36)
Protest (GDELT)			0.11 (0.23)	0.45 (0.29)
Protest (GDELT) × Repression of Opposition			0.42 (0.34)	0.097 (0.39)
GDP pc (log)		-0.072 (0.16)		
Population (log)		0.15* (0.079)		
Oil revenue pc (log)		-0.075* (0.045)		
Attempted coup		0.70*** (0.27)		0.062 (1.07)
Democracy		-0.80** (0.32)		-1.68*** (0.29)
Military		0.25 (0.24)		1.36*** (0.29)
Monarchy		-1.11** (0.51)		-0.19 (0.70)
Single Party		0.24 (0.31)		1.21*** (0.35)
Protest + Protest × Dissent Repression	1.08	1.06	0.53	0.55
Std. error	0.16	0.22	0.30	0.31
Continent dummies	No	Yes	No	Yes
Observations	7879	5005	63867	63867
Number of countries	163	137	176	176

Standard errors (clustered at the country level) in parentheses.

We now turn to the results for the Cox survival analysis, presented in table 4. Each column in the table represents a survival model in which the dependent variable is the duration until regime breakdown. The results also support our two hypotheses. Consistent

with H_1, the coefficient of repressive regimes, α_2, is negative and statistically significant in most models. This implies that, as suggested by our theory, more dissent repressive regimes are in fact more stable than non-repressive ones. Similarly, the coefficient of the interaction term between civil protest and repressive regimes, α_3, is positive in all models and statistically significant in the country-year specifications, providing support for H_2.

Overall, our empirical findings support our theoretical results. Dissent repressive regimes seem to enjoy higher levels of stability a priori, but they become more vulnerable to civil protest once it actually takes place.

5. Concluding Remarks

This paper explores how mass uprisings by (mostly) unarmed citizens that are orchestrated spontaneously and in a decentralized fashion can effectively challenge repressive rule. Most of the existing political economy literature on autocracies focuses on elites. One reason to focus on elite threats is that citizens are powerless if they fail to coordinate. They do not control weapons, personnel, and other political resources. Citizens' power stems exclusively from their numbers. Because the regime is likely to imprison, torture and kill protesters, citizens would be willing to take to the streets only when they expect that a sufficiently large group of citizens will coordinate in challenging the government.

We explore how the masses can coordinate to orchestrate a civil revolution, and the conditions under which rulers will be more vulnerable to threats from below. Building on Kuran (1991a,b) and Lohmann (1994, a, b), we develop a model of protest where the danger posed by civil protests is a function of their signaling potential; that is, what citizens can infer about other citizens' true attitudes towards the regime. Under more repressive regimes, coordinating and orchestrating mass protests is significantly harder—phones are likely to be intervened, conversations spied, citizens interrogated, the mass media controlled. However, the most dangerous protests occur where dissatisfaction is spread and the political institutions are highly repressive. Under these conditions, civil protest has its maximum information revealing potential. Where citizens face significant risks if they protest, their defiance will constitute a powerful signal about the strength of anti-government sentiment and thus of the underlying weakness of the regime.

Consequently, formally we show that repression is a double-edge sword: while it allows rulers to survive by deterring the opposition, repression makes the regime more vulnerable because even small acts of resistance have the potential to cascade into a mass uprising.

Our theory and empirical findings raise important questions about the optimal govern-

ment survival strategy: to repress or to compromise. Rulers that sustain themselves in power mostly through repression and intimidation can stay in power mostly to the extent that they successfully manage to deter any acts of civil disobedience. When they fail to do so, these regimes are more likely to fall prey of civil ousts.

Our paper contributes to the literature on coordination and state abuse (Weingast 1997; Fearon, 2010; Magaloni 2010). In our framework, citizens will more likely fail to coordinate to orchestrate a mass revolution when protest loses its signaling potential. Consider Mexico during the PRI regime or China today. Peasants, teachers, employees, debtors, victims of natural catastrophes, and the like continuously negotiate with the autocrats using protests. In institutionalizing protests, autocrats mange to reduce its signaling potential, dividing the the opposition.

We show that citizens are more likely to coordinate to oust autocratic rule when the regime is more repressive. One key challenge citizens face under these conditions is who would be brave enough to take the first move. However, once a critical group of citizens takes to the streets, their protesting can more easily cascade.

Our theory suggests that when citizens are in the streets in their masses, they can destabilize the regime, but, importantly, we do not assume any specific mechanism whereby they can do so. Civil protests can cascade to civil revolutions, wherein the masses overthrow the regime and establish a democracy, as was the case in the 1989 revolutions in East Europe. Alternatively, they can force the dictator to step down and hold elections, as was the case in Serbia in 2000. Lastly, they can also induce the elite to take over the regime and establish a new autocracy, as was the case in Cote D'Ivoire in 1999.

An important element missing from our model is the government's response to civil protest. Governments might respond to civil protests by increasing or decreasing repression levels, which in our paper are presumed to remain constant in both periods. Aside from its direct effects, increasing repression might signal to the citizens that the government is weak (or that it is powerful), which might influence citizens willingness to turn out and protest.

Another element missing is the type of signal that can more effectively spark a revolution. First move protesters play a powerful role signaling to others that it is time to overthrow a dictator. A question is if it is more effective to signal through violence or peaceful marches and if this varies according to the anticipated response by the regime. In other words, whether acts of terror and violent agitation vs peaceful marches with candle lights will do the trick to spark a mass uprising, and whether this is violent or peaceful, should be endogenous to the type of regime respond that citizens anticipate. We leave this for future research.

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6. Appendix

6.1. A Model of Protests Under Repressive Regimes

In this section we present and analyze a model of political participation under repressive rule.

6.2. Setup

Individuals   We consider a society of $n + 1$ citizens living under repressive rule. Citizens $1 \leq i \leq n + 1$ have ideal points $x_i \in [-1, 1]$, which represent their net utility from the overthrow of the government: the higher her ideal point, the higher is the citizen's utility from a regime change whereby the current government is overthrown.

Citizens' ideal points are distributed as follows: the median ideal point is a random variable X distributed according to a probability mass function f on $\{-\frac{1}{2}, -\frac{1}{2}+\frac{1}{n}, ..., \frac{1}{2}-\frac{1}{n}, \frac{1}{2}\}$. Given the realization of the median, individuals' ideal points are evenly spaced on the points $\{X - \frac{1}{2}, X - \frac{1}{2} + \frac{1}{n}, ..., X + \frac{1}{2} - \frac{1}{n}, X + \frac{1}{2}\}$, with the order of citizens' ideal points being an equally-likely random choice of a possible permutation of the citizens.

Importantly, the model does not assume that ideal points are drawn independently across citizens. Citizens' political preferences are dependent in the sense that in every possible realization of preferences, there exist "hard-liners", who, relative to other citizens, support the regime; "extremists", who, relative to other citizens, oppose the regime; and "moderates", who are in between. The random variable X simply determines the absolute preferences of these citizens. That is, it determines *how* dissatisfied are the moderates with the regime.

Information Structure   Citizens' political preferences are private information. That is, *a priori*, each citizen knows only her own ideal point. They do not know the median ideal point in society X, and thus ignore what other citizens' ideal points are. With this structure, we attempt to capture the central challenge to mass uprisings under repressive rule: a fundamental uncertainty about other citizens' preferences.

The structure of preferences in the model entails, nonetheless, that citizens with extreme preferences (those close to 1 or -1) will have more information about other citizens than moderates. The underlying idea is that one's personal ideal point can be informative about the ideal points of others, because of their mutual dependence. In the most extreme case, a citizen whose ideal point is equal to 1 (that is, a staunch opposer of the regime) knows with certainty that the median's ideal point is $\frac{1}{2}$. The only possible realization that can

accommodate her own preferences. However, for every other individual in society there will always be some uncertainty about the presence of more extreme preferences than their own.

Structure of the game   The game has two periods. Specifically, in the first period, citizens simultaneously decide whether or not to protest. If a sufficient number of individuals $p \in \mathbb{N}$ protests, then the protest is successful, the regime is overthrown, and the game ends. If, on the on the other hand, less than p citizens protest in the first period, all citizens observe the number of protesters in the first period, and thus turnout becomes common knowledge among them. Then, in the second period, citizens simultaneously decide again whether or not to protest. Here too, p citizens are needed for a successful overthrow. If the protest is successful, the regime is overthrown and the game ends; otherwise, it remains in power and the game ends.

Payoffs   A citizen who protests in period $1 \leq t \leq 2$ suffers a cost c per period in which she protests and the regime is not overthrown. This cost represents the risk a citizen bears of being beaten, shot, arrested or refused material benefits by the regime during or after a protest.

In addition, citizen i gets a benefit equal to her ideal point x_i if the regime is overthrown. We assume that citizens have linear utility functions and that they gain or lose utility only from the political outcome and the personal costs of protesting. Thus, citizen i's utility function is:

$$U_i = \mathbb{1}_{\text{regime collapse}} \cdot x_i - c \cdot \sum_{t=1}^{2} \mathbb{1}_{\text{citizen i protests in period } t \text{ and the regime survives period } t}$$

6.3.   Analysis

We now turn to analyzing the model. Our focus in this section is on citizens' strategic behavior. We ask whether, in equilibrium, the number of people who protest in the first period can serve as an informative signal of the degree of dissatisfaction with the regime. We show that citizens use protest as a way to signal their preferences and thereby facilitate successful overthrows in the future.

A pure strategy profile for citizen i is a pair of action functions (σ_1, σ_2) for the two periods. In the first period, an individual decides whether or not to protest based only on her ideal point:

$$\sigma_1 : \left\{ -1, -1 + \frac{1}{n}, ..., 1 \right\} \rightarrow \{NR, R\}$$

where R and NR represent the decisions to protest or not, respectively. In the second period, an individual also conditions her behavior on the number of demonstrators observed in the first period, as well as her own prior protest decision:

$$\sigma_2 : \left\{-1, -1 + \frac{1}{n}, ..., 1\right\} \times \{0, ..., n, n+1\} \times \{NR, R\} \to \{NR, R\}$$

The solution concept we use is a pure strategy, symmetric perfect Bayesian equilibrium. We follow the literature on voting behavior in looking at specific types of equilibria that eliminate the plethora of degenerate equilibria which exist in such games. Moreover, since we are interested in the dynamics of endogenous information revelation in repressive regimes, we restrict the equilibrium selection only to *information-based equilibria* in which the regime is overthrown if it is common knowledge at any period that a sufficient number of citizens are dissatisfied. The challenge in our model is to reveal this information.

We assume that the cost to protesting c is non-negligible, in the sense that it is comparable to the possible benefits from the regime being overthrown (for the lowest possible type that strictly prefers the removal of the government). Explicitly, we make the technical assumption of meaningful costs:

$$\frac{F\left(\frac{p-2}{n} - \frac{1}{2}\right)}{1 - F\left(-\frac{1}{2}\right)} \cdot c > \frac{1}{n}$$

where F is the CDF of the distribution of the median ideal point.

Our first result establishes that information revelation is a crucial part in the dynamics of mass politics under repressive regimes. Specifically, we find that, if there is protest in the first period of the game, it only serves as an information revealing mechanism. Protesters signal their preferences to their fellow citizens to facilitate the overthrow of the regime in the second period. The regime, then, cannot fall in the first period.

THEOREM **1.** *In a pure strategy, symmetric, and information-based PBE in non-weakly-dominated strategies, the regime cannot be overthrown in the first period.*

(Proof of Theorem 1 in the following section of the appendix.)

Theorem 1 suggests that protest in the first period is always done with the intent of signaling protesters' preferences, with a view towards facilitating political change in the second period; protest in the second period, in turn, is always aimed exclusively at overthrowing the regime.

To understand the power of protest in revealing information regarding citizens' preferences, and thus in facilitating political change, we characterize in the next theorem the

structure of equilibria in which citizens in fact signal their preferences in the first period in order to facilitate the regime's fall in the next period. In what follows, we call *protest equilibria* to those symmetric and information-based equilibria in which citizens protest in the first period with positive probability. We restrict the rest of the analysis to these appealing equilibria.

THEOREM **2.** *Any protest equilibrium is of the following form: citizens of types $\underline{x}_1 \leq x \leq \bar{x}_1$ protest in the first period in order to facilitate political change in the second period. If citizens of types $\underline{x}_1 \leq x \leq \bar{x}_1$ turn out and protest in the first period, then all citizens with types $\underline{x}_2 \leq x \leq \bar{x}_2$ go out and protest in the second period, trying to topple the regime. The thresholds $\underline{x}_1, \bar{x}_1, \underline{x}_2, \bar{x}_2$ satisfy:*

1. $n\left(\bar{x}_1 - \underline{x}_1\right) + 1 < p$

2. $n\left(\bar{x}_2 - \underline{x}_2\right) + 1 \geq p$

3. $\bar{x}_2 \geq \bar{x}_1$

(Proof of Theorem 2 in the following section of the appendix.)

Theorem 2 reveals that when protests serve as an information transmission mechanism under repressive regimes, the resulting protest dynamic is of the following form: In the first period, some citizens who are unhappy with the regime undertake the signaling effort and take to the streets. The protest they stage in this period does not directly threaten the government, and only serves a signaling function. Then, in the second period, if the first period protest did not reach a critical mass of $n\left(\bar{x}_1 - \underline{x}_1\right) + 1$, the protest dies away and has no continuation. If, on the other hand, the first period protest reached this critical mass, then in the second period additional citizens might join the protest: citizens who were not willing to take to the streets in the previous period because of the personal cost and political risk associated with doing so now learn that there is a positive probability that a second-period protest will topple the regime and are thus willing to take to the streets and protest. The information transmitted in the first-period protest, if this protest reaches the necessary critical mass, reduces the risk citizens face when they turn out. As a result, more citizens are willing to turn out in the second-period protest.

We emphasize that generally, there is a wide multiplicity of protest equilibria in the protest game. Theorem 2 characterizes the structure of *all* possible protest equilibria. For any set of parameters for which a protest equilibrium exists, there always exists the equilibrium where $\underline{x}_1 = \bar{x}_1 = 1$. In this equilibrium, the first period protest happens only when the

most radical type of citizen exists. When this is the case, the radical citizen demonstrates alone in the first period, bearing the cost c, and sparks a successful overthrow in the second period. However, this equilibrium is usually very inefficient, since in many states of the world where the regime's collapse is efficient, the regime will not fall. The most efficient equilibrium is always one in which $\underline{x}_1 = \bar{x}_1 = \min\{\frac{p-1}{n}, c\}$. In this equilibrium, a single demonstrator—she who incurs in the lowest possible cost—bears the cost of protest alone and allows a successful overthrow.

Comparative Statics We now turn to analyze how the protest equilibrium changes when the parameters of the model change. We characterize the effects of changes in the cost to dissent imposed by the existing level of repression, c, on the equilibrium size of protest in the first period, and on the probability of the survival of the regime. Since our game is discrete and we work with pure strategy equilibria, equilibria tend to change discontinuously when the underlying parameters change. Thus, after a small change in c, for example, some equilibria may no longer exist while others may suddenly appear. For this reason, we conduct comparative statics over the entire set of equilibria, generating statements that characterize how this set changes when the underlying parameters change.

Our first comparative static describes changes in the probability of the regime's downfall. We establish that more repressive regimes, characterized by higher c, will be less vulnerable to a collapse because they will be able to deter protests. Formally:

PROPOSITION **1.** *The set of states of the world in which the regime is overthrown under protest equilibria shrinks when c increases.*

(Proof of Proposition 1 in the following section of the appendix.)

Proposition 1 is intuitive—in the static environment we analyze so far, where the level of repression is independent of citizens' preferences, repressive regimes are better able to deter potential protesters from taking to the streets and informing their fellow citizens about their preferences over the regime, and are thus more likely to avert a mass uprising.

Our second comparative static establishes that protests will be more predictive of political change under more oppressive regimes. This means that conditional on observing a successful first period protest, i.e., one that triggers a second period protest, we are more likely to observe political change when the regime is more oppressive. Formally:

PROPOSITION **2.** *Consider a protest equilibrium characterized by the thresholds $\underline{x}_1, \bar{x}_1, \underline{x}_2, \bar{x}_2$. Fixing $\underline{x}_1, \underline{x}_2, \bar{x}_2$, the set of $\bar{x}_1$ that can possibly be sustained in a protest equilibrium is shrinking in c from below, so lower values of $\bar{x}_1$ may no longer be possible as c increases.*

(Proof of Proposition 2 in the following section of the appendix.)

Proof of Theorem 1. Assume that an equilibrium exists in which the regime can be overthrown in the first period. There exists $\underline{x}_1, \bar{x}_1 \in \left\{ \frac{1}{n}, ..., 1 - \frac{1}{n}, 1 \right\}$ such that individuals with ideal point x satisfying $\underline{x}_1 \leq x \leq \bar{x}_1$ protest in the first period, while others do not. Note, that $\underline{x}_1 > 0$ since individuals with non-positive ideal points will never protest, as protesting is weakly dominated for these agents.

Moreover, the most the agent of type $1/n$ can gain from protesting in the first period is $1/n$. On the other hand, this agent, conditioning on his own existence, expects a revolution to fail with probability $F \left(\frac{p-2}{n} - \frac{1}{2} \right) / \left(1 - F \left(-\frac{1}{2} \right) \right)$. Thus, by our assumption on meaningful costs, this agent will not protest in the first period in any equilibrium, and hence $\underline{x}_1 > 1/n$.

Since the ruler can be overthrown in the first period, it must be that $n(\bar{x}_1 - \underline{x}_1) \geq p - 1$, such that the maximal number of protesters in the first period must be at least p. Note that since $\underline{x}_1 > 0$, the revolution in the first period has a positive probability of failing. Also note that if the revolution fails, but, yet, a positive number of citizens turn out to demonstrate in the first period, the state of the world (i.e., the distribution of preferences) is fully revealed to everyone. This is due to the structure of protest equilibria.

Denote by $\hat{x}_1 := (p - 1)/n$. Let us divide into the following cases:

1. $\hat{x}_1 \leq \underline{x}_1$. Consider type $\underline{x}_1 + 1/n$'s decision to protest. If this citizen does protest, there is a positive probability that the revolution attempt may fail, and the citizen would incur the cost, c. However, if he does not protest, either the regime will be overthrown without his participation, or a protest with at least one person would take place. This is because under this suggested equilibrium and conditional on type $\underline{x}_1 + 1/n$ existing, type $\underline{x}_1$ would protest. Because $\hat{x}_1 \leq \underline{x}_1$, any demonstration with a positive number of participants makes it common knowledge in the second period that the state of the world is such that enough citizens are willing to support a revolution. Thus, by the information-based criterion, the regime will be overthrown in the second period.

   Thus, it is profitable for type $\underline{x}_1 + 1/n$ to deviate and not protest, and this cannot be the case in equilibrium.

2. $\hat{x}_1 \geq \bar{x}_1$. This is a straightforward contradiction, as:

$$\frac{p-1}{n} \leq \bar{x}_1 - \underline{x}_1 \leq \bar{x}_1 < \underline{x}_1 \leq \hat{x}_1 = \frac{p-1}{n}$$

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3. $\underline{x}_1 < \hat{x}_1 \leq \bar{x}_1$. Consider the type $\hat{x}_1 + 1/n$. If this type deviates and does not protest in the first period, then all other citizens become convinced that the most radical type that exists is at least $\hat{x}_1$. By the information-based criterion, the ruler will be overthrown for certain in the second period. On the other hand, because $\underline{x}_1 > 1/n$, protesting in the first period carries a positive risk of incurring the cost c. Thus, this deviation for type $\hat{x}_1 + 1/n$ is profitable, which cannot be the case in equilibrium.

Thus, we have concluded that in equilibrium the ruler cannot be overthrown in the first period. ∎

Proof of Theorem 2. Assume that there exists a symmetric and information-based equilibrium in the protest game, where protest is possible in both periods. We can denote the least radical and most radical types of agents who protest in period i by $\underline{x}_i, \bar{x}_i$. We know by Theorem 1 that a revolution is not possible in the first period, and thus the maximum number of protesters in the first period must be strictly less than p, and we have that $n(\bar{x}_1 - \underline{x}_1) + 1 < p$.

We next claim that a protest is possible in the second period if and only if there is full turnout in the first period demonstration. Assume otherwise, and thus there exists some $\hat{x} < \bar{x}_1$ such that if all citizens of types $\underline{x}_1 \leq x \leq \hat{x}$ turn out in the first protest, a second period protest happens. Note that if this is indeed the turnout in equilibrium in the first period, then the realization of X must be $X = \hat{x} - 1/2$, and thus there is no uncertainty in the second period in this scenario. Therefore, when $X = \hat{x} - 1/2$ it must be that there are at least p citizens who are unsatisfied with the regime to protest in the second period. Consider now a deviation by type $\bar{x}_1$, from protesting in the first period to not protesting. If type $\bar{x}_1$ exists but does not protest, the number of protesters in the first period will be $n(\bar{x}_1 - \underline{x}_1) \geq n(\hat{x} - \underline{x}_1) + 1$, and thus there are at least p citizens who prefer to protest and topple the regime in the second period. Thus, by our information-based criterion, it must be that when type $\bar{x}_1$ deviates the regime must still be removed for sure in the second period. Thus, this type is strictly better off by deviating and not protesting in the first period and paying a cost then, leading to a contradiction.

We have that if the protest in the first period is of full capacity, in the second period citizens with types $\underline{x}_2 \leq x \leq \bar{x}_2$ protest, for some constants $\underline{x}_2, \bar{x}_2$. Since a protest in the second period is only profitable if there is a strictly positive probability that it will overthrow the regime, it must be that $n(\bar{x}_2 - \underline{x}_2) + 1 \geq p$

Finally, we want to show that $\bar{x}_2 \geq \bar{x}_1$. Assume otherwise. When a second period protest is triggered, its outcome is deterministic, as there is no uncertainty with regards to the

number of protesters (since all the potential protesters in the second period have already been shown to exist in the first period demonstration). For this to be profitable to the demonstrators, the outcome must be that the regime is overthrown. Thus, there must be at least p citizens with types strictly less than $\bar{x}_1$ who prefer to protest in the second period to topple the regime. Therefore, when $X = \bar{x}_1 - 1/n - 1/2$ it is revealed after the first period that there are enough people who prefer to overthrow the regime. By the information-based selection criterion, we must have that in this realization we will have second-period political change, which leads to a contradiction. ∎

Proof of Proposition 1.   We claim that the set of the states of the world in which the regime can be overthrown in a protest equilibrium is the set:

$$\mathcal{S} = \left\{ X \geq \max\left\{ c, \frac{p-1}{n} \right\} \right\}$$

If this is indeed the case, then this set is (weakly) decreasing with c, as the proposition states. To see this, first consider the equilibrium defined by the following thresholds:

$$\underline{x}_1 = \bar{x}_1 = \max\left\{ c, \frac{p-1}{n} \right\} \qquad \underline{x}_2 = \frac{1}{n} \qquad \bar{x}_2 = 1$$

In this proposed equilibrium only one citizen potentially protests in the first period. If this citizen turns out to protest, then all unsatisfied citizens protest in the second period. To see that this is indeed an equilibrium, note that in the second period, conditional on a protest in the first period taking place, citizens know for certain that there are enough unsatisfied citizens to overthrow the regime. Thus, it is optimal for every unsatisfied citizen to protest. In the first period, citizens of type $x > \bar{x}_1$ know that a first period protest will take place and the government will be overthrown in the second period, and thus have a strict incentive not to protest in the first period. Citizens of type $x < \bar{x}_1$ can fall into different cases. If $x < c$ then a citizen of type x prefers not to protest in the first period even if she were pivotal for overthrowing the ruler. If $c \leq x < \frac{p-1}{n}$ then citizen x knows that, in equilibrium, the regime will be overthrown if and only if there are enough unsatisfied citizens in the population. Thus, he has no incentive to deviate.

Under this equilibrium, the regime is overthrown exactly in the set of states $\mathcal{S}$, and thus the possible set of states of the world in which the regime can be overthrown is a superset of $\mathcal{S}$.

Now, consider a state of the world in which $X < \max\left\{ c, \frac{p-1}{n} \right\}$. If $X < \frac{p-1}{n}$, there are

not enough unsatisfied citizens in the population to protest and overthrow the regime, and thus no equilibrium with this outcome occurs. If $\frac{p-1}{n} < X < c$, no citizen finds it profitable to protest in the first period under any protest equilibrium. This is the case because, by Theorems 1 and 2, protest in the first period only serves a signaling purpose. Thus, in this state of the world, there is no protest equilibrium in which the regime can fall. ∎

Proof of Proposition 2. Consider citizen $\underline{x}_1$'s decision to protest in the first period. In any state of the world where the regime will be overthrown in equilibrium, citizen $\underline{x}_1$'s participation in the first period protest is pivotal for the government to fall. This is immediate from Theorem 2. Thus, the benefit $\underline{x}_1$ gains from protesting in the first period is given by:

$$\frac{1 - F\left(\underline{x}_2 + \frac{p-2}{n} - \frac{1}{2}\right)}{1 - F\left(\underline{x}_1 - \frac{1}{n} - \frac{1}{2}\right)} \cdot \underline{x}_1$$

where the fraction is the conditional probability of the regime being overthrown given the existence of a type $\underline{x}_1$.

On the cost side, citizen $\underline{x}_1$ expects to pay a cost c in the first period, and potentially another c if the first period protest succeeds yet the second period protest fails to overthrow the regime. This is given by:

$$c + \frac{F\left(\underline{x}_2 + \frac{p-2}{n} - \frac{1}{2}\right) - F\left(\bar{x}_1 - \frac{1}{n} - \frac{1}{2}\right)}{1 - F\left(\underline{x}_1 - \frac{1}{n} - \frac{1}{2}\right)} \cdot c$$

Rearranging, we have that benefits exceed costs if and only if:

$$F\left(\bar{x}_1 - \frac{1}{n} - \frac{1}{2}\right) \geq 1 + F\left(\underline{x}_2 + \frac{p-2}{n} - \frac{1}{2}\right) - F\left(\underline{x}_1 - \frac{1}{n} - \frac{1}{2}\right) - \left(1 - F\left(\underline{x}_2 + \frac{p-2}{n} - \frac{1}{2}\right)\right)\frac{\underline{x}_1}{c}$$

Since benefits must exceed costs in equilibrium, this inequality has to hold for $\underline{x}_1, \bar{x}_1, \underline{x}_2, \bar{x}_2$ to define a protest equilibrium. The LHS of this inequality is increasing in $\bar{x}_1$, while the RHS is increasing in c. Thus, as c increases, the inequality might fail to hold for low values of $\bar{x}_1$. ∎