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Announcement, Credibility, and Turnout in Popular Rebellions

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The dynamics of popular rebellions against authoritarian governments are examined by focusing on how the public's beliefs about the durability of an authoritarian government may have a self-fulfilling quality. This self-fulfilling quality gives both government and opposition leaders an incentive to make exaggerated "announcements" about the likelihood of a rebellion in the near future. Yet if their predictions are too far off, they will lose credibility, and their future announcements will carry less weight. The case of Indonesia, where the government's loss of credibility and the opposition's ability to exploit this weakness led to a popular uprising in 1998, is examined. A computational model consisting of a government, an opposition, and a population of citizens with heterogeneous preferences is developed to explore how announcements by the opposition and the government can influence the likelihood of rebellion. Results suggest that when the government's credibility is high, the opposition can do little to inspire rebellions; however, a small loss of credibility, if capitalized on by the opposition, markedly boosts the chances of a rebellion. When the public's underlying preferences are polarized, the likelihood of a rebellion drops sharply.

Keywords: Indonesia; rebellion; announcement; turnout; agent-based model

Since the late 1980s, there has been a surge of popular, antiauthoritarian rebellions in East Asia, Sub-Saharan Africa, and Central and Eastern Europe. Often these movements have surprised scholars; sometimes they even surprised opposition leaders in the countries where they occurred as well as the incumbent government itself.

These events—which we call *popular rebellions*—are puzzling to political scientists for two reasons. First, they seem to depart from earlier types of popular movements. Previous studies of mass political rebellions suggested they were commonly motivated by scarcity or inequality (Russett 1964; Gurr 1970; Midlarsky 1982; Muller and Seligson 1987); had rural or peasant roots (Tilly 1977; Scott 1976; Goldstone 1991); or, if they occurred in urban settings, would most likely transpire in advanced

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industrialized democracies, where protest is far less risky (McCarthy and Zald 1977; Chong 1991; Tarrow 1995). By contrast, the popular rebellions of the past two decades have most often been led by the middle class; focused on political, not economic issues; were based in urban areas; and occurred despite the terrible risk of challenging an incumbent authoritarian government.

Second, popular rebellions seem to confound the widespread belief among scholars that democratic transitions begin “from above” (due to elite cleavages or negotiations) instead of “from below” (due to popular movements). According to a landmark study by O’Donnell and Schmitter (1986, 19), “there is no transition whose beginning is not the consequence—direct or indirect—of important divisions within the authoritarian regime itself.” Many other democracy scholars have agreed with this analysis (Di Palma 1990; Colomer 1991; Przeworski 1991; Haggard and Kaufman 1995). Yet, more recently, others have argued that many transitions begin with popular pressures from below (Collier 1999; Wood 2000). Some scholars have used formal models to help explain how large protests can suddenly arise, even under repressive conditions (Kuran 1989; Lohmann 1994; Ginkel and Smith 1999). We observe that both elite cleavages and popular movements are typically important to these processes and wish to explore how they interact.

We develop an agent-based model that builds on these earlier efforts. Our model emphasizes a conundrum faced by both the government and the opposition. To overthrow the government, the opposition must persuade citizens to voice their dissent. Given that speaking out is hazardous, however, few citizens are likely to do so unless they are already convinced the government will soon fall. The government, conversely, can prevent citizens from voicing their dissent by persuading them that the opposition is certain to fail, rendering their protests futile. For both the government and the opposition, the likelihood of success depends in part on the public’s perceptions of the likelihood of their success. In other words, the public’s beliefs about the durability of an unpopular regime have self-fulfilling qualities: if they believe the government will fall, they will voice their dissent and help cause its fall; if they believe it will endure, they will stay home and thus help it to endure. How might this dynamic influence rebellions?

The computational model we develop to explore this problem consists of a government, an opposition, and a population of citizens with heterogeneous preferences. We use this model to address a series of interlinked questions: How do announcements by the government and the opposition on the durability of the current regime influence the likelihood of rebellion? Are some announcement strategies more effective than others? How does the level of repression influence the likelihood of rebellion? How do different preference distributions among the population influence outcomes? We believe that computational modeling can be a fruitful way to explore these questions, which are extraordinarily difficult to study empirically.

In the next section, we describe previous work on popular rebellions, explain how we build on this work, and explore the case of Indonesia’s 1998 popular uprising. In the third section, we explain our model, and in the fourth, we present our results. We conclude the article in the fifth section and suggest possible extensions of the model.

BACKGROUND AND MOTIVATION

Social scientists have long tried to explain the outbreak of protests, rebellions, and revolutions in undemocratic states. Some have focused on economic factors—tying these movements to economic growth (de Tocqueville [1856] 1998; Huntington 1968), economic decline (Haggard and Webb 1994; Przeworski et al. 1996), a combination of growth and decline (Davies 1962; Zagorin 1982), or inequality and “relative deprivation” (Russett 1964; Gurr 1970; Muller and Seligson 1987). Others have drawn on survey research in democratic countries to scrutinize the factors that cause people to protest, noting they are often motivated by nonmaterial rewards conferred by their peers, including enhanced reputations and conformance with group norms, and by a belief that their own participation can contribute to the movement’s success (Chong 1991; Muller, Dietz, and Finkel 1991; Oberschall 1994; Finkel and Muller 1998). Another set of scholars has constructed an overarching framework for the study of “contentious politics,” suggesting that mass movements are caused by changes in the “political opportunity structure” when closed systems of opportunities begin to open up (Tarrow 1995; McAdam, McCarthy, and Zald 1996; Tilly, Tarrow, and McAdam 2001).

Formal theorists have recently made important contributions to this literature, enabling us to better understand the microbehavioral foundations of protest movements. One key advance has been the application of threshold models—also called bandwagon, cascade, or tipping models—to the study of popular rebellions. The essence of such models is that actors face a set of choices, and the net benefits of each choice are influenced by the number of others making the same choice. Threshold models have been used to explain fads, riots, strikes, stock market crashes, and crime waves (Granovetter 1978; Genotte and Leland 1990; Glaeser, Sacerdote, and Scheinkman 1996; Bikhchandani, Hirshleifer, and Welch 1998). Their structure is attractive for explaining rebellions against authoritarian regimes because they retain rational choice assumptions but can account for abrupt shifts such as the rise of collective protests sometimes observed in nondemocratic states.

Several threshold models have led to important advances in our understanding of popular rebellions. Models by Kuran (1989, 1991) suggest that uprisings occur when the costs of living under repression become outweighed by the emotional need of individuals to voice their opposition to such restrictions and violence. Once a sufficient number of aggrieved individuals openly criticize the government, the individual cost of dissent begins to drop, because dissidents begin to achieve safety in numbers.¹ When the cost of dissent drops sufficiently, the result is a bandwagon of dissent. In Kuran’s models, citizens are motivated by the satisfaction of denouncing a repugnant government.

An alternative model by Lohmann (1994) suggests that antiauthoritarian protests occur when protests provide citizens with previously hidden information about the malignant quality of the government. Lohmann divides society into four subgroups—

1. That is, once the number of dissenters begins to outweigh the state’s repressive capacity, the marginal risk to any one individual of speaking out against the government begins to drop.

activist moderates, rationally apathetic moderates, anti- and pro-status-quo extremists—based on their level of discontent and proclivity to join demonstrations. When organized extremists protest, bystanders gain no salient information, but when moderates protest, bystanders realize that their government has performed more poorly than they thought and decide to join in. The bandwagon is not created by safety in numbers—as in Kuran’s (1989, 1991) models—but by the aggregation of information about the government’s performance.

Finally, Ginkel and Smith (1999) construct a model in which the government becomes an active agent and chooses to respond to dissidents with either concessions or repression. Although theirs is not a threshold model, but instead a game with three actors (the government, a group of organized dissidents, and the mass public), it incorporates both Kuran’s (1989, 1991) insight that actors tend to falsify their preferences and Lohmann’s (1994) argument that the public acts in part based on information about the government’s performance.

OUR APPROACH

Our model seeks to build on these efforts in four ways. First, we go further than previous models in capturing the heterogeneity of the public. Prior studies acknowledge that the distribution of preferences among the public at large is a critical variable; however, most have been forced to treat the public as a unitary actor to render their models tractable. Lohmann (1994) shows that dividing the public into multiple groups—in her case, four—can produce surprising results. In our model, the crowd is composed of 100 actors with varying preferences; we also test the model with four different preference distributions. This enables us to examine how variations in popular preferences may influence the success or failure of popular rebellions.

Second, we suggest that for most individuals, the decision to publicly criticize a repressive government—by joining a demonstration, signing a petition, or simply speaking out—is *not* principally influenced by a desire for emotional release, as Kuran (1989, 1991) suggests; nor is it mainly caused by the disclosure of information that the government’s performance has been poor, as Lohmann (1994) implies.² Rather, the decision to openly denounce the government is most strongly influenced by individuals’ expectations about the consequences for themselves and their families, which in turn heavily depend on their beliefs about whether the incumbent regime or the opposition is likely to prevail in the near future. If citizens believe that the government will prevail, they will be reluctant to oppose it, no matter how odious they find it; if they believe the opposition will soon prevail, they will be more likely to voice their dissent. In other words, citizens in repressive states are strongly motivated by the desire to be on the winning side.³

2. We agree, however, that these factors offer important partial explanations.

3. Protesters in states that are wealthier and more democratic—where the costs of dissent are much lower—may have somewhat different motivations. Some scholars have found, for example, that for some participants, joining a protest is a pleasurable social activity and an end in itself (Tarrow 1989; Opp 1989; Klandermans 1997; Finkel and Muller 1998). In highly repressive states, we believe that this is a far less important motivation.

We think there is good reason to support this view. Survey research in democratic states has found that citizens decide whether to join a demonstration based in part on their beliefs about the likelihood of the movement's success (Muller, Dietz, and Finkel 1991; Finkel and Muller 1998). We hypothesize that individuals have even stronger incentives in authoritarian settings to pick the winning side. Liberal democratic governments tend to provide citizens with many public goods and few selective goods; moreover, the public's right to dissent is protected by law. Hence, citizens in democratic states have relatively few material incentives to back the winning side and face correspondingly few penalties for supporting the losing side. Authoritarian states tend to provide fewer public goods and more selective goods, enabling them to differentially reward their backers. In states with neopatrimonial or clientelistic features, these benefits take the form of patronage; in communist and other one-party states, selective benefits go to members of the ruling party and its affiliate organizations. Opposition, meanwhile, can lead to imprisonment, torture, and death. As a result, individuals have a much greater incentive to remain in good graces with the government, regardless of their ideological views. The more repressive the government, the more likely the public will be to suppress its criticism—and hence, the more they will be influenced by their beliefs about the regime's durability.

We are certainly not the first to point out the importance of being on the winning side in social movements.⁴ We believe, however, that we are the first to place this insight at the center of a model of popular rebellions and to explore how this influences the outcome of democratic movements.⁵

Third, our use of a computational model permits us to capture aspects of rebellions that have not been explicitly incorporated into game-theoretic or threshold models.⁶ In particular, we treat the credibility of the government and opposition as endogenous: agents in the model compare government and opposition announcements with subsequent events and devise credibility scores for both. The model thus generates its own history, and agents update their beliefs about the credibility of official information, as well as their own information, and act on updated beliefs based on this information.

4. As Lichbach (1995) notes, many scholars make the same argument: for a rebellion to succeed, participants must first believe that victory is possible.

Hobbes's (1640) third condition of revolution is the "hope of success." Gottschalk (1944, 5) identifies "hopefulness of success" as a cause of revolution. Lasswell and Kaplan (1950, 46-47) argue that "in the face of the necessity of continued sacrifice without expectations of ultimate success, solidarity may progressively weaken and ultimately break down." Hoffer (1951, 18) argues that dissidents must maintain an "extravagant hope" that victory is not far away. Johnson (1964, 99) recognizes that one accelerator of revolution is "an ideological belief held by a protesting group that it can . . . succeed in overcoming the elite's armed might." (Pp. 361-62)

Karklins and Petersen (1993) draw on this argument as well, suggesting that the Eastern European protests of 1989 were facilitated by a set of assurance games.

5. Ginkel and Smith (1999), for example, acknowledge that the probability that a regime can survive a popular rebellion will influence the likelihood of an actual rebellion; however, they treat the likelihood of regime survival as exogenous. We treat it as endogenous, because it not only influences the actions of the crowd, it is, in turn, directly affected by the crowd's actions. Thus, our model shows how popular beliefs about the regime's durability can become self-fulfilling prophecies.

6. For problems such as ours, agent-based models are more suitable than game theoretic models, most notably because they address the dynamic nature of the problem and accommodate requisite heterogeneity of agents.

This enables the model to capture the emergent, path-dependent properties of popular rebellions, because its dynamics are driven endogenously rather than by exogenous events or shocks to the system. In addition, the simulation can be run hundreds or thousands of times—with various tracking measures or outcome variables summarized across runs—to study the variations in and sensitivity of results.

Finally, other cascade models—like those of Kuran (1989, 1991) and Lohman (1994)—rely on a core group of selfless activists to begin the bandwagon of protests. Although this may accurately model some types of rebellions, others seem to occur even in the absence of any organized core group.⁷ Our model does not rely on any such selfless activists, although it does assume the presence of an opposition, which may be either domestic or in exile. As such, it is designed to simultaneously capture the initiation and diffusion of a mass movement, which we believe to be an important advance in the formal study of rebellions.

PERCEPTIONS OF REGIME DURABILITY

What then influences the public's beliefs about the regime's durability? We believe that at least six factors matter. First, if an authoritarian government is highly personalistic or patrimonial, so that power is held by an individual rather than an institution, anything that influences the longevity of the ruler—for example, advancing age or decrepit health—will also influence beliefs about the regime's durability.

Second, if authoritarian power rests with an institution, such as the military, a dominant party, or a well-institutionalized monarchy, then this institution's perceived unity—and its ability to replace its leadership—will influence perceptions about regime durability. A government run by the collective leadership of a party that is unified and can replace senescent or incompetent leaders should increase the public's belief that the regime will endure. If the party grows highly factionalized or has weakly institutionalized procedures for succession, it should lower the public's estimates of the regime's longevity.

Third, public perceptions should be influenced by information about the government's prior vulnerability. In states where authoritarian governments have been overthrown in the past—for example, Thailand and Nigeria—*ceteris paribus* the public should be more likely to view the government as vulnerable.

Fourth, perceptions may be influenced by spillover effects from other states. When citizens observe similar authoritarian governments stepping down or being overthrown or unseated, they may revise upward their estimates of their own government's vulnerability.⁸

Fifth, beliefs about regime vulnerability should depend in part on beliefs about the likelihood that the military will continue to back the government, even if the opposition grows large. If the military is perceived as relatively independent from the government, or is highly factionalized, it may appear less likely to stand by the ruler in a time of crisis. If the military is more unified and closely tied to the government—or perhaps

7. For example, the 1988 protests in Burma and the protests that swept Eastern Europe in 1989.

8. This could help account for the contagion effects of democratic uprisings in Latin America in the 1970s and 1980s, Eastern Europe in 1989, and Sub-Saharan Africa between 1990 and 1994.

runs the government itself—people should be more inclined to believe that the government will endure.⁹

Finally, and most important for our purposes, perceptions about regime durability may be influenced by “announcements”—that is, efforts to influence popular opinion through public statements or symbolic actions—made by both the government and the opposition. Each side has a large stake in influencing public perceptions. In a repressive state, information on factors that may influence the regime’s underlying durability—such as splits in the ruling party, the position of the military, and events in neighboring states—is likely to be scarce and unreliable. Moreover, both the government and opposition may realize that the regime’s actual durability will be heavily influenced by its perceived durability. The government should hence try to make credible announcements that make it appear invulnerable, whereas the opposition should attempt to deliver credible messages that the regime’s demise is imminent.¹⁰

We note that regime change in authoritarian states is rare. Yet there are at least a handful of situations that may cause citizens to significantly downgrade their estimates of regime durability—for example, when a personalistic ruler appears to be near death, when a ruling party or elites grow bitterly factionalized or lose the support of the military, or when authoritarian regimes are toppled in neighboring states. During these all-too-rare episodes, the efforts of government and opposition leaders to influence the public beliefs about the regime’s future, using announcements, may become critical.

TYPES OF ANNOUNCEMENTS

Because our model focuses on the influence of these announcements, it may be useful to specify what form they take. For opposition movements, they commonly include inspirational rhetoric and symbolic leadership. Leaders of rebellions and revolutions often use inspirational rhetoric to persuade their followers that their movement is on the verge of crossing a critical threshold. Marx’s claim that revolution was assured by the “iron laws of historical necessity” may be seen as an effort to persuade his audience that capitalist regimes were not as durable as they appeared. Writing in 1930, Mao urged his colleagues to believe that “our forces, although small at present, will grow very rapidly. In the conditions prevailing in China, their growth is not only possible but indeed inevitable. . . . All China is littered with dry faggots which will soon be aflame” (Mao [1930] 1963).

Armed, organized insurrections—such as those instigated by Mao and Lenin—are able to use violence to signal that the government is vulnerable: they can attack symbolic targets, conduct high-profile strikes in areas believed to be secure for the government, and more generally use the arsenal of terror to persuade the population to raise

9. Once the Gorbachev government suggested it would not intervene militarily to protect the communist governments of Eastern Europe, the perceived vulnerability of the East German government almost certainly rose, as activists correctly guessed that the state’s own army would not intervene to protect the government.

10. Bates, de Figueiredo, and Weingast (1998) discuss the problem of signal credibility. Cho and Kreps (1987) and Banks and Sobel (1987) provide complete explanations of signaling games. Lohmann (1994) uses a signaling model to explain mass political action.

its estimates of the government's vulnerability. Popular rebellions that forsake armed struggle, or are loosely organized, must rely more heavily on rhetoric alone.

Another important tool is the selection of symbolic leaders who, by their personal or family association with previous governments, make the opposition's aspirations more credible and the government's incumbency appear less inevitable. Pakistan's Benazir Bhutto, Burma's Aung San Suu Kyi, and Indonesia's Megawati Sukarnoputri were all the daughters of previous national leaders; in the Philippines, Corazon Aquino was the wife of a martyred party leader. All had catalytic effects on their nations' democratic movements, in part due to their ability to persuade disaffected bystanders to raise their valuations of the incumbent government's vulnerability.¹¹

Among authoritarian governments, we discern at least three types of announcements. The first are symbolic displays of the state's coercive power, such as military parades, pageants, and slogans. These exercises are intended less to suppress the opposition than to persuade the public that the government is determined to prevail and the opposition is certain to fail. By lowering the public's estimate of opposition victory, these actions can raise their perception of regime durability.

A second type of symbolic action is noncompetitive elections. Many political scientists are puzzled by noncompetitive elections, because they ostensibly confer little "legitimacy" on the governments that stage them (Taylor 1996). But the government's goal may not be to show that it is loved by its citizens but rather that its opponents remain weak, fragmented, and demobilized and the government retains an overwhelming ability to coerce its citizens.¹²

A third type of announcement may entail symbolic liberalization. Scholars tend to find liberalization difficult to explain, because it often leads to the decline of governments that initiate it (Przeworski 1991). In some cases, superficial liberalization might be explained as a form of signaling. If a repressive government fears that opposition strength is growing, it may offer a preemptive liberalization program in an effort to raise public perceptions about its durability. In these cases, liberalization from above may be provoked by fear of popular rebellions from below.

Our model cannot possibly capture the variety of announcements made by government and opposition. It can, however, capture a critical feature of their strategies: their decision whether to accurately announce the likelihood of their success, whether to modestly exaggerate the likelihood of their success, or whether to strongly exaggerate the likelihood of their success. We have noted above that each side has an incentive to overstate the likelihood of its own victory in hopes of creating a self-fulfilling prophecy. If this were their only incentive, they would invariably exaggerate the strength of their position as much as possible. But they also have a countervailing incentive: if

11. Of course, there is nothing intrinsically democratic about the use of symbolic leadership: in Cambodia, the opposition Khmer Rouge built substantial support against the Lon Nol government by gaining the endorsement of King Sihanouk.

12. Using noncompetitive elections as a type of announcement, however, can be hazardous for the government. Elections that are fully noncompetitive can produce a signal that has little credibility. To gain credibility, governments must give the opposition at least the appearance of a fair vote. Sometimes this backfires and the opposition does unexpectedly well or triumphs outright—for example, in Brazil (1974), India (1977), Uruguay (1980), South Korea (1985), the Philippines (1986), Chile (1988), Burma (1990), and Malawi (1994).

their announcements are subsequently contradicted by events, they will lose credibility in the public's eyes, and their future announcements will be discounted. Our model, hence, allows each side to choose an announcement strategy, issuing realistic announcements, moderately optimistic announcements, or highly optimistic announcements about the likelihood of their imminent success. By varying the optimism of each side's announcements, we explore how different government and opposition strategies can influence the ultimate likelihood that the government will be overthrown.¹³

AN ILLUSTRATION: SUHARTO'S OVERTHROW

To illustrate how government and opposition may adopt announcement strategies that vary in their level of optimism, consider the 1996 to 1998 movement that overthrew Indonesia's President Suharto. Suharto had been in power since 1966, and by the mid-1990s, virtually all observers agreed he would remain in office as long as he wished. In 1996, one of Indonesia's two opposition parties—both were moribund entities whose activities were largely controlled by the government—appointed Megawati Sukarnoputri, the daughter of Indonesia's first president, Sukarno, as its head. Megawati was not selected for her skills as a political organizer, tactician, or visionary: she was a shy housewife with little experience in public affairs, few discernible opinions, and an aversion to speaking in public.¹⁴ Indeed, she was only approached after all her brothers and sisters refused. Her appointment, however, can be seen as a type of opposition announcement: as the daughter of Suharto's predecessor, she was instantly viewed as someone who could legitimately be president herself—making Suharto's incumbency appear less inevitable.¹⁵ This announcement might be seen as moderately optimistic: if the opposition made a realistic announcement, it would have to state that the Suharto government was virtually invulnerable—what almost all observers believed at the time. A highly optimistic announcement (declaring, for example, that Suharto would soon be overthrown) would squander the opposition's credibility. Issuing a moderately optimistic announcement turned out to be the right strategy: Megawati's presence soon energized a wide range of anti-Suharto groups, who gathered around this once-ineffectual opposition party.

The government tried to buttress Suharto's perceived invulnerability with several announcements of its own. In June 1996, the government forced the opposition party to replace Megawati with its own handpicked candidate; when pro-Megawati activists refused to comply, the party's headquarters were sacked. To restore the appearance of government invulnerability, the Suharto regime also made an exceptional effort to increase its share of the vote in the May 1997 noncompetitive elections.¹⁶ As Aspinall

13. We have no strong prior assumptions about the factors that determine each party's selection of a strategy; our intent is to explore the consequences of these strategies, not their determinants.

14. As one student activist put it, "We have been unable to detect the direction of Mother Megawati's thoughts" (Cohen 1998).

15. Indeed, Megawati became president in July 2001.

16. Although the Suharto government used a wide range of methods to hobble the opposition parties and boost support for its own party, the government's margin of victory was widely perceived as an indicator of its true popularity.

(1997) noted, its campaign seemed less designed to attract supporters than to persuade the public of its political supremacy:

[Indonesian] elections functioned as visible demonstrations of the government's ability to assert its will over the population. The mobilization of overwhelming financial and administrative resources, the humiliation wreaked on the parties, even the openness of the pressure brought to bear on voters: all seemed designed to parade the New Order's invincibility. The orderly and ritualistic character of campaigning communicated the essential message that even when the population was handed an opportunity to challenge, the government could remain aloof, impervious, triumphant. (P. 1)

If the government wished to use the 1997 election to make a realistic announcement about its vulnerability, it might have allowed a relatively free vote—something far too risky for Suharto to chance, given the growing resentment against his government's corruption and nepotism. Instead, the government used an array of pressure tactics to produce a 74% vote—a moderately or highly optimistic announcement about its own popularity.¹⁷ The tactic soon backfired: press reports strongly hinted that the government had overstated its own popularity, which led to a decline in the government's credibility. This loss of credibility, although initially small, tipped off a series of protests that grew gradually, then exponentially, over the next 12 months, as the Suharto regime was overtaken by a cascade of popular opposition.

We might infer from the Indonesian case that the opposition used the correct strategy and the government an incorrect strategy to persuade the population that the government was vulnerable. But how can we test this? How might the results have varied if leaders had used different strategies? If there had been more repression or greater (or less) dissatisfaction with the Suharto government? To address these questions, we turn to an agent-based model that simulates what we believe are the key features of popular movements in repressive states.

MODEL SPECIFICATION

The model we develop involves a government G , an opposition party O , and n individuals denoted by the subscript i . The government and opposition each make announcements about the likely turnout at a planned antigovernment demonstration. Each individual is characterized by a fixed prediction about likely turnout at a demonstration $A_i \sim U[0, 1]$, a unique threshold for action $T_i \in [0, 1]$, and a credibility score S_i based on the correlation between A_i and true turnout from past events. We assume that the cost (benefit) incurred (gained) by an individual for supporting the opposition is captured by T_i . Hence, T_i reflects both the individual's political preferences and the government's repressiveness.

17. No independent observers believed that in a free election, Suharto's ruling party would win 74% of the vote. See, for example, Bird (1998).

Episodes—each composed of 100 “events”—are structured to reflect the sequence of interactions that occur during incidents of popular rebellion. Each event consists of simultaneous announcements by the government and opposition on the expected level of turnout as well as the subsequent reaction of individuals—the decision to participate or refrain from participating—to these announcements. After each individual has had an opportunity to participate (or refrain), we set A^* equal to the percentage of individuals who participated in the rebellion. During each subsequent event, the government and opposition announce new estimates of turnout, and play continues in this manner.

We note that government and opposition announcements are made in the absence of information on the distribution of individual thresholds. To inject an element of randomness into the choice of strategies—and thereby better capture the uncertainty and incomplete information that tends to characterize popular movements—each side randomly draws an estimate of turnout from bounded intervals between the turnout from the previous round of play and what they hope to see in the next round of play (for the government, a lower turnout; for the opposition, a higher turnout). To make a realistic announcement, a party selects an estimate that closely reflects previous turnout; to make a moderately optimistic announcement, the party randomly chooses an estimate that falls between the previous turnout and a modestly favorable turnout; and in the case of a highly optimistic announcement, the party randomly selects a value that falls between the previous turnout and a more ideal turnout. More formally, the government’s announcement is denoted by $A_g \sim U[\alpha, A^*]$ and the opposition’s announcement is denoted by $A_o \sim U[A^*, \beta]$, such that α is the lower bound for A_g and β is the upper bound for A_o . We specify one-sided bounds, based on our belief that the government always seeks to minimize turnout, whereas the opposition always seeks to maximize turnout in a rebellion.

We recognize—as Scott (1985) and others have pointed out—that citizens will greet the announcements of political elites with skepticism. Hence, once the government and opposition announcements have been made, individuals must decide whether to accept the government’s estimate of turnout, accept the opposition’s estimate of turnout, or rely on their own estimate. The individual decision rule is based on a simple comparison of credibility scores. We define S_g as the correlation coefficient of true turnout and government estimates of turnout in previous events. Likewise, S_o is the correlation coefficient of opposition estimates of turnout and true turnout in all prior events. By comparing S_g , S_o , and S_i , each individual selects the estimate with the highest credibility score—what effectively reflects an individual’s confidence in the government’s announcement, the opposition’s announcement, or her or his own estimate. At the most basic level, a government that consistently makes inaccurate announcements is likely to suffer a decline in credibility, whereas consistently accurate announcements on the part of the opposition are likely to result in increasing credibility as an episode progresses.

The model retains a stochastic component, in that the progression of an episode is determined in part by the initial level of turnout A^* —drawn randomly at the start of play. Multiple runs of the model therefore permit us to analyze distributions of histo-

ries generated under a variety of initial conditions. Finally, to generate government and opposition credibility scores endogenously, we assume that individuals rely on their own estimates of turnout for the first three events.

PARAMETER SWEEPS

We are interested in exploring the interplay between the government and opposition by paying particular attention to announcements. As a result, we permit the government and opposition to adapt to turnout information by randomly drawing values of A_g and A_o from the bounded intervals $[\alpha, A^*]$ and $[A^*, \beta]$, respectively. These intervals may closely reflect previous turnout such that $\alpha = 0.9A^*$ and $\beta = 1.1A^*$ —in which case we have *realistic* announcements R ; imprecisely reflect previous turnout, such that $\alpha = 0.7A^*$ and $\beta = 1.3A^*$ —in which case we have *moderately optimistic* announcements M ; or hardly reflect previous turnout, such that $\alpha = 0.5A^*$ and $\beta = 1.5A^*$ —giving rise to *highly optimistic* announcements H . We examine the effects of both “symmetric” and “nonsymmetric” combinations of announcements—to reflect different levels of political maneuverability on the part of government and opposition—and examine these effects with uniformly distributed participation thresholds, an inactive or *high threshold* population, an active or *low threshold* population, and a stratified or *bipolar* population.

In the following sections, we present the results of our analysis. We treat a uniform threshold distribution as the base case in our analysis and subsequently examine how our results change by skewing this distribution. We derive the probability of rebellion p by running a model (with 100 agents and 100 events) under each threshold distribution for 1,000 episodes and counting the number of times two-thirds or more of the population participates in rebellion. We do this for each of the nine possible combinations of government and opposition bounds.¹⁸ Our decision to run the model for 100 events reflects our desire to both capture salient patterns of behavior for a particular set of parameters and keep an episode relatively short-lived, given that the government and opposition do not adapt to turnout in our specification of the model. Likewise, our decision to run a model with 100 agents reflects our desire to represent the dynamics of a popular rebellion—the interaction between government, opposition, and the public at large, as opposed to an elite-level game—with a tractable number of agents. We find it highly unlikely that adding additional agents would change the model’s dynamics in any fundamental way. For purposes of the discussion, we consider $p < .33$ to indicate that the probability of rebellion is low; $.33 \leq p < .66$ to indicate that the probability of rebellion is medium; and $p \geq .66$ to indicate that this probability is high. We define a scenario by specifying the accuracy of government announcements, the accuracy of opposition announcements, and the corresponding probability of regime change. A scenario in which the government announcement is highly optimistic H_g , the opposi-

18. This makes a total of 9,000 runs for each of the four threshold distributions we examine. In all, 36,000 runs of the model were conducted for the analysis.

tion announcement is realistic R_o , and $p = .5$, would be given by $(H_g, R_o, .5)$. We follow this convention in the sections that follow.

RESULTS

Our use of an agent-based model permits us to unpack our results and examine how trajectories of participation differ across various parameter settings. Figure 1 provides an example of how aggregate participation varies across the events in one episode. Participation initially peaks at 55, drops steadily to 25, hovers between 30 and 15, and finally levels out at 12 by event 70. We surmise that trajectories for participation might exhibit distinct patterns under different parameter settings but reserve such an analysis for later work on this topic.

The agent-based framework further allows us to track individual participation histories across events. For example, we can record each individual's actions during each event that comprises the episode analyzed in Figure 1. Figure 2 analyzes individual participation histories for the same episode, and indicates that unlike the monotonic behavioral cascades observed in threshold models, participation is not simply confined to extremists at time t , with less extreme individuals joining in at $t + 1$, and the least extreme at $t + 2$. Rather, we see that a number of agents participate initially and then refrain from participating as the episode progresses, whereas others participate initially, later refrain from participating, and subsequently resume their participation, at times on an event-by-event basis.

Based on an analysis of participation histories, we locate Nash equilibria under each of the four different population distributions we examine. These outcomes are driven, in large measure, by the opposition's trade-off between maintaining credibility and inspiring turnout and the government's trade-off between maintaining credibility and deterring turnout. Small mistakes by the government, given low or uniform threshold distributions, can lead to major gains for the opposition. Likewise, slipups by the opposition, given low and bipolar threshold distributions, can be costly. In these more volatile settings, selecting the right strategy will have a critical influence on the outcome. Our runs of the model also produce an unexpected result: having a bipolar, as opposed to a uniform, threshold distribution matters greatly. Rebellion is less likely and outcomes are much more difficult to predict when citizen preferences are polarized. Data from our runs of the model are summarized in Table 1. We discuss these and other results in greater detail in the sections that follow.

UNIFORMLY DISTRIBUTED PARTICIPATION THRESHOLDS

In the first population of agents we examine, citizens tend to be neutrally disposed toward collective protest, although they hold heterogeneous preferences that are uniformly distributed. This neutral disposition does not necessarily imply that they are indifferent toward their ruler; rather, it suggests that they believe that the benefits of regime change (which may be large or small) are closely balanced by the costs of protest (which may also be large or small). As a result, agents with high and low thresholds

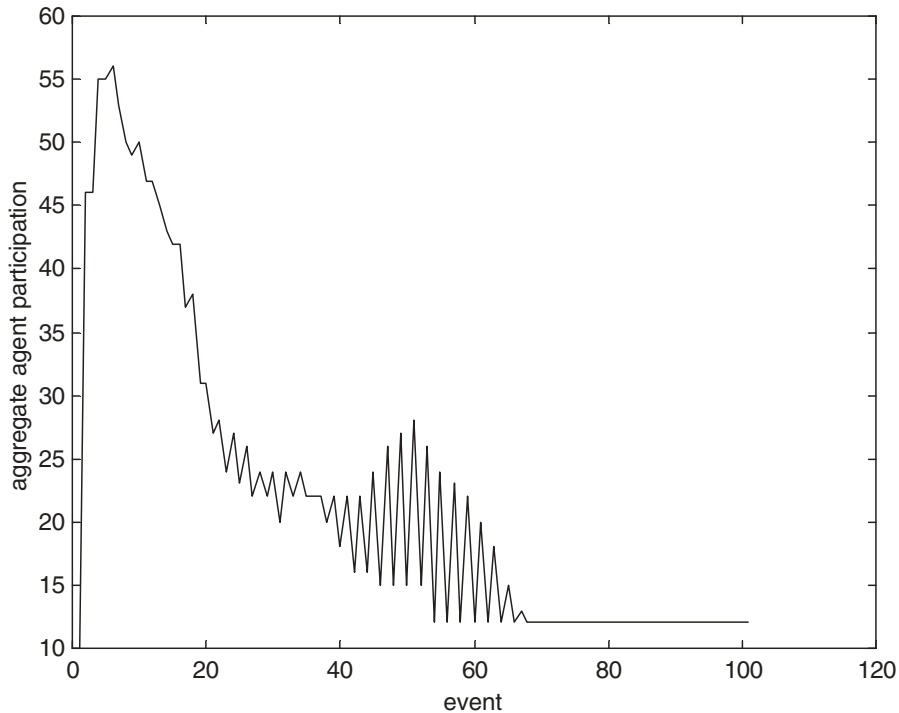


Figure 1: Agent Participation: Event-Based History for a Single Run of the Model

NOTE: These results depict a single run of the model with 100 agents for 100 events. The y axis measures aggregate participation over the course of an episode (100 events measured on the x axis).

(as well as everything in between) for participating in rebellion—those disposed towards action and inaction—are evenly distributed throughout the population.

Figure 3 depicts how the probability of rebellion, given uniformly distributed thresholds, varies with the accuracy of government and opposition announcements. In particular, two scenarios in which p is high include $(H_g, M_o, .880)$ and $(M_g, M_o, .677)$; five scenarios in which p is medium include $(R_g, R_o, .360)$, $(M_g, R_o, .581)$, $(H_g, R_o, .605)$, $(M_g, H_o, .480)$, and $(H_g, H_o, .640)$; and two remaining scenarios in which p is low include $(R_g, M_o, .270)$ and $(R_g, H_o, .248)$. Variation in the probability of rebellion, holding all other things constant, increases as government announcements become more optimistic moving from R_g to H_g .

Under these conditions, it pays for the opposition to make realistic announcements when the government also does so. In the event that the government deviates and makes highly optimistic announcements, the opposition can take advantage of this opening by exercising restraint and making moderately optimistic announcements. In contrast to the opposition, the government's dominant strategy is to make realistic announcements—a strategy that yields the highest payoff to the government when the

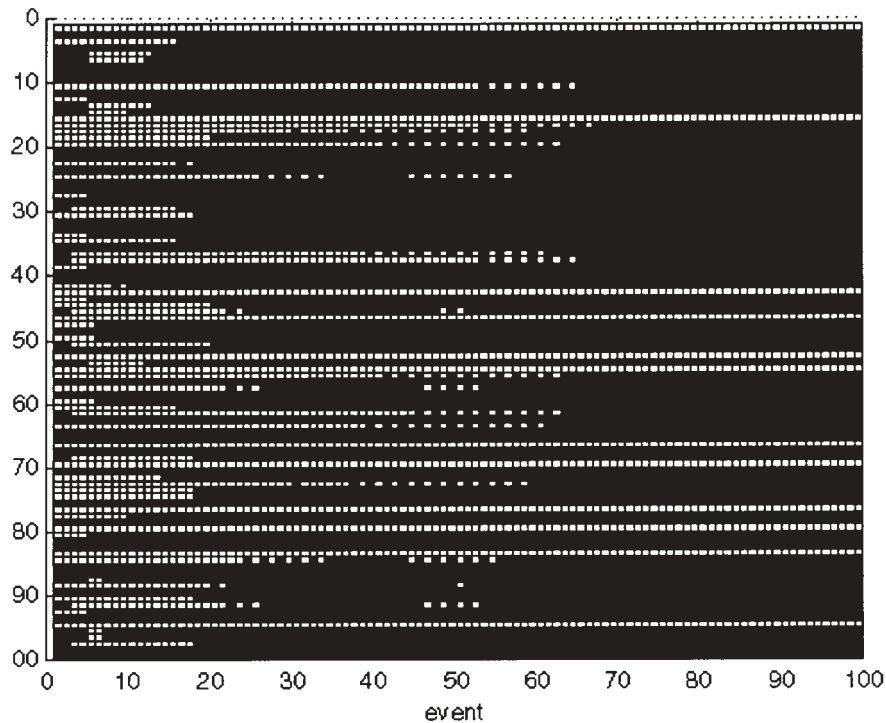


Figure 2: Agent Participation: Individual Histories for a Single Run of the Model

NOTE: These results depict a single run of the model with 100 agents for 100 events. Each row records an individual agent's history of participation (white = participated, black = refrained) over the course of one episode (100 events measured on the *x* axis).

opposition makes highly optimistic announcements. The normal form representation in Figure 4 captures the strategies that each party, as a rational actor, would adopt in response to the other's behavior, and reveals a Nash equilibrium that consists of both government and opposition making realistic announcements. It follows that as long as government announcements remain realistic, the probability of rebellion remains low, regardless of opposition strategy.

From this set of runs, we see that as the government becomes less accurate (and hence more optimistic) in its forecasting, rebellion grows more likely, although the opposite does not hold true. Our results imply that a repressive government's optimal strategy is to maintain its credibility by not understating the size of the opposition. As long as the government retains its credibility, there is little that the opposition can do. But if the government's forecasts of opposition activity grow inaccurate, it creates an important opening for the opposition to boost dissent.

In the Indonesian case, this suggests that the Suharto government's strategy of strongly exaggerating its popularity in the May 1997 elections may have had a critical

TABLE 1
Simulation Data

	R _o	M _o	H _o	mean	stdev
Uniform participation thresholds					
R _g	360	270	248	293	59
M _g	581	677	480	579	99
H _g	605	880	640	708	150
mean	515	609	456		
stdev	135	311	197		
High participation thresholds					
R _g	20	69	111	67	46
M _g	48	226	262	179	115
H _g	66	422	583	357	265
mean	45	239	319		
stdev	23	177	241		
Low participation thresholds					
R _g	731	333	280	448	247
M _g	934	930	585	816	200
H _g	927	986	972	962	31
mean	864	750	612		
stdev	115	362	347		
Bipolar participation thresholds					
R _g	50	81	123	85	37
M _g	78	330	301	236	138
H _g	79	414	778	424	350
mean	69	275	401		
stdev	16	173	339		

NOTE: The figures in each cell were generated from 1,000 runs of a model with 100 agents and 100 events and form the basis of our analysis. *R* = realistic announcement; *M* = moderately optimistic announcement; *H* = highly optimistic announcement. Subscripts denote the government (*g*) and the opposition (*o*).

effect—leading to a loss of credibility, which gave new opportunities to the opposition. Had the government more accurately acknowledged the magnitude of the opposition—which at the time was still small—it might have benefited by maintaining its credibility.

HIGH PARTICIPATION THRESHOLDS

In the second population of agents we examine, thresholds for participating in popular rebellion are skewed to reflect a bias toward inaction. Although the heterogeneity of types is still maintained, agents with a high threshold for participating in rebellion dominate the population. We therefore move away from our base case to examine a population in which the effects of government repression are pronounced. We use this to examine the optimal strategies for government and opposition in settings where the public is less inclined to mobilize against a repressive regime—perhaps because the benefits of regime change are less than the costs of voicing dissent. We expect this set-

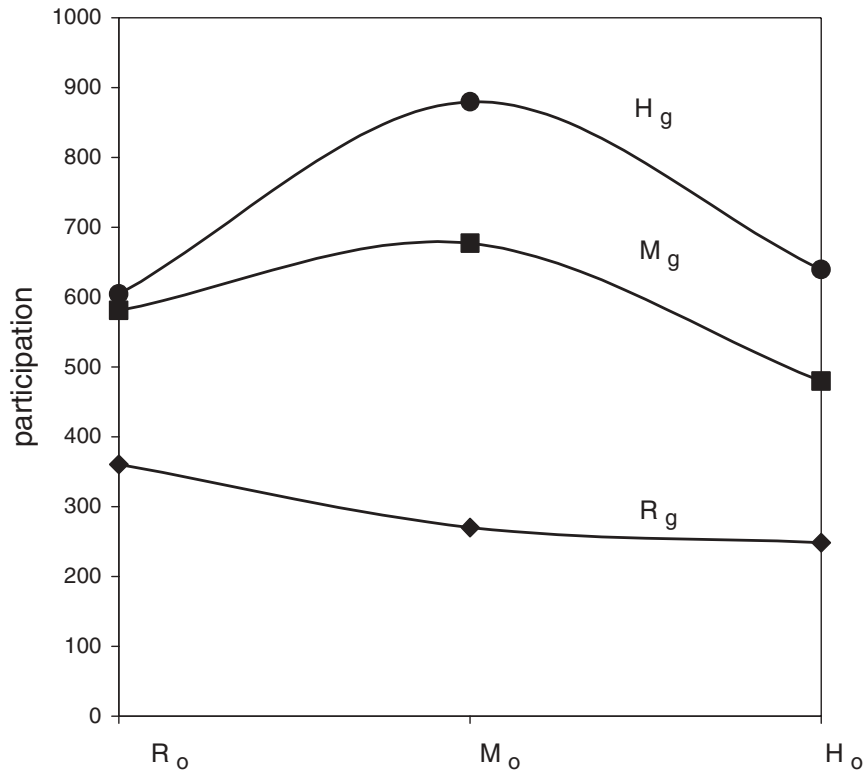


Figure 3: Agent Participation: Uniformly Distributed Thresholds (Base Case)

NOTE: R denotes a realistic announcement, M a moderately optimistic announcement, and H a highly optimistic announcement. Subscripts denote the government (g) and the opposition (o). The y axis counts the number of episodes in which there was at least one rebellion—two-thirds or more of the population participated during one event—over the course of 1,000 runs of the model.

ting to fit two types of cases: high-growth authoritarian states with soft repression and low-growth authoritarian states with harsh repression.

Under a high threshold distribution, as may be expected, there are no scenarios in which p is high. Rather, we find two scenarios in which this probability is medium: $(H_g, H_o, .583)$ and $(H_g, M_o, .422)$. In all the remaining scenarios, the probability of rebellion is low. As in the case of uniformly distributed thresholds, variation in the probability of rebellion—holding all else constant—increases as the government strategy changes from R_g to H_g . Unlike the case of a uniform threshold distribution, however, changing the accuracy of government announcements when opposition announcements remain realistic has little impact on turnout, which remains low.

Under these conditions, the opposition's dominant strategy to make highly optimistic announcements, regardless of the government's strategy. In contrast, the government's dominant strategy is to make realistic announcements, especially when opposition announcements are moderately optimistic or highly optimistic. It follows that the

		Government Announcement		
		H	M	R
Opposition Announcement	H	640	480	248
	M	880	677	270
	R	605	581	360

Figure 4: Normal Form: Agent Participation with Uniformly Distributed Thresholds
 NOTE: *R* denotes a realistic announcement, *M* a moderately optimistic announcement, and *H* a highly optimistic announcement. The government seeks to minimize whereas the opposition seeks to maximize participation.

government has no payoff from failing to disclose a situation that is to its advantage. The more accurate the information provided by the government, the less likely rebellion is. Rebellion becomes possible only with inaccurate signals from the government about its own fortitude. Our finding mirrors the Indonesian setting during three decades of high growth (between 1967 and 1996), in which dissent was punished but not severely—what in effect suggests that one of the Suharto’s shrewdest qualities was his willingness to acknowledge the size and strength of his opponents and not squander credibility by minimizing their influence.

Figure 5 depicts how the probability of rebellion varies as the accuracy of government and opposition announcements change, given a high threshold population. Figure 6, in turn, provides a normal form representation of government and opposition strategies and the associated payoffs in terms of popular participation, revealing a Nash equilibrium that consists of government making realistic announcements and the opposition making highly optimistic announcements.

LOW PARTICIPATION THRESHOLDS

In the third population of agents we examine, the distribution of thresholds for participating in popular rebellion is skewed to reflect a bias toward action. Although the heterogeneity of types is still maintained, agents with a low threshold for participating in rebellion dominate the population. As a result, we move away from our base case to examine a population in which citizens tend to view the benefits of regime change as outweighing the costs of dissent. We wish to know how the payoffs of government and opposition strategies differ when the population is more inclined to rebel.

With a low threshold distribution, several scenarios that support rebellion emerge, although *p* is extremely sensitive to shifts in government and opposition strategy. In six

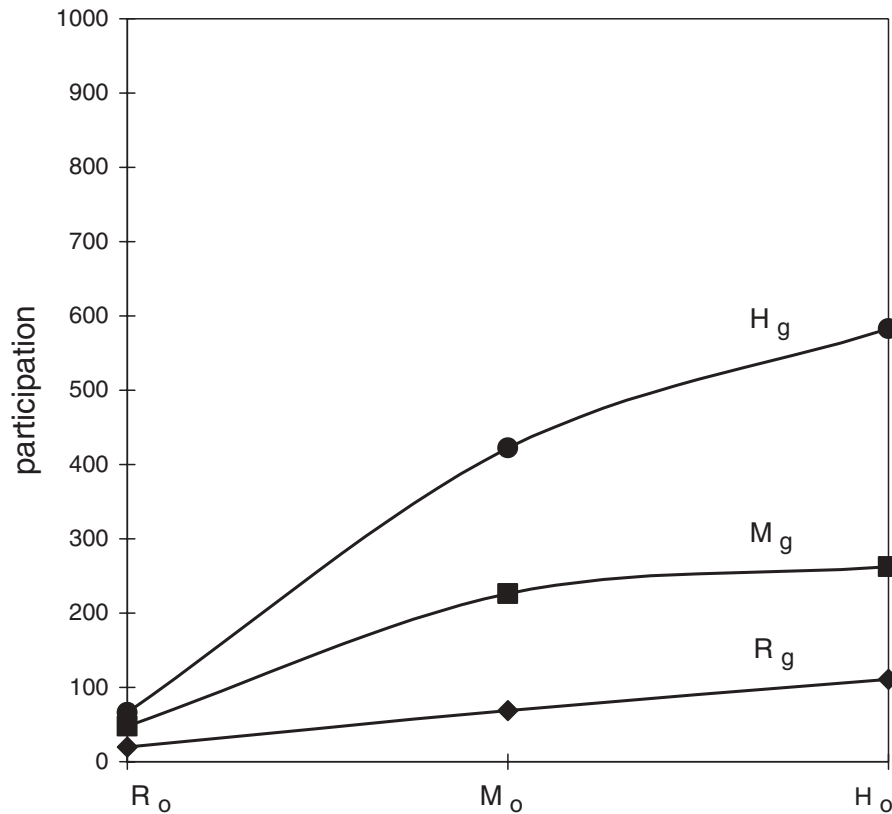


Figure 5: Agent Participation: High Thresholds

NOTE: R denotes a realistic announcement, M a moderately optimistic announcement, and H a highly optimistic announcement. Subscripts denote the government (g) and the opposition (o). The y axis counts the number of episodes in which there was at least one rebellion—two-thirds or more of the population participated during one event—over the course of 1,000 runs of the model.

scenarios, p is high. These include $(R_g, R_o, .731)$, $(M_g, R_o, .934)$, $(M_g, M_o, .930)$, $(H_g, R_o, .927)$, $(H_g, M_o, .986)$, and $(H_g, H_o, .972)$. We find only one scenario in which p is medium: $(M_g, H_o, .585)$. For two other scenarios, p is low, including $(R_g, M_o, .333)$ and $(R_g, H_o, .280)$. In contrast to both uniform and moderate threshold distributions, variance in participation levels—holding all other things constant—decreases as the government strategy changes from R_g to H_g .

Under these conditions, the opposition generally prefers to make realistic announcements, although it could arguably fare better by making highly optimistic announcements when the government does the same. The government's dominant strategy is always to make realistic announcements, especially when the opposition does not. It follows that the opposition stands to gain from realistically describing a situation that is to its advantage and that the loss in credibility that results from deviation

		Government Announcement		
		H	M	R
Opposition Announcement	H	583	262	111
	M	422	226	69
	R	66	48	20

Figure 6: Normal Form: Agent Participation with High Thresholds

NOTE: *R* denotes a realistic announcement, *M* a moderately optimistic announcement, and *H* a highly optimistic announcement. The government seeks to minimize whereas the opposition seeks to maximize participation.

mitigates the advantage of a favorable situation. Only an opposition mistake—that is, overstating its position against official claims to the contrary—can reduce *p* to below .50.

Figure 7 depicts how the probability of rebellion varies with changes in the realism of government and opposition announcements, given a low threshold distribution. The normal form representation in Figure 8 reveals a Nash equilibrium in which both sides make realistic announcement, as in the case of a uniform population distribution.

Our results reflect the cleverness of the opposition’s strategy in Indonesia as the public became more mobilized in 1997 and early 1998. Opposition groups were careful not to overestimate the chances of their own success; indeed, they considered it taboo to call for Suharto to step down until the final months of their campaign. This helped them maintain a high degree of credibility, which in turn helped them win more neutral citizens to their side.

BIPOLAR PARTICIPATION THRESHOLDS

In the final population of agents we examine, thresholds for participating in popular rebellion are bimodal, reflecting a split in the population. Although the heterogeneity of types is still maintained, extremists with low thresholds and moderates with high thresholds for participating in rebellion dominate the population. Once again, we move away from our base case to examine a population in which the government may favor one group while repressing another. We expect this case to approximate repressive states in which the population is sharply divided—for example, along ethnic lines—and the government favors one group and discriminates against another.

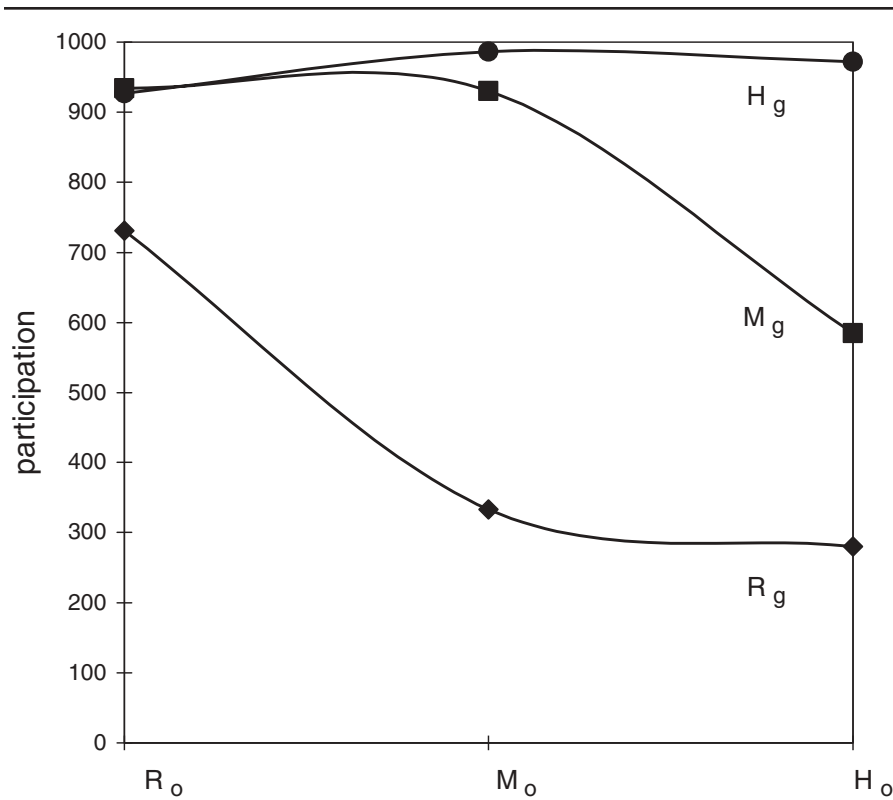


Figure 7: Agent Participation: Low Thresholds

NOTE: R denotes a realistic announcement, M a moderately optimistic announcement, and H a highly optimistic announcement. Subscripts denote the government (g) and the opposition (o). The y axis counts the number of episodes in which there was at least one rebellion—two-thirds or more of the population participated during one event—over the course of 1,000 runs of the model.

With a bipolar distribution, there is only one scenario under which rebellion is likely: when both government and opposition make highly optimistic announcements. It follows that p is high if and only if $(H_g, H_o, .778)$. Also distinct from the other cases examined thus far, the variance in participation levels—holding all other things constant—increases as the government strategy changes from R_g to M_g but decreases as the government strategy changes from M_g to H_g .

Under these conditions, it pays for the opposition to make highly optimistic announcements when government announcements are either realistic or highly optimistic. When the government makes moderately optimistic announcements, however, the opposition is best served by mirroring this strategy. In contrast, the government's dominant strategy is to be realistic, especially when the opposition makes moderately optimistic or highly optimistic announcements.

		Government Announcement		
		H	M	R
Opposition Announcement	H	972	585	280
	M	986	930	333
	R	927	934	731

Figure 8: Normal Form: Agent Participation with Low Thresholds

NOTE: *R* denotes a realistic announcement, *M* a moderately optimistic announcement, and *H* a highly optimistic announcement. The government seeks to minimize whereas the opposition seeks to maximize participation.

Figure 9 depicts how the probability of rebellion varies as the accuracy of government and opposition announcements change given a bipolar threshold distribution. Government and opposition strategies together with the associated payoffs are represented in Figure 10, which reveals a Nash equilibrium that consists of the government making realistic announcements and the opposition making highly optimistic announcements. The striking finding from this set of runs is that rebellion under a bipolar distribution is less likely than rebellion under a uniform distribution. A politically splintered population is bad news for a democratic or otherwise antiauthoritarian opposition but good news for an authoritarian regime.

In Figure 11, we compare our results across various threshold distributions, examining symmetric pairs of government and opposition announcements. We find that as the government and the opposition both ratchet up their level of optimism, participation increases moderately before reaching a ceiling with a low threshold population, climbs to a peak and then declines slightly with uniformly distributed participation thresholds, but increases sharply with bipolar or high participation thresholds.

CONCLUSIONS

Our objective in this study has been to better understand the determinants of popular rebellions by focusing on citizens' perceptions about regime durability and efforts by the government and the opposition to influence these perceptions. We develop an agent-based model to explore how announcements by the government and the opposition concerning the durability of the current regime influence the likelihood of rebellion and how different preference distributions among the population influence outcomes. Our model nonetheless constitutes a representation—and an artificial one at

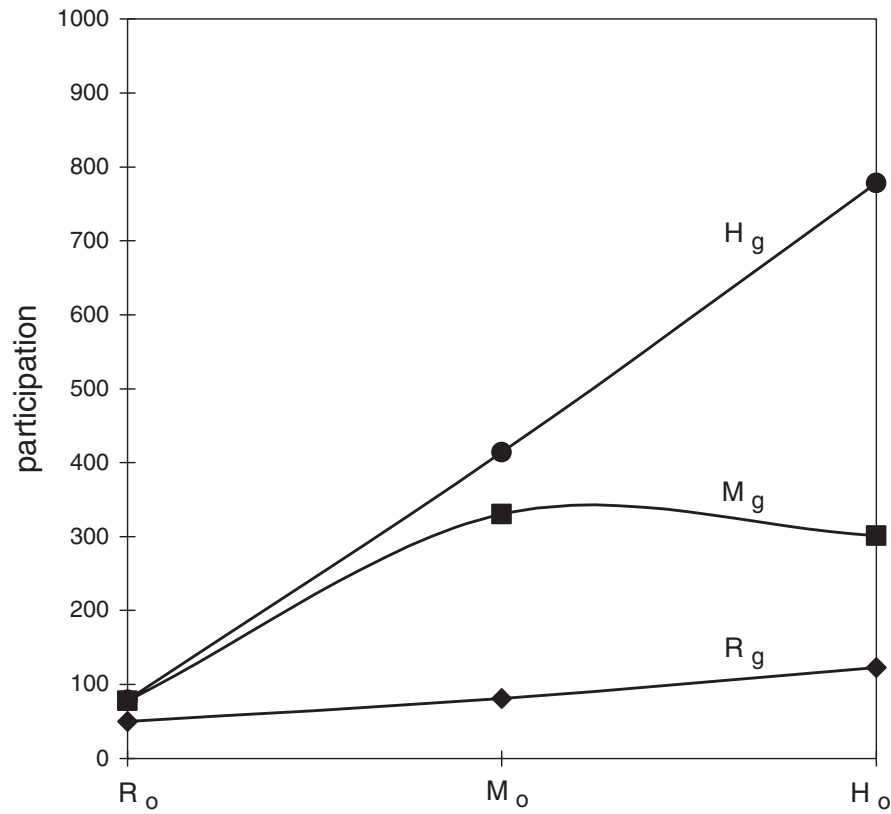


Figure 9: Normal Form: Agent Participation with Bipolar Thresholds

NOTE: R denotes a realistic announcement, M a moderately optimistic announcement, and H a highly optimistic announcement. Subscripts denote the government (g) and the opposition (o). The y axis counts the number of episodes in which there was at least one rebellion—two-thirds or more of the population participated during one event—over the course of 1,000 runs of the model.

that—of a process that conceivably influences individual turnout in rebellions. With this caveat in mind, we consider two of our results to be especially interesting.

Our analysis identifies one Nash equilibrium for each of the four different population distributions we consider. In every instance, the government's dominant strategy is to make realistic announcements. In contrast, the opposition's optimal strategy varies. Under both a uniform and a low threshold distribution, the opposition is best served by making realistic announcements, whereas under high and bipolar threshold distributions, its preference is for making highly optimistic announcements. That said, the only equilibrium among the four that is especially conducive to rebellion occurs with a low threshold population. This implies that as long as repressive governments select the "right" strategy—that is, one that minimizes or mitigates their loss of credi-

		Government Announcement		
		H	M	R
Opposition Announcement	H	778	301	123
	M	414	330	81
	R	79	78	50

Figure 10: Agent Participation with Bipolar Thresholds

NOTE: *R* denotes a realistic announcement, *M* a moderately optimistic announcement, and *H* a highly optimistic announcement. The government seeks to minimize whereas the opposition seeks to maximize participation.

bility—they should be able to deter rebellion. It follows that some of the rebellions we observe in practice may have been precipitated or otherwise aided by mistakes in government strategies. In fact, once play moves off the equilibrium path, the strategies of the government and the opposition assume critical importance. Small mistakes by the government under uniform and low threshold distributions, in particular, can lead to major gains for the oppositions. Likewise, slipups by the opposition under low and bipolar threshold distributions can be costly.

One way to explain this dynamic is to note that the opposition faces a trade-off between maintaining credibility and inspiring turnout, whereas the government faces a trade-off between maintaining credibility and deterring turnout. For the government, we find that the benefits of retaining credibility usually outweigh the potential gain of exaggerating its own popularity to deter turnout. For the opposition, the equation is less one-sided: there are situations when the demand for credibility is greater than the demand for inspiration, but the opposite can also hold true. As a result, it must keenly tune its strategy to that of the government and utilize changes in government strategy to its advantage. Most important, we find that a small loss in the credibility of the government can lead to dramatic changes in turnout, especially when the opposition properly adjusts its own strategy to capitalize on this opportunity.

Our finding may help to explain the unexpected success of the movement to overthrow Indonesia's President Suharto in 1997 and 1998. Few if any observers believed in mid-1997 that the Suharto government—which had been firmly in charge for more than 30 years—might be vulnerable to a popular rebellion. Yet the modest loss in government credibility produced by the overstated results of the 1997 election, coupled with a shrewd opposition strategy to encourage turnout, helped produce a dramatic rise in popular participation. When these protests reached a critical size in May 1998, even longtime supporters of Suharto defected to the opposition, effectively forcing him to

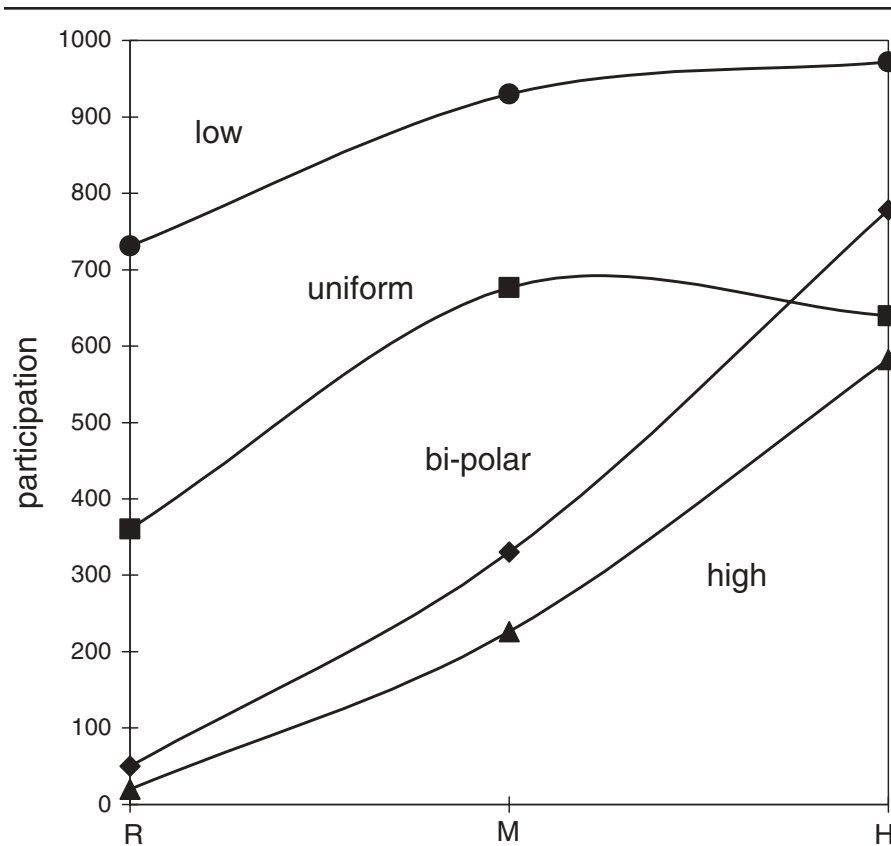


Figure 11: Agent Participation Given Symmetric Announcements: A Comparison across Threshold Distributions

NOTE: *R* denotes a realistic announcement, *M* a moderately optimistic announcement, and *H* a highly optimistic announcement. The y axis counts the number of episodes in which there was at least one rebellion—two-thirds or more of the population participated during one event—over the course of 1,000 runs of the model.

resign from office. We suspect that a similar dynamic could help explain other surprising popular rebellions against authoritarian rule, including ones in Thailand (1973), the Philippines (1988), and Burma (1988).

Upon comparing our results across different threshold distributions, we find that the probability of rebellion is lowest with a moderate population and increases as we move toward an extreme population—that is, one in which more citizens are strenuously opposed to the government and thus inclined to act. Although this result is intuitive, our runs of the model also produce an unexpected result: having a bipolar—as opposed to a uniform—threshold distribution matters greatly. Rebellion is less likely and outcomes are much more difficult to predict when citizen preferences are polarized.

In closing, we note that our model can be extended in a number of ways. For instance, one could examine how adaptive government and opposition strategies, as well as learning by individual agents, influence turnout in popular rebellions. It is also conceivable to incorporate networks that structure communication between agents, thereby highlighting the difference between spontaneous participation and participation coordinated by key agents—information gatekeepers—who enjoy greatest credibility.

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