Elections, Information, and

Political Survival in Autocracies

by

Arturas Rozenas

Department of Political Science
Duke University

Date: __________________

Approved:

Herbert P. Kitschelt, Supervisor

Bahar Leventoglu

Emerson Niou

Karen Remmer

David Soskice

Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Political Science in the Graduate School of Duke University

2012
Abstract

Elections, Information, and Political Survival in Autocracies

by

Arturas Rozenas

Department of Political Science
Duke University

Date: __________________

Approved:

______________________
Herbert P. Kitschelt, Supervisor

______________________
Bahar Leventoglu

______________________
Emerson Niou

______________________
Karen Remmer

______________________
David Soskice

An abstract of a dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Political Science in the Graduate School of Duke University
2012
Abstract

Chapter 1: Forcing Consent: Information and Power in Non-Democratic Elections. Why do governments hold elections that lack credibility? What explains variation in repression levels across non-democratic elections? While the literature has suggested many explanations for elections in autocracies, it has not yet provided a theory that would explain both the incidence of non-democratic elections and the variation in their degree of competitiveness. In this paper, we build an informational model of non-democratic elections explaining when elections may stabilize an autocrat’s rule and when they may fail to do so. We argue that to achieve stability, elections must yield a sufficiently high vote-share for the incumbent and be optimally repressive. The degree of optimal repression is shown to increase with the incumbent’s expected popularity. The model is then applied to explain some stylized facts about non-democratic elections and to derive a set of novel research hypotheses about the effects of non-democratic elections, variation in electoral repression, and fraud technology. We test the chief implication of the model using an original dataset on political arrests in the Soviet Union. We find that even if elections present no choice, they reduce the expression of anti-government sentiments.

Chapter 2: A Ballot Under the Sword: Political Security and the Quality of Elections in Autocracies. What explains the democratic quality of elections outside established democracies? We argue that when a government does not have to convince the opposition of its wide support in the society, it holds repressive elections.
Conversely, when a government needs to send a strong signal about its popularity, it takes a riskier strategy of holding more competitive, and hence more informative elections. Using cross-national panel data, we find that the incumbents facing political insecurity – measured through the incidence of economic crises and coup threats – tend to hold higher quality elections than their more secure counterparts. In addition, via structural equation modeling, we find evidence that economic crises affect the quality of elections only indirectly through increased political insecurity. These findings reject the conventional view that autocrats use electoral repression when they are afraid of losing due to low expected support. This analysis has important implications for modernization theory and for understanding the role of political and economic instability in the democratization process.

Chapter 3: The Calculus of Dissent: Rigged Elections, Information, and Post-Election Stability. Why do some elections result in concession speeches while others spiral into protests, riots, and conflicts? This paper draws attention to the informational content of the electoral process and its outcome. We argue that elections induce stability when they communicate that the winners are truly popular and derive several novel predictions as to when such communication can succeed or fail. First, unfair elections lead to instability only if they are won by slim margins. Second, excessively large victory margins increase instability irrespective of the unfairness of elections. The theory is then applied to explain the incidence of post-election protests across the world and the patterns of mandate denial in sub-Saharan Africa. We find that structural conditions (e.g., poverty and ethnic diversity) contribute little to post-election instability. Instead, the quality of elections and their results affect post-election politics in an interactive and non-linear fashion as predicted by the model.

Chapter 4: An Experimental Study of Fraudulent Elections and the Post-Election Protests. How can a winner of elections marred by fraud and voter intimidation
convince the loser that he has large support in the society? Using an experimental setting, this paper studies how the information about election results and the competitiveness of the electoral process affect citizens’ beliefs about the true popularity of the government and, subsequently, the success of a protest. We theoretically derive and evaluate the following hypotheses: (1) There will be no information update if elections are sufficiently manipulative and are won with great margins; (2) There will be positive updating in elections with medium levels of manipulation and high vote margin for the government; (3) There will be negative information updating if elections are highly manipulative but do not yield high margin for the government. We find relatively strong support for the first two hypotheses but none for the last one. The study also points to difficulties in studying rigged elections experimentally. The first difficulty has to do with the heterogeneity of the experimental population and the second one with the operationalization of electoral manipulation in a laboratory environment.
## Contents

Abstract iv  
List of Tables xi  
List of Figures xii  
Acknowledgements xiv  

Introduction 1  

1 Forcing Consent: Information and Power in Non-Democratic Elections 7  
1.1 Popular Support, Information, and Political Survival 12  
1.2 Model of Rigged Elections and Information 14  
1.3 Analysis and Results 19  
1.3.1 Elections and Belief-Transformation 19  
1.3.2 Equilibrium Repression 21  
1.4 Empirical Implications 23  
1.4.1 Explaining Stylized Facts 24  
1.4.2 Research Hypotheses 25  
1.5 Extensions: Fragmented Opposition and Fraud 27  
1.5.1 Fragmented Opposition 27  
1.5.2 Election Fraud 28  
1.5.3 Discussion 33  
1.6 Electoral Anesthesia in Single-party Elections 34
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6.1</td>
<td>Data on Anti-Regime Dissent</td>
<td>36</td>
</tr>
<tr>
<td>1.6.2</td>
<td>Theoretical Expectations</td>
<td>41</td>
</tr>
<tr>
<td>1.6.3</td>
<td>Statistical Model</td>
<td>43</td>
</tr>
<tr>
<td>1.6.4</td>
<td>Results</td>
<td>46</td>
</tr>
<tr>
<td>1.7</td>
<td>Discussion</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>A Ballot Under the Sword: Political Security and the Quality of Elections in Autocracies</td>
<td>51</td>
</tr>
<tr>
<td>2.1</td>
<td>Office Security and the Quality of Elections</td>
<td>54</td>
</tr>
<tr>
<td>2.2</td>
<td>Empirical Implications</td>
<td>58</td>
</tr>
<tr>
<td>2.3</td>
<td>Data and Model Specification</td>
<td>59</td>
</tr>
<tr>
<td>2.3.1</td>
<td>Measure of Electoral Repression</td>
<td>59</td>
</tr>
<tr>
<td>2.3.2</td>
<td>Measure of Economic Crisis</td>
<td>59</td>
</tr>
<tr>
<td>2.3.3</td>
<td>Coup History as a Measure of Coup Threat</td>
<td>60</td>
</tr>
<tr>
<td>2.3.4</td>
<td>Regime Type Conditionality</td>
<td>62</td>
</tr>
<tr>
<td>2.3.5</td>
<td>Control Variables</td>
<td>64</td>
</tr>
<tr>
<td>2.3.6</td>
<td>Statistical Model</td>
<td>65</td>
</tr>
<tr>
<td>2.4</td>
<td>Empirical Findings</td>
<td>67</td>
</tr>
<tr>
<td>2.5</td>
<td>Robustness to Alternative Measures</td>
<td>70</td>
</tr>
<tr>
<td>2.6</td>
<td>Causality and the Causal Mechanism</td>
<td>75</td>
</tr>
<tr>
<td>2.6.1</td>
<td>Causal Effects of Crises via Matching</td>
<td>75</td>
</tr>
<tr>
<td>2.6.2</td>
<td>Probing the Causal Mechanism</td>
<td>77</td>
</tr>
<tr>
<td>2.7</td>
<td>Discussion</td>
<td>82</td>
</tr>
<tr>
<td>3</td>
<td>The Calculus of Dissent: Rigged Elections, Information, and Post-Election Stability</td>
<td>84</td>
</tr>
<tr>
<td>3.1</td>
<td>Previous Literature</td>
<td>87</td>
</tr>
<tr>
<td>3.2</td>
<td>A Model of Post-Election Dissent</td>
<td>88</td>
</tr>
</tbody>
</table>
3.2.1 The Setting ........................................ 88
3.2.2 Analysis and Predictions ............................. 91
3.3 Empirical Evaluation .................................. 97
  3.3.1 Data for the Analysis of Post-election Protests .... 97
  3.3.2 Statistical Model ................................ 100
  3.3.3 Composite Hypotheses ............................ 101
  3.3.4 Explaining Post-Election Protest .................. 102
  3.3.5 Explaining Mandate Denial ........................ 106
3.4 Discussion ............................................. 110

4 An Experimental Study of Fraudulent Elections and the Post-Election Protest 113
  4.1 Theoretical Model ................................. 117
    4.1.1 Manipulation Model ............................ 118
    4.1.2 Belief-Updating ............................... 119
    4.1.3 Hypotheses .................................. 123
    4.1.4 Statistical Model ............................. 124
  4.2 Experimental Protocol ............................... 125
  4.3 Internal Validity of the Data ......................... 129
  4.4 Results .......................................... 132
  4.5 Discussion ........................................ 137

A Proofs for Chapter 1 141
B Measuring the Quality of Elections 147
C Proofs for Chapter 3 148
D Robustness of Empirical Results 151
  D.1 Alternative measures of electoral repression ........ 151

ix
D.2 Alternative Proxy for Retaliation Cost $\gamma$ . . . . . . . . . . . . . . . . 153

Bibliography 155

Biography 163
List of Tables

1.1 Predicting anti-state dissent as a function of distance to elections. . . 45
2.1 Electoral repression, risk, and information. . . . . . . . . . . . . . . . 56
2.2 Predicting levels of electoral repression: robust ordinal regressions (with Cauchy link function) and country-level random intercepts. . . 66
2.3 Predicting levels of electoral repression in the different subsets of data. 69
2.4 Ordinal regression estimates using alternative measures of election quality, democracy, and economic shocks. . . . . . . . . . . . . . . . . 74
2.5 Matching estimates of the causal effects of crises. . . . . . . . . . . . 76
2.6 Structural parameter estimates of the system in (2.3) - (2.4). . . . . . 80
3.1 Predicting post-election protests and riots. . . . . . . . . . . . . . . . 103
3.2 Predicting the losers’ reaction to election results in Sub-Saharan Africa.108
4.1 Elections and uncertainty. . . . . . . . . . . . . . . . . . . . . . . . . 114
4.2 The distribution of treatments in the experiment. . . . . . . . . . . . 128
B.1 NELDA variables used to construct a measure of electoral repression. 147
D.1 Political Terror scale as a proxy for retaliation cost. . . . . . . . . . . 154
List of Figures

1. Trends in unfree and unfair elections from 1946 to 2006. 3

1.1 Stages of the game. 18

1.2 Theoretical effect of successful elections: comparison of prior and posterior beliefs. 22

1.3 Autocrat’s expected popularity, $E(\theta)$, and equilibrium level repression. 25

1.4 Optimal levels of pre-election repression conditional on the fraud-detection probability. 31

1.5 Monthly number of anti-Soviet crime cases in the USSR. The red verticals are the times of elections to the Supreme Soviets. 38

1.6 Cross-validating the data on political arrests. 39

1.7 Asymmetric (solid line) and symmetric (pointed line) distance functions. 44

1.8 Predicted counts of arrests as a function of distance to elections. 47

1.9 Model comparisons when distance to elections is included and when it is ignored: in-sample predicted values. 48

2.1 Incidence and quality of elections across Polity IV categories in non-OCED countries, 1946-2006. 53

2.2 Coup history and coup incidence in Haiti. 60

2.3 Sensitivity of model results to alternative measures of electoral repression. 72

2.4 Marginal effects of crises and coup threats for different Polity IV scores. 73

2.5 Theoretical mechanism of the crisis effect on electoral repression. 77

2.6 Comparing the indirect and direct effects of crises. 81
3.1 The structure of the informational model of elections. . . . . . . . . . . 91

3.2 Posterior probability that the incumbent is unpopular as a function
of \( r \), the signal of electoral bias, and \( v \), the election result. . . . . . . 93

3.3 Probability that the incumbent is supported by less than a majority
of citizens as a function of election result, \( v \). . . . . . . . . . . . . . . 94

3.4 Predicted probability of a post-election protest or riot as a function
of electoral repression. . . . . . . . . . . . . . . . . . . . . . . . . . . 104

3.5 Predicted probabilities of post-election protest as a function of the
winner’s vote-share. . . . . . . . . . . . . . . . . . . . . . . . . . . . . 105

4.1 Prior beliefs, prior risks, and posterior beliefs. . . . . . . . . . . . . . 120

4.2 A slide from the experiment. . . . . . . . . . . . . . . . . . . . . . . . 125

4.3 Internal validation of the experimental data I. . . . . . . . . . . . . . 130

4.4 Internal validation of the experimental data II. . . . . . . . . . . . . . 131

4.5 The difference between the posterior and prior probability that the
government is more popular than the opposition. . . . . . . . . . . . . . 133

4.6 Changes in the protest propensity depending on the treatment \((v, m)\). 134

4.7 Probability of switching from protest a priori to non-protest a poste-
riori given information \((v, m)\) with the semantic definition of manipu-
lation. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 136

D.1 Results of sensitivity analysis. . . . . . . . . . . . . . . . . . . . . . . 152
Acknowledgements

For numerous discussions, comments, criticisms and suggestions, I am grateful to my dissertation committee – Herbert Kitschelt (chair), Bahar Leventoglu, Emerson Niou, Karen Remmer, and David Soskice. I have also benefited from the discussions with other faculty members and colleagues at Duke University, especially John Aldrich, Pablo Beramendi, Geoffrey Brennan, Florian Hollenbach, Haifeng Huang, Justin Valasek, Anoop Sadanandan, Erik Wibbels, and Sean Zeigler. A number of people at other institutions gave me insightful comments and criticisms during various conferences and seminars: Alexandre Debbs, Kanchan Chandra, Eric Chang, Jon Eguia, Mark Fey, Barbara Geddes, Hein Goemans, Ellen Immergut, Torben Iversen, Patrick Kuhn, Dimitri Landa, Andrew Little, Nikolay Marinov, Patrick Kuhn, Jean-Laurent Rosenthal, Milan Svolik, Shanker Satyanath, and Daniel Treisman. I am also grateful to Vladimir Gel’man for being a great host while I was visiting at the European University at Saint Petersburg in the winter of 2011. Dilorom Ahmedzhanova and Laura Narijauskaite provided excellent research assistance. Last but not least, I would like to thank Rebecca Anthopolos for helping me immensely with this project in all possible regards. The usual disclaimer applies. This research was in part supported by the National Science Foundation Dissertation Improvement Grant, research grants from the Institute for Democracy, Institutions, and Political Economy (DIPE), PARISS Research Fellowship, as well as Summer Research Grants from the Graduate School at Duke University.
Introduction

In 1856, the French Emperor Napoleon III received a letter from his minister of interior Adolphe Billaut stressing the gravity of the forthcoming parliamentary elections. “It is necessary at all costs that people should not be able to say either in France or in Europe, that the imperial government has lost its ground with the masses”, wrote the minister (Zeldin, 1958, p. 69). Napoleon III – the first elected president of France who became its second Emperor after the coup d’etat against the parliament 1952 – did not require the popular mandate to rule. Nonetheless, he took the forthcoming elections very seriously.

The minister recommended a crude strategy to assure the ultimate victory for the Emperor’s supporters: “The government cannot alone remain dumb and indifferent. It will tell the country which men have its confidence. You will give them your patronage openly and you will fight without hesitation all candidatures” (Zeldin, 1958, p. 69). Clientelism, bribery, patronage, intimidation of the opponents, restrictions on political campaigning, and censorship of the press were the defining features of elections in the Second French Empire (Price, 2001, p. 95-134).

Napoleon III established the first modern regime which combined autocratic governance with seemingly democratic institutions. The essential democratic institutions – elections, plebiscites, political parties, and the Parliament – existed but they did not have the proper democratic content. Elections were not free and not fair whereas the Parliament was largely powerless. Yet, the arrangement turned out to
be a highly durable one: no other leader in the post-revolutionary France, including his prominent uncle Napoleon Bonaparte, survived as long in his office as did Napoleon III.

It would be farfetched to presume that the nominal democratic institutions were the reason behind the relatively lengthy survival of the Second French Empire.  

Yet, this fact seems remarkable in the wider context: an extensive line of research suggests a perplexing correlation between the survival of autocratic leaders and the existence of nominally democratic institutions (Blaydes, 2010; Geddes, 2006; Cox, 2009; Lust-Okar, 2006; Magaloni, 2006; Svolik, N.d.).

How can elections prolong the survival of political leaders? The answer to this question depends on the type of elections one has in mind. If one has in mind competitive elections, then the mechanism relating political survival and the electoral institutions is rather clear: by providing an alternative route to power, leaders avoid being removed from office by violence. Such ‘safe exit’ explanation is the crux of the present day literature on elections in non-democratic regimes (Magaloni, 2006; Cox, 2009). This explanation would suffice if all elections were competitive, but it fails to hold ground in unfree and unfair elections – many elections in the world do not provide a safe exit path because they do not give opposition any reasonable chance of winning.

Figure 1 shows the dynamics of unfree and unfair elections: they have been and remain relatively common. How can elections that are not free and not fair (and in the limit are not competitive) prolong leadership survival? This key puzzle is evident in the aforementioned letter by Billaut: On the one hand, the government intends to employ elections to show that it has not “lost ground with the masses.” On the other hand, the government does not allow free and fair political competition that

---

1 Successful large-scale infrastructure projects and victorious military campaigns were perhaps the most essential for the regime’s longevity (Price, 2001).
would reveal how much real support the government actually has. It is not evident how unfree and unfair elections can demonstrate wide support for the government. Solving this puzzle is the key problem I tackle in this dissertation.

A theory proposed and defended in this dissertation relies on an intuitive premise: elections can reveal and communicate important information about the popular support for the incumbent leadership. I am by no means the first one to have this insight (Barkan and Okumu, 1978; Geddes, 2006; Magaloni, 2006; Pepinsky, 2007; Sonin and Egorov, 2011). However, an insight does not constitute a theory. To become a theory, an insight needs to be developed into a set of logically consistent propositions that attempt to explain as large a set of empirical phenomena as possible. It also needs to specify a mechanism that consistently explains how, in this instance, elections can reveal and communicate the popularity of the incumbent even if they are not free and not fair.

The existing theories of elections fail to provide such a mechanism. For example,
Magaloni (p. 9 2006) writes that during the PRI rule in Mexico, “high turnout and huge margins of victory signaled to elites that the ruling party’s electoral machine was unbeatable because citizens supported the regime.” This argument, unfortunately, lacks the most crucial link: how can an excellent electoral performance convince citizens of a party’s popular strength if it is common knowledge that the elections were not free and fair? Moreover, under what conditions would elections show that the ruling party has popular support and under what conditions would they fail to do so? These questions pertain to the theoretical mechanism that links the unfree and unfair electoral process with the information generated by the election outcome. This dissertation presents a candidate for such mechanism.

A theory that explains a single phenomenon is not a strong theory. A strong theory should not only answer the question ‘Why do leaders hold elections that have no credibility?’ A strong theory should also explain many other phenomena surrounding elections under authoritarianism: If elections prolong the survival of a regime, why do some autocrats abstain from holding elections? Why are some elections extremely repressive while others are reasonably free? When will losers of elections reject the result and go out on the streets to protest? Why do some leaders use only observable technologies to manipulate election results (imprisonment of opponents, restrictions on assembly rights, etc.) while others resort to fraud? When do the opponents of a regime unite in an electoral battle against an autocratic incumbent and when do they fail to do so? When do unfair elections lead to post-election protests?

I contend that the informational theory of elections developed in this dissertation provides answers to these questions. I also contend that the alternative theories of elections under authoritarianism provide answers to only some of these questions. For instance, the theory that autocrats hold elections in order to have an opportunity for the clientelistic distribution of goods (Blaydes, 2010; Lust-Okar, 2006) provides
an explanation of why autocrats might hold elections but the theory does not say anything about other important characteristics of these elections.

Another theory argues that elections can co-opt political opponents by providing them with access to legislative institutions (Gandhi and Przeworski, 2007). However, this theory suffers from another flaw: since its argument applies only to institutions where power can be shared (e.g., legislatures), it must presume that those institutions carry significant value. However, legislative institutions in many autocratic states are often powerless, whereas the office of the president has great powers but cannot be shared.

Similarly, another theory suggests that elections allow to identify the regime’s true opponents (Schmitter, 1978). This is an intuitive and appealing explanation of why elections occur, but it suffers from an important inconsistency: If elections are held to identify opponents, why are so many opponents threatened before they even appear on a political stage? In other words, why do we observe repressive elections that make it costly for the opponents to identify themselves? In short, a theory of non-democratic elections has to provide an explanation not merely for the existence of elections but for the existence of unfree and unfair elections.

The dissertation consists of four independent chapters. In Chapter 1 titled “Forced Consent: Information and Power in Non-Democratic Elections”, I present the main theoretical argument on the informational role of unfree and unfair elections. Here, I pose the following questions: How can elections that are openly unfree and unfair produce political stability for incumbent leaders? I argue that under certain conditions, elections can communicate to the public that the incumbent is popular with sufficiently high probability to deter opposition from revolting. In this chapter, I also use original data on political arrests in the Soviet Union to argue that even single-party elections add to social and political stability by reducing expressions of public dissent against the government.
In Chapter 2, titled “A Ballot Under the Sword: Political Security and the Quality of Elections in Autocracies”, I use cross-national data to test one key empirical implication derived from the model in Chapter 1. Here, I argue that insecure autocrats hold elections with greater democratic quality than autocrats who are secure about their office. This chapter presents evidence against the common view that autocrats do not have an incentive to repress the opposition and manipulate elections if they are confident about their wide popular support (e.g., Geddes, 2006; Magaloni, 2006).

In Chapter 3, I focus on outcomes of the electoral process. Here, I study how post-election political stability is affected by the quality of elections and their outcome. I extend the theoretical model of Chapter 1 to account for uncertainty about the degree of electoral manipulation and specify a set of conditions where the communicative function of elections increases political stability in the aftermath of elections and when it fails to do so. Using two cross-national datasets on post-election protest and mandate denial, I show that that the informational theory of elections generates strong predictions about political instability.

Finally in Chapter 4, I present results of a laboratory experiment where I study how information transmitted in elections affects people’s beliefs about the true popularity of the government. Though the results of the experiment are not conclusive, they lend partial support to the core idea developed in this dissertation; namely, that even openly rigged elections, under some conditions, can increase the perceived popularity of the incumbent government.

Although the four chapters of the dissertation are independent, there is a set of common arguments uniting all of them. As a result, some repetitions across the chapters are unavoidable.
“Only God who appointed me will remove me”, claimed the Zimbabwean President Robert Mugabe before the run-off presidential election in 2008. After a campaign marked by violence and intimidation, Mugabe won the election with 85 percent of the vote. This is but one example of the old, widespread, and yet puzzling phenomenon of unfree and unfair elections where the public is given a right to elect their leaders, but the outcome is largely forced upon them. What is the value of non-democratic elections to political leaders? Why do some leaders hold elections that are perceived as a sham while others avoid them altogether? What explains variation in competition levels across non-democratic elections?

Existing literature has largely focused on the reasons as to why autocrats choose to hold elections. One common explanation is that elections ‘legitimize’ the regime by creating a facade of democracy and making the public believe that the autocrat has a popular mandate (Barkan and Okumu, 1978; Magaloni, 2006; Schedler, 2006; Pepinsky, 2007). Unfortunately, this line of research has not suggested a mechanism to explain how the facade of democracy can be effective if everyone knows it is a
Other theories focus on the usefulness of elections in maintaining elite-cohesiveness (Geddes, 2006; Magaloni, 2006), co-opting the opposition (Gandhi and Przeworski, 2007), or distributing patronage (Blaydes, 2010; Lust-Okar, 2006). These theories serve well in explaining the reasons for non-democratic parliamentary elections, where the spoils of the office can be shared. However, in presidential elections, where political power is rarely divisible and where few elite members can expect political gains, these theories are inadequate (Gandhi and Lust-Okar, 2009, p. 407).

Further, by focusing mostly on the usefulness of elections, the above studies fail to address why some autocrats abstain from holding elections. Geddes (2006, 28) estimates that about 26 percent of non-democratic regimes avoid direct national elections. Why do some leaders insist “I will die, my successor will die but there will never be elections again!”3, while others hold elections that are discounted as sham? To account for this variation, not only the benefits but also the costs of elections must be considered. The fact that elections can facilitate protests and destabilize the status quo (Fearon, 2011; Kuzio, 2005; Tucker, 2007) has had little recognition in the theories on the incidence of elections. Such recognition is necessary if we want to understand not only the presence but also the absence of elections.

This paper proposes a theory that focuses on the informational role of non-democratic elections. We propose a mechanism explaining how evidently unfree and unfair elections can change public perceptions about the autocrat’s popularity, and thereby deter threats to his rule. Thus, our model makes the following contributions: First, it shows how even evidently rigged elections can induce political stability. This way, we address the main deficiency of the ‘legitimacy’ theories of non-democratic

---

1 On the same point, see Cox (2009, p. 5), Schmitter (1978, p. 149), Bueno de Mesquita et al. (2003, p. 6), and Lust-Okar (2006, p. 460).

2 For the same reasons, these theories cannot be used to analyze non-democratic referenda.

3 Augusto Pinochet of Chile, quoted in Munoz (2008, p. 66).
elections. Second, it specifies the conditions under which elections fail to achieve stability and instead facilitate revolts and uprisings against the government, thereby addressing both the occurrence and the absence of non-democratic elections. Third, our model proposes a rationale for both parliamentary and presidential elections (as well as referendums). Fourth, it provides predictions for a wide set of phenomena pertinent to elections under authoritarianism.

The latter contribution is perhaps the most important one. While there are many theories that suggest various reasons for non-democratic elections, they fall short of providing a unified framework within which non-democratic elections can be studied. A theory of non-democratic elections should not only provide a reason as to why such elections are held but also give an explanation for other phenomena that are of interest for students of such elections: What explains the variation in repression levels used in such elections? When can one expect a stable political environment in the aftermath of non-democratic elections? How can one explain the variation in electoral fraud technology? Building up from a set of simple and reasonable assumptions, we develop a model that generates hypotheses for each of these questions.

The informational perspective on non-democratic elections has been adopted in some previous studies, and it is important to emphasize the difference between these accounts and the one presented in this paper. In his influential account of elections under authoritarianism, Cox (2009) argued that election campaigns allow autocrats and their opponents to acquire information about each other’s capacity to mobilize and thereby avoid costly conflicts.

There are two key difference between this account and ours. First, the above model ignores election results by assuming that they cannot be credible by definition. This approach assumes away one of the key problems appearing in non-democratic elections: what can the results of rigged elections tell us about the true popularity
of the elected party? Instead of assuming that election results are *never* credible, we model their credibility explicitly. We specify how electoral repression affects the outcome of elections and, in turn, how the credibility of election results is judged in light of the information about the levels of electoral repression. This approach allows us to generate empirical predictions about the post-election political stability conditional on election results, which cannot be done in the framework by Cox (2009).

The second difference is that we focus not on information *acquisition* but on *communication*. The argument that focuses on information acquisition is well suited to provide an answer to the question ‘Why do autocrats hold elections they can lose?’ The explanation is as follows: by providing information about the opposition’s capacity to mobilize, elections provide a safe exit path to the leaders who would otherwise face the threat of violent removal. For unpopular leaders it is better to lose elections and step down than to be removed violently from office. However, this account does not provide any answer to another equally important question: ‘Why do autocrats hold elections they cannot lose?’ If elections cannot be lost, they also cannot provide a safe exit path. This is an important shortcoming of the theory because it cannot explain a large class of non-democratic elections.

In contrast, our communicative model of elections accommodates both competitive and non-competitive elections. We argue that non-democratic elections not only provide a safe exit path but that they also *deter* violent challenges, thus removing the need for a safe exit path altogether. To lend support to the communicative model of elections, in the first empirical section of the paper, we employ original data on single-party elections in the Soviet Union. We show that the patterns we observe in the data are compatible with the communicative model but they cannot be accounted for in the alternative framework that focuses on information acquisition and a safe exit path.

Another set of models emphasizes the communicative role of elections. For in-
stance, in her seminal paper, Geddes (2006) argued that non-democratic elections deter threats from the opposition by signaling the incumbent’s popularity and resourcefulness (cf. Magaloni, 2006). This argument is conceptually identical to the ‘legitimization’ theories of non-democratic elections (Barkan and Okumu, 1978; Schedler, 2006; Pepinsky, 2007).

Our model employs a similar intuition, but there are crucial differences. Instead of simply assuming that non-democratic elections send a signal that the government is popular and resourceful, we explain the strategic intuition as to why the public accepts election results even if it knows them to be distorted. We also specify conditions under which elections fail to achieve the goal posited by the theory. Therefore, we are able to generate some theoretical predictions that diverge from the existing accounts of non-democratic elections. Most importantly, our theory predicts that autocrats with high public support are expected to hold more repressive elections than autocrats with low public support. This prediction is in stark difference with the suggestion that leaders resort to restricting political competition when they are not confident in winning free and fair elections (Geddes, 2006, p. 7).

The nature of non-democratic elections is important not only for explaining how autocracies work, but it is also essential for understanding the dynamics of democratization. Democratization models assume that elections induce governments to follow the interest of a majority. For instance, the poor desire democracy because it is expected to lead to wealth redistribution (Acemoglu and Robinson, 2006). However, opposition intimidation, franchise manipulation, and patronage may result in a leadership that does not represent the preferences of the majority. Those who threaten autocracy because they believe in the redistributive nature of democracy should not be expected to settle for unfree and unfair elections resulting in representatives who do not redistribute. Yet, often democratization efforts lead to rigged electoral systems that survive for quite some time.
Consider, for example, czarist Russia around the 1905 Revolution. In response to frequent popular uprisings, Nicholas II appeased the public by introducing an elected legislature, the Duma (Acemoglu and Robinson, 2006, 140-2). However, soon thereafter the electoral process became so tightly controlled that few believed it had any substance ((Carson, 1955, p. 1-8); (Pipes, 1974, p. 114)). The rigged electoral system did not solve all the problems of the Czar but it did, for more than a decade, delay further revolutionary threats. If the dissenters rebelled in order to institute elections, why would they be appeased by rigged elections? There are multiple examples in history where non-democratic elections have had such an ‘anesthetic effect’ (Schmitter, 1978) on a regime’s opponents.

This paper proposes a mechanism explaining this anesthetic effect. We proceed as follows: First, we briefly explain our focus on the informational nature of elections. Second, we present a formal model of non-democratic elections. Third, we apply the model to explain some stylized facts about non-democratic elections and to derive new research hypotheses. Fourth, we consider an extension of the model to account for a fragmented opposition and post-election fraud. Finally, in the empirical section of this paper we use original dataset on single-party elections and argue that even such blatantly uncompetitive elections might foster political stability.

1.1 Popular Support, Information, and Political Survival

Our model builds upon the observation that autocrats, even brutal ones, care about their popularity (Arendt, 1963; Finer, 1988; Wintrobe, 1998). In particular, we maintain the assumption that an autocrat who faces an attempt to overthrow him is more likely to survive in the office when he is popular. This implies that in order to remain unchallenged, an autocrat must maintain a public *belief* that he is sufficiently popular. Importantly, whether such belief is factually correct matters only if the challenge does actually occur.
How does the image of popularity add to the autocrat’s survival? First, leaders who rule without a modicum of consent are more likely to face attempts of removal. As noted by Finer (1988, p. 15), “the claim to rule by virtue of superior force invites challenge.” Second, the autocrat’s opponents will be more inclined to express their dissent if they believe they are in a majority (Kuran, 1995). Thus, the opposition will organize more easily if it believes that the autocrat has a narrow base of support. This applies not only to the civilian opposition but also to the military class. According to Linz (1978, 17), “it seems unlikely that military leaders would turn their arms against the government unless they felt that a significant segment of society shared their lack of belief”.

A potential difficulty with the above arguments is that the major threat to most leaders, especially in military regimes, comes in the form of a coup, not a popular uprising (Tullock, 1987, p.10). Why would popular support aid leaders who face a coup threat? First, a wide support base for an incumbent may suggest high costs of removal if, for example, a removal attempt leads into a civil conflict. A coup can be conducted by a handful of men in uniform but it can fail or escalate into war if strongly opposed by the civilian population. Second, leaders who are uncertain about the continuing support of military forces may attempt to widen their popular support base in order to deter coups. General Ziar Rahman of Bangladesh is a an example of a leader who adopted this strategy (Masoom, 2000, p. 233). Lastly, removing a popular leader is less attractive because the successor will be less popular and hence more likely to be challenged (Geddes, 2006, p.4).

The above arguments point to the importance of beliefs about the autocrat’s support base. By definition, autocracies restrict free expression of opinion and thus

---

4 The Spanish Civil War is a paradigmatic case of how a coup attempt escalated into civil war (see Beevor, 2006, Part 2). Knapp Putsch in Germany (1920), February Mutiny in Japan (1936), and the April Rebellion in France (1961) are a few examples of coups that failed due to civilian opposition (Lichbach, 1995, p. 81).
make it difficult for anyone to learn citizens’ true political loyalties. Opinion surveys can be highly unreliable since respondents are prone to misrepresent their preferences (Kuran, 1995). News harmful to a leader may be risky to report; hence, even the secret police cannot be completely relied upon in finding out the population’s political preferences (Wintrobe, 1998, p. 25). For these reasons, we maintain the assumption that neither the autocrat nor his challengers know the autocrat’s true popularity.

Information scarcity is not the only problem facing autocratic leaders and their opponents. An autocrat’s rule is more stable not when he himself knows that he has wide support, but when his opponents believe him to be widely supported. Thus, the key problem we emphasize is that of communication, not learning. Suppose an autocrat knows that he is popular. In order to deter challenges to his rule, he must make this information public. But how can he credibly communicate this information without free media and fair elections? Paradoxically, in order to communicate his popularity to potential challengers, an autocrat may behave like a democrat. However, as we show below, under certain circumstances, the best choice for an autocrat is to call unfree and unfair elections that reveal and communicate only partially credible information.

1.2 Model of Rigged Elections and Information

Consider an autocratic leader $A$ facing a challenger $B$ who might be either a member of the opposition or a member of the ruling coalition. Each player receives a payoff equal to 1 if he is in power and 0 otherwise. Power can be acquired either peacefully or through a conflict. Peaceful acquisition of power is costless both for the party that exits the office and the party that enters the office. In contrast, if power is acquired through a conflict, it incurs a deadweight cost of $c > 0$ on both of the parties.\footnote{One could assume that the costs are different for $A$ and $B$, but this would not change the substantive results.} For
example, if $B$ rebels and $A$ concedes, then $B$’s utility is $u_B = 1$; however, if $A$ fights, then $u_B = 1 - c$ if $B$ wins and $u_B = -c$ if $B$ loses.

Suppose the society consists of $n$ individuals of two different types: if $s_i = 1$, then citizen $i$ supports $A$; otherwise, if $s_i = 0$, the citizen $i$ supports the challenger $B$. The reasons for which citizens support the autocratic government on its opposition are immaterial to our analysis. Let $\theta = \frac{1}{n} \sum_i s_i$ denote the share of the population that supports $A$ (hence, $1 - \theta$ is $B$’s popularity). We assume that $A$ wins in a conflict against $B$ if and only if $\theta \geq w$. Here, $w$ represents the weakness (e.g., military or repressive) of the autocratic state. If the state is weak ($w$ is high), then the $B$ can win even if $A$ is moderately popular. Conversely, if the state is strong ($w$ is low), $B$ can overthrow $A$ only if $A$ is overwhelmingly unpopular. To be successfully overthrown, the government must be weak and unpopular.

We assume that the autocrat’s popular support, $\theta$, is known only imperfectly: both players have common prior beliefs about $\theta$, represented by a probability distribution $F$ with support on $[a, b]$, where $a < w < b$. Accordingly, popular support for $A$ is known to be at least $a$, and the popular support for $B$ is known to be at least $1 - b$. Sometimes we refer to citizens who are known to support the opposition (their share in society is $1 - b$) as the ‘core opponents’.

Let $\pi$ denote a prior probability that $A$ would lose if challenged by $B$: $\pi = \Pr(\theta < w) = \int_a^w dF(\theta)$. Note that if $A$ is perceived to be sufficiently unpopular ($c < \pi$) then $B$ prefers to challenge him: probability of winning against $A$ outweighs the costs. Whether the challenge results in a conflict depends on the magnitude of $A$’s perceived unpopularity. If $\pi > 1 - c$, then $A$ is better-off relinquishing his power and avoiding a costly conflict. However, if $\pi \in (c, 1 - c)$, then both parties strictly prefer conflict to a peaceful resolution. We refer to the interval $(c, 1 - c)$ as the ‘conflict range’ and assume that this range is non-empty ($c < 1/2$). Note that, contrary to the framework by Fearon (1995), the inefficient conflict is not driven by informational asymmetry.
Further, suppose the autocrat can call elections and reveal some new information about his true popularity, $\theta$. Specifically, we are interested in elections where the autocrat can use pre-election repression, denoted by $r$. Intentionally, we define ‘repression’ somewhat broadly as a set of observable actions that inhibit electoral competition to the autocrat’s advantage - intimidation or bribery of voters, prohibition or ‘elimination’ of popular opposition candidates, restrictions on assembly rights that impede the opposition’s mobilization, or media bias. This concept of repression is similar to that of Wintrobe (1998, p. 33) and the concept of ‘authoritarian manipulation’ by Schedler (2006, p. 3). Importantly, repression refers to the autocrat’s observable activities before votes are counted, and therefore it does not include post-election fraud. Later, we extend the model to allow post-election cheating.

The election result will naturally depend on the autocrat’s true popularity and the degree and effectiveness of repression. We use the following model of voting:

\[
\begin{align*}
\Pr(y_i = 1|s_i = 1) &= 1 \quad (1.1) \\
\Pr(y_i = 1|s_i = 0) &= r \quad (1.2)
\end{align*}
\]

Every citizen who supports the government, votes for the government. However, every opponent votes for the government only with probability $r$, which denotes the degree of repression used in elections. The greater is repression, the more it is likely that every opponent will vote (or will be forced to vote) for the incumbent. Note that this is very general representation of many practices used in non-democratic elections: $r$ could represent voter intimidation, bribery, or disenfranchisement of the opposition groups.

However, if the opposition is well-organized to counteract the repression, or if the repressive system is not sufficiently efficient, there will be some critical amount of votes that the opposition will receive regardless of how much the autocrat chooses to
repress. Formally, let \( z \) be the maximum number of votes the autocrat can receive from the set of known opponents. Then, for any repression level, the vote-share of \( A \) cannot exceed the upper bound \( \overline{y} = \overline{y}(z) = b + z(1 - b) \). For example, if \( z \) is close to 1 (the opposition is badly organized or repression is highly efficient), then the maximum percentage of votes the autocrat can receive is close to 100 percent.\(^6\)

It turns out that, in large electorates, the autocrat’s vote-share in elections can be represented by a simple vote-share production function, substantially simplifying the further analysis.

**Lemma 1.** In large electorates, the autocrat’s vote-share, given the true support level \( \theta \) and repression \( r \), is given by \( y(\theta, r, z) \equiv \min\{\theta + r(1 - \theta), \overline{y}\} \).

All proofs are in the Appendix.

Thus, few very reasonable assumptions about voting in non-democratic elections lead to a tractable function for the autocrat’s vote-share: when elections are free and fair (\( r = 0 \)) the autocrat’s vote-share is equal to his true popular support (\( y = \theta \)). Otherwise, if elections are not free and fair (\( r > 0 \)), the autocrat’s vote-share becomes biased to the autocrat’s favor. Note that since the autocrat’s popularity (\( \theta \)) is unknown, election result is uncertain, unless \( r = 1 \), in which case elections are completely unfair and hence completely predictable.

The election result, \( y \), and repression levels, \( r \), are used to update the players’ beliefs about the autocrat’s popularity, \( \theta \). We let \( f(\theta|y, r) \) denote the posterior beliefs. This model emphasizes a trade-off between risks and benefits of pre-election repression. On the one hand, the greater the repression the less risky is the outcome of elections – as \( r \) increases so does the probability that the autocrat wins with a larger margin (\( y = \overline{y} \)) irrespective of his true popularity, \( \theta \). On the other hand, the higher is repression, the less informative are the elections. Intuitively, if all voters are

\[^6\] A more realistic model could assume that \( z \) (and, therefore, \( \overline{y} \)) is also a random variable. We conjecture that this additional complexity would not change the qualitative results.
A chooses \( r \); \( r \) and \( z \) observed

\begin{tabular}{|c|c|c|}
\hline
Conflict or\hline
settlement\hline
y(\( \theta, r, z \))\hline
observed\hline
Conflict or\hline
settlement\hline
1 \hline
2 \hline
3 \hline
4 \hline
\end{tabular}

\textbf{Figure 1.1:} Stages of the game. At stages 1 and 2 players’ information is given by \( f(\theta) \). At stage 4, players’ information is given by \( f(\theta | y, r) \).

intimidated into voting for the autocrat, then the election result will not provide any new information – a forced vote does not indicate political loyalty. Mathematically, it can be easily demonstrated that as repression increases \( (r \to 1) \), the posterior beliefs approach the prior beliefs, \( f(\theta | y, r) \to f(\theta) \). Conversely, as elections become more free and fair (and hence riskier), the autocrat’s true popularity can be learned with increasingly high precision. Formally, \( f(\theta | y, r) \) converges to a degenerate distribution \( I(\theta) \) as \( r \to 1 \). The main objective of the autocrat is to repress at such a level that elections are sufficiently informative but not too risky.

The structure of the game is given in Figure 3.1. At Stage 1, \( A \) decides between having no elections \( (r = \emptyset) \) and having elections with repression level \( r \geq 0 \). The choice of \( r \) is observed by the opposition\(^7\). At Stage 2, \( B \) decides between not rebelling, \( R(r) = 0 \), and rebelling, \( R(r) = 1 \). If \( B \) rebels, \( A \) can respond by either fighting or concession. A history where \( B \) rebels and \( A \) fights is called a ‘conflict’; any other history is called a ‘settlement’. If either \( r = \emptyset \) or \( R(r) = 1 \), then the game is terminated at Stage 2; otherwise, at Stage 3, the election result is announced. At Stage 4, \( B \) again chooses \( R(y, r) = \{0, 1\} \) and \( A \) responds by fighting or conceding.

The model does not assume that the loser must concede to the winner of elections. For instance, suppose winning elections requires a simple majority of votes. The

\(^7\) The assumption of observable repression is largely immaterial: since players have the same information sets at the start of the game, \( B \) can perfectly infer \( A \)’s action whenever \( A \) has a unique best response, which is mostly the case in this game.
autocrat who is able to withstand a rebellion even if he is highly unpopular ($w$ is low) will have an incentive to disregard elections even if they clearly indicate that the incumbent’s true support is less than a simple majority (e.g., Burma in 1990 or Ivory Coast in 2000). The frequency of such ‘stolen’ elections (Thompson and Kuntz, 2006) suggests that what is important is not the formal margin (i.e., a majority) but the ‘effective margin’ that deters the losing party from questioning the voting outcome.

There are a few potentially important features not incorporated explicitly in this model. First, the opposition parties may boycott uncompetitive elections (Beaulieu and Hyde, 2009; Lindberg, 2006). We conjecture that the opposition’s decision whether to rebel after elections are announced but before votes are counted (Stage 2) is in many ways equivalent to a boycott. Second, we assume that the autocrat faces a united opposition – an assumption frequently violated in reality. Later, we extend the model to accommodate a fragmented opposition.

1.3 Analysis and Results

1.3.1 Elections and Belief-Transformation

Let $\pi(y, r) = \Pr(\theta < w|y, r)$ be the updated probability that the autocrat is sufficiently unpopular. To derive $\pi(y, r)$, we need to distinguish two cases. When $y < \bar{y}$, the posterior distribution is degenerate and $\theta$ can be inferred exactly from election results $y$ and repression level $r$. However, if $y = \bar{y}$, then $\theta$ can only be learned imperfectly. For notational convenience, define a function $\eta(x, y) \equiv \frac{x - y}{1 - y}$. The probability that the autocrat is unpopular after elections that yielded him at least $\bar{y}$ votes is given by

$$\tau(r) = \pi(y = \bar{y}, r) = \int_{\max\{a, \eta(\bar{y}, r)\}}^{\max\{w, \eta(\bar{y}, r)\}} f(\theta|y = \bar{y}, r)d\theta. \quad (1.3)$$

In words, $\tau(r)$ is the probability that the autocrat is unpopular given that he
repressed at level $r$ and the election result is $y = \overline{y}$. Note that for $r \leq \eta(\overline{y}, w)$, $\tau(r)$ is identically zero. The Lemma below states that under certain conditions, elections can transform public beliefs about the popularity of the autocrat only to the advantage of the autocrat.

**Lemma 2.** If $r < \eta(\overline{y}, a)$ and $y = \overline{y}$, then $f(\theta|y, r) = f(\theta|\theta \geq \eta(\overline{y}, r))$ and $\tau(r) < \pi$.

The results may not be intuitive. First, after an election delivers a high vote-share to the autocrat, the updated belief distribution is more ‘favorable’ to the autocrat than it was before the election. That is, the posterior distribution will be equal to the prior distribution truncated from the left: before the election it is believed that the share of the autocrat’s supporters is at least $a$ and after the election it is believed that this share is at least $\eta(\overline{y}, r)$, which is greater than $a$. Second, if repression is not excessive, the posterior (post-election) probability that the government is unpopular is always smaller than the prior (pre-election) probability.

We call this mechanism of belief-transformation a ‘forced consent’. Elections can create public consent to the incumbent’s rule by signaling that he is popular and therefore any attempt to remove him is less likely to succeed. However, rigged elections provide only partial information about the autocrat’s true popularity; thus, they do not permit learning whether the autocrat is truly popular or not. It is possible that the autocrat is in reality unpopular, $\theta < w$, but the information after rigged elections leads everyone to believe that he is popular with a sufficiently high probability. In this sense, the consent resulting from rigged elections is ‘forced’: by repressing, the autocrat does not allow some of the dissenting voices to speak out. By contrast, free and fair elections result in perfect information, which precludes any discrepancy between the true state of the world and public beliefs and hence makes the consent not forced but a ‘natural’ one.
1.3.2 Equilibrium Repression

The autocrat is facing the following trade-off: when too much repression is used, elections lose informational content and thus they cannot transform the beliefs; if too little repression is used, then elections are informative but risky. How much is a rational autocrat expected to repress the electoral competition?

**Proposition 1.** Let \( \pi \in (c, 1-c) \). There is a unique equilibrium such that

\[
 r^* = \tau^{-1}(c) = \frac{\bar{y} - K}{1 - K}, \quad \text{where} \quad K = F^{-1}\left(\frac{\pi - c}{1 - c}\right). 
\]

If the autocrat is facing risk of conflict \( (\pi \in (c, 1-c)) \), then his optimal action is to hold elections and repress at such level that makes the opposition indifferent between rebelling and not rebelling whenever the autocrat wins a sufficiently high vote-share, \( y = \bar{y} \). In the proof of this proposition, we also demonstrate that given this strategy of the autocrat, the optimal strategy for the opposition is to postpone the decision to rebel to the post-election period, \( R^*(r^*) = 0 \). Moreover, since elections may inform the competing parties of their relative popularity, conflict in the presence of elections is less likely than in their absence. Thus, by providing additional information, elections can help autocrats to avoid a costly exit from power (cf. Cox, 2009).

However, reducing the risk of a costly exit from power is not the only, and indeed not the main, value of non-democratic elections deduced from this model. In addition to providing such an exit, unfree and unfair elections allow some of the less popular autocrats – who would certainly lose against the opposition – to remain in power unchallenged. By revealing only partial information about true popularity, rigged elections allow moderately unpopular \textit{ex ante} types of autocrats to ‘mix’ with popular \textit{ex ante} types.
Figure 1.2: Beliefs about regime popularity, $\theta$, before and after elections where $A$ received $\bar{y}$ votes. The dark red area is the ex post value added of elections with result $\bar{y}$ and repression $r$.

Figure 1.2 is useful in explaining this intuition. Before elections are held, $A$ can expect to win either in conflict or in free and fair elections only if $\theta \geq w$. In equilibrium, $A$ must repress at such a level that if the opposition observes the result $y = \bar{y}$, then it must believe that $A$ is unpopular with a probability of at most $c$. The ex ante probability that an autocrat who represses at level $r$ receives a vote-share of $\bar{y}$ is $\Pr(\theta \geq \eta(\bar{y}, r^*))$ – the dark shaded area in Figure 1.2. Thus, without elections, the autocrat can expect to remain in power only if his true type happens to be in the light shaded area. With optimally rigged elections, he expects to remain in power unchallenged both when his true type is in either the light or dark shaded area.

Consider this hypothetical deliberation of an autocrat: ‘If I call free and fair elections, I will remain in power only if my true popularity is above $w$. Without elections, I will also remain in power only if my true popularity is above $w$, but now
I will incur a cost of conflict. However, if I call optimally rigged elections and receive a sufficient vote-share (at least $\bar{y}$), then I will remain in power and face no rebellion if my true popularity is at least $\eta(\bar{y}, r^*)$, which is less than $w$. Hence, calling optimally rigged elections, I can remain peacefully in power even if I am less popular than what is required to do so.

Similarly, one can think about the deliberation of the opposition after the elections: ‘Given that the autocrat won $\bar{y}$ votes by repressing at level $r^*$, how likely is it that the share of his supporters is less than $w$? This election result is possible if either the autocrat is in fact popular (light shaded area) or if he is moderately unpopular (dark shaded area). But the probability that he is moderately unpopular is $c$ since $\tau(r^*) = c$ and hence, it does not pay me to revolt against him.’ This way, repressive elections obfuscate the popular *ex ante* types of autocrats (light shaded area) with some of their less popular *ex ante* types (dark shaded area).

What happens if the autocrat does not face a threat of removal, $\pi \leq c$, or if the threat is too great to be worth fighting it, $\pi > 1 - c$?

**Proposition 2.** If $\pi \leq c$, then either (1) $r^* = \emptyset$ or (2) $r^* \geq \eta(\bar{y}, a)$. If $\pi \geq 1 - c$, then $r^* \leq \eta(\bar{y}, b)$.

Without a threat of rebellion, the autocrat does not have a reason to communicate new information about his popular support to the public. Hence, he either does not call elections or calls highly rigged elections without any informative content. On the contrary, if an autocrat is perceived as sufficiently unpopular, $\pi \geq 1 - c$, then he holds competitive and fully informative elections.

### 1.4 Empirical Implications

In this section, we apply the model to account for a few stylized facts associated with non-democratic elections and to generate a set of new hypotheses.
1.4.1 Explaining Stylized Facts

Large victory margins. Non-democratic elections frequently result in margins of victory that are dubious, if not absurd, by any reasonable standards. This empirical regularity begs a question: ‘Why not settle for more moderate and more believable results?’ According to our analysis, the autocrat can obfuscate the public beliefs about his true popular support only if he gathers a sufficiently high vote-share, \( y = \bar{y} \). Note that since \( \bar{y} \geq b \), the autocrat must receive a larger vote-share than the maximum possible support he has in the population, \( b \). A lower vote-share would reveal too much information and leave elections void of their full purpose.

Elections in military regimes. Geddes (2006) reports two interesting empirical findings: (1) military regimes are the least likely to hold elections and (2) elections increase regime survival across all types of regimes but less so in military ones (p. 28-29). This is very much consistent with our analysis as the following proposition suggests.

**Proposition 3.** In equilibrium, an autocrat’s expected gain from unfair elections is equal to \( \tau(r^*) + c \) if \( \pi < c \), and zero otherwise. Moreover, \( \tau(r^*) \) is strictly increasing in \( w \).

Military regimes (low \( w \)) are less likely to call elections because (a) they are less likely to be threatened and (b) they can gain much less from elections than non-military regimes (high \( w \)). Elections called by military regimes will be less free and fair and hence they will have less informational content. Such elections can cause only small changes in public beliefs about the regime’s popularity and hence they cannot generate a large increase in political stability. The monopoly of force allows military regimes to be less sensitive to public discontent. However, this very insensitivity also precludes them from behaving in a manner that creates a greater public consent to the existing order.
1.4.2 Research Hypotheses

There are many comparative statics results one can draw from Propositions 1 and 2. We discuss a few of the more interesting ones.

Regime’s expected support. How does a regime’s willingness to hold elections depend on its expected popularity? Do leaders who are more secure hold more free and fair elections? Figure 1.3 shows how an autocrat’s equilibrium behavior changes as a function of his expected popularity, $E(\theta)$, assuming that $a priori \theta$ is distributed uniformly on the interval $[a, b]$, $w = 1/2$, $z = 0$, and $c = 1/5$.

When an autocrat’s true public support is believed to be very low, $\pi \geq 1 - c$, free and fair elections are held. On the contrary, if an autocrat’s expected popularity is sufficiently high, $\pi \leq c$, then either no elections are called or there is a range of unfair elections that one can observe in equilibrium. Assuming that holding elections incurs a fixed cost gives a more clear-cut comparative static: autocrats with a sufficiently high expected popularity do not hold elections.
The most interesting case is when an autocrat’s expected support is in the intermediate range, \( \pi \in (c, 1 - c) \). In this case, unfair elections are called and the levels of repression increase with the expected popularity. Interestingly, the stronger the autocrats assess their base of support, the more they are willing to suppress the electoral competition. This counterintuitive implication can be explained as follows: If, prior to elections, the threat is high (\( \pi \) is substantially greater than \( c \)), in order to avoid conflict, the autocrat needs a substantive change in public beliefs, which in turn requires moderately free and fair elections. On the contrary, if the autocrat is perceived to be relatively popular (\( \pi \) is only slightly greater than \( c \)), then in order to deter a challenge, he needs only a minor change in public beliefs about his popularity. Hence, the autocrat who believes he is popular can reduce the risk of losing elections by repressing more.

Costs of Conflict. It is straightforward to verify that \( r^* \) is increasing in \( c \) — elections are less competitive when the costs of conflict are large. For example, if the opposition can rebel only in a way that incurs a minor cost on the autocrat (i.e., a peaceful public protest), then the autocrat is likely to use less repression. If, instead, a civil conflict is a possibility, then elections are less free and fair.

In addition, notice from Figure 1.3 that the range where rigged elections are possible, \( (c, 1 - c) \), widens as costs of conflict depreciate. Goemans and Marinov (2008) report that in the post-Cold War era elections — both democratic and non-democratic — have increased in frequency. One way to explain this finding is by noting that increased international interference in conflict resolution may have lowered the costs of conflict and hence widened the range at which autocrats find it optimal to wage rigged elections.
1.5 Extensions: Fragmented Opposition and Fraud

We now enrich the model to accommodate two important assumptions: a fragmented opposition and possibility of post-election fraud.

1.5.1 Fragmented Opposition

There are many ways in which opposition fragmentation may affect actors’ political calculations. Opposition voters might be discouraged from voting if their political wing is fractionalized. Also, the opposition’s capacity to mobilize voters might be impeded due to reduced economies of scale. However, what seems to be crucial in the context of our model is the cooperation and coordination problems that a fragmented opposition must solve.

Suppose that there are two opponents $B_1$ and $B_2$ whose cooperation in removing the autocrat most likely will depend on multiple factors (e.g., mutual trust, attitudes towards violence). We let $k$ denote the probability that the opposition manages to cooperate. Let $b_1$ and $b_2$ denote the weights of groups $B_1$ and $B_2$ respectively, and let $b_2 \leq b_1$. This implies that the popular support of the opposition group $B_i$ is $b_i(1-\theta)$. Let $\lambda_i(k)$ refer to a prior probability that $A$ would lose in a conflict against the opponent $B_i$:

$$\lambda_i(k) = (1 - k) F(b_iw) + k\pi.$$  \hspace{1cm} (1.4)

If the opposition parties cooperate for sure ($k = 1$), then their probability of winning is $\pi$, the same as a unified opposition. Naturally, when the opposition is divided, the threat the autocrat is facing is smaller compared to when the opposition is united: $\lambda_i(k) < \pi$ for $k < 1$. Since a divided opposition is less likely to pose a threat, the autocrat has fewer incentives to hold elections. However, when the threat exists,
\[ \lambda_1(k) \in (c, 1-c), \text{ we have:} \]

**Proposition 4.** \[ r^*(k) = \frac{\pi}{1-K}, \text{ where } K = F^{-1}\left(\frac{k\pi + (1-k)F(b_1w) - c}{2k + 1 - c}\right). \]

A few interesting insights follow from this analysis. First, repression is *decreasing* in the opposition’s ability to cooperate, \( k \). A stronger (more likely to be united) opposition poses a greater threat to the incumbent and, thus, by the logic spelled out earlier, the government needs to send a stronger signal to convince the opposition that the costs of challenge will most likely outweigh the expected benefits. A stronger enemy needs a stronger argument to be deterred from attacked. Empirical researchers have noticed a positive correlation between the opposition’s cohesion and the level of democracy (van De Walle, 2006). Our analysis provides a theoretical mechanism making sense of this correlation. It also suggests that, in the causal mechanism linking electoral repression and opposition unity, the latter is the antecedent of the former.

Second, electoral repression is decreasing in \( b_1 \), the share of the largest opposition group. When opposition’s support is divided evenly, in the face of uncertainty about its cooperation, it poses a smaller threat to the government, which induces more repressive elections. Thus, opposition fragmentation increases electoral repression for two related but conceptually different reasons: there is a direct effect of the threat from the largest group \( b_1 \) and there is an indirect effect. When none of the opposition groups constitute a natural leader, admittedly, opposition groups should find it more difficult to cooperate (lower \( k \)), which, by the above argument, should also increase electoral repression.

### 1.5.2 Election Fraud

We now add an extra stage in the game: after observing an election result \( y \) (Stage 3), the autocrat announces a result \( \psi(y) \in [0, 1] \), which may or may not be equal to the
true result. We assume that if the autocrat commits fraud, $\psi(y) \neq y$, then the fraud can be detected with a commonly known probability $p$. If fraud is detected, then the opposition receives a signal $s = 1$ and otherwise it receives a signal $s = 0$. Signal $s = 1$ might mean that election results are released suspiciously late (e.g., Zimbabwe in 2008), or suspiciously early (e.g., Iran in 2009), or a truck with rigged ballots is uncovered (e.g., Ukraine 2005). In such cases, the public knows that cheating occurred but they cannot tell its full extent.

Availability of fraud changes the informational structure of the game in an interesting manner: Without fraud, the autocrat and his opponents have the same information about $\theta$ throughout the game. With fraud, players have the same information before the elections, but in the post-election period, the autocrat, contrary to the opponent, learns the true election result $y$.

Let $\pi_A(y, r) = \Pr(\theta < w | y, r)$ denote $A$’s post-election belief that he is unpopular. There are three types of beliefs that $A$ can possibly have in the post-election period. First, after history where $y < w + r(1 - w) < \overline{y}$, $A$ knows that he is certainly unpopular, $\pi_A(y, r) = 1$; we denote the type of $A$ who holds such beliefs by $w$. Second, after history where $y \in [w + r(1 - w), \overline{y})$, $A$ must believe that $\pi_A(y, r) = 0$; we refer to this type as $\overline{w}$. Third, let $u$ be those types that observed $y = \overline{y}$ and hence are uncertain whether they are popular, $\pi_A(y, r) = \tau(r)$.

Let $I(r)$ be an information set of player $B$ induced by history $r$; that is, the information as to what type of $A$ player $B$ is facing given history $r$. For example, if elections are free and fair, $r = 0$, then $B$ knows that $A$ has perfectly learned his true type $\theta$ and hence $I(r) = \{\underline{w}, \overline{w}\}$. Interestingly, the choice of pre-election repression determines what the autocrat will be able to know about himself and what the opposition will believe about him in the post-election period.

We assume that, in the event of rebellion, the autocrat cannot avoid paying the cost of conflict. This means that by announcing ‘I won the elections’, the autocrat
states that he is not going to concede power peacefully. The sequence of moves in the game with post-election fraud is as follows:

1. A chooses between no elections, \( r = \emptyset \), and elections with repression \( r \geq 0 \).

2. A observes \( y \) and every type \( t \in \{ \overline{w}, \overline{w}, u \} \) announces \( \psi_t(y) \);

3. Iff \( \psi(y) \neq y \), then the Nature with probability \( p \) sends signal \( s = 1 \);

4. B responds by choosing \( R(r, s, \psi) = \{0, 1\} \).

The game in stages 2-4 constitutes a signaling game with imperfectly observable actions. In equilibrium, two conditions must be satisfied. First, the players’ strategies in stages 2-4 must constitute a perfect Bayesian equilibrium (PBE) after every history \( (y, r) \). Let \( E_s u^*_A(r, y(\theta, r)) \) be A’s expected payoff in a PBE after history \( r \). Second, at stage 1, A must choose \( r^* \) such that \( r^* = \arg\max_r \int E_s u^*_A(r, y(\theta, r)) f(\theta) d\theta \). That is, the autocrat must choose such a repression level that maximizes his \textit{ex ante} expected payoff given expected equilibrium payoff following any history \( r \).

**Proposition 5.** Let \( \pi \in (c, 1 - c) \). There are two sets of equilibria where

- If \( p \in \left( \frac{\pi - c}{\pi(1 - c)}, \frac{1}{1 + c} \right) \), then \( r^* = \frac{\pi - K}{1 - K} \), where \( K = F^{-1}\left( \frac{1}{p} \frac{\pi - c}{1 - c} \right) \) and \( \psi^*_t(y) \neq y \) iff \( t = \overline{w} \) and \( R^*(s, \cdot) = 1 \) iff \( s = 1 \);

- If \( p \notin \left( \frac{\pi - c}{\pi(1 - c)}, \frac{1}{1 + c} \right) \), then \( r^* = \frac{\pi - K}{1 - K} \), where \( K = F^{-1}\left( \frac{\pi - c}{1 - c} \right) \) and \( \psi^*_t(y) = y \) for all \( t \) and \( R^*(s, \cdot) = 1 \) for any \( s \) if \( p < \frac{\pi - c}{\pi(1 - c)} \) and \( R^*(s, \cdot) = 1 \) iff \( s = 1 \) for \( p > \frac{1}{1 + c} \).

\(^{8}\) Here, the expectation is taken with respect to the random variable \( s \). As we show in the proof, after history \( (r, y) \), any PBE (if it is not unique) yields the same expected payoff, thus, given \( (y, r) \), \( E_s u^*_A(r, y(\theta, r)) \) is unique too.
Figure 1.4: Optimal levels of pre-election repression given the fraud detection probability $p$. $\kappa = \frac{\pi - c}{1 + c}$ and $F$ is the prior distribution function of $\theta$. The example assumes that $\theta$ a priori is distributed uniformly on $[0.1, 0.9]$, $c = 0.3$, and $z = 0$.

A graphical expression of the Proposition 5 is given in Figure 1.4. Several intriguing findings can be derived from this analysis. First, pre-election repression is a necessary but not a sufficient condition for post-election fraud. When fraud is feasible and the fraud detection probability is neither too low nor too large, the autocrat optimally uses less pre-election repression than in the equilibrium of the game where fraud is not feasible. However, the optimal degree of fraud is always bounded above zero. Pre-election repression and post-election fraud are technological complements not substitutes.

Remarkably, even if an autocrat has a possibility to commit fraud after votes are counted, it does not incentivize him to abandon repression before votes are counted. If an autocrat uses pre-election repression everybody knows for sure that election result does not represent the true distribution of support. If he does not use repression but uses only fraud, then nobody might actually find out that fraud took place. Repression is evident whereas fraud requires evidence. Thus, one would intuitively
suspect that, if fraud is feasible, the best option would be to allow competitive elections with no repression and then fix the results if need be.

However, in the strategic environment with uncertainty the above intuition fails. Since only the loser benefits from fraud, whenever fraud signal is detected, everyone can infer that the incumbent is in fact the loser. Thus, when detected, fraud is highly informative of the autocrat’s true unpopularity. By contrast, pre-election repression is not informative about the unpopularity of the incumbent because it takes place before votes are counted (at which point the autocrat and the opposition share the same situation). Using sufficient degree of pre-electoral repression allows autocrats to avoid a situation where they commit a lot of fraud and thereby risk being detected as unpopular types.

The second interesting finding is that fraud is committed only if the fraud-detection probability \( p \) is neither too low nor too high. The latter condition is intuitive but the former is not. When \( p \) is very small, the signal \( s = 0 \) is uninformative about the autocrat’s true actions – since the detection probability is low, the fact that fraud was not detected does not inform whether fraud was actually committed. Consequently, popular autocrats cannot separate themselves from the unpopular ones and elections lose their informational content. In such conditions, the autocrats who learn they are unpopular are better-off reporting the true results and avoiding costly conflicts that they know they are going to lose.

However, the autocrats who learn they are popular cannot credibly convince the opposition that the reported election result is true even if in fact it is true. This is the curse of low detection probability: an autocrat cannot be caught lying and thus it would seem he would want to lie; but since lies cannot be detected, nobody believes him even if he is not lying. Thus, when the fraud detection probability is low, the autocrat who wins elections with a sufficient margin cannot deter the opposition from revolting against him. Moreover, since he learns that he has greater popular support,
he will not concede and therefore a conflict is going to be more likely. Only when the detection probability is reasonably high, autocrats can start benefiting from elections and election fraud. This finding could inform further research, in line with Beaulieu and Hyde (2009), on the autocrats’ incentives to invite election monitors.

1.5.3 Discussion

The insight that non-democratic elections can change the beliefs of the population has been widely used in the literature. Our contribution consists in turning this insight into a theoretical tool that enables us to hypothesize about variety of phenomena pertinent to non-democratic elections. In particular, we proposed an explanation for two empirical regularities: the frequency of large vote margins and the relatively small effect of elections on political survival in military regimes. In addition, we generated a set of new hypotheses for future empirical research on variation in pre-election repression, the effects of opposition fragmentation, the costs of conflict, and the likelihood of post-election fraud.

In addition to showing how elections can present autocrats with a peaceful exit path (cf. Cox, 2009), we argued that elections may also allow them to avoid exiting altogether. Indeed, if the purpose of elections is only to provide new information and thereby avoid costly conflicts, then it is not clear why autocrats employ rigged elections, which in fact provide biased (and hence low-quality) information. The model of forced consent, however, suggests that, under variety of circumstances, the best option for autocrats is to reveal and communicate only partial information; thus, it explains why autocrats who want to avoid costly conflicts do not go all the way into calling fully informative free and fair elections.

Finally, the model presented some results regarding opposition fragmentation and post-election fraud. With respect to the former, we found that opposition fragmentation induces autocrats to increase repressiveness of elections, contrary to what
intuition would suggest. This calls into question a suggestion made in literature that opposition fails to be unified because the system is repressive (e.g., van De Walle, 2006). We suggest that the relationship is in the reverse: the system is more repressive because the opposition is fragmented.

With respect to post-election fraud, first, we found that post-election fraud occurs only if elections are repressive but not vice versa. This finding may help understand why leaders resort to observable measures of repression as opposed to holding free and fair elections and then falsifying the results. Second, the model suggests an explanation as to why autocrats might be interested in increasing transparency of elections (e.g., by allowing international observers): post-election fraud is a useful technology only under common knowledge that the fraud-detection probability is sufficiently high.

1.6 Electoral Anesthesia in Single-party Elections

Can elections, even if they are blatantly unfree and unfair, have an effect on the population posited by the theory of forced consent? To investigate this question empirically, we study single-party elections in the Soviet Union. The analysis is based on an original dataset on political prosecutions in the Soviet Union – a country with an extended and well-documented history of non-competitive elections – and explore how waves of political dissent are related to the timing of elections. To our knowledge, this is the first attempt in the field to study non-democratic elections using this kind of micro-level data.

Elections in the Soviet Union could be considered they epitome of an empty electoral ritual. Ever since Stalin introduced his ‘social democratic’ constitution of the Soviet Union in 1936, elections to the Soviet legislature – the Supreme Soviets – were held with nearly clocklike precision. Every four years (or five years after the new constitution was introduced in 1978) more than 99 percent of Soviet citizens
were diligently casting (or were forced to cast) their votes in elections where a single candidate ‘competed’ for a single seat.

Many students of Soviet Union politics have long noted that, even without a choice, Soviet elections were ‘legitimating’ the government (Pravda, 1978; White, 1985) and producing a “psychological reinforcement of unity between regime and subjects” (Karklins, 1986, p. 449). This is typically considered to be the main explanation of why the Soviet Union was holding such elections in the first place. Theoretically, such an explanation is incomplete because it does not specify a mechanism explaining how the public begins to perceive a government as popular (‘legitimate’) in the aftermath of elections without choice and under what conditions elections would fail to achieve this goal. Moreover, there has been no empirical evidence in the existing literature to support the notion that the single-party elections did have a ‘legitimating’ effect. In this section, we present such empirical evidence and explain how it ties in with the theory of forced consent.

Importantly, focusing on the single-party elections allows us to provide evidence for the theory of forced consent, which is not compatible with some other theories of non-democratic elections. Many theories argue elections provide a safe exit path for leaders who want to avoid a violent removal from office (Cox, 2009; Magaloni, 2006). Our argument is different: we do not deny that elections might serve this purpose (in fact, our model accommodates this intuition); however, we argue that elections can also reduce the threat of challenge altogether – one does not need to look for a safe exit if one is not under threat. Since single-party elections cannot be lost, they do not provide any path for safe exit and, thus, they pose a challenge to ‘safe exit’ theories. In contrast, the theory of forced consent does accommodate single-party elections and explains how can they be used as informational devices that deter threats. Yet, to demonstrate its validity, we need to show that the stabilizing effect of elections does exist even if they present no choice and, hence, no safe exit.
The Soviet elections also cannot be accounted for by the argument that elections are institutions of co-option and power-distribution among the lower rank members of the ruling party (Magaloni, 2006). First, the Supreme Soviet was largely a powerless institution. There is some difference of opinion in the scholarship about the power of the Supreme Soviet: some describe it as an “ornamental and decorative” institution and others suggest that it had a more important role but “a lesser role than that of other major institutions” (Hough and Fainsod, 1979, p. 368). Indeed, the Supreme Soviet held only a few brief sessions a year (being in the legislature was never a full time job), and the legislation offered by the Central Committee was always unanimously approved. It is therefore very difficult to see how elections to the Supreme Soviet would serve as tools for opposition co-optation and power-distribution.

Lastly, distributive accounts of non-democratic elections suggesting that elections are tools for the distribution of clientelistic benefits (Blaydes, 2010; Lust-Okar, 2006) also fail to accommodate the Soviet elections. While election campaigns were extensive and resourceful (Carson, 1955), there is no historical evidence of resources having been distributed to attract voters to the polls.

1.6.1 Data on Anti-Regime Dissent

To study how waves of political dissent varied with respect to the timing of elections, we employ an original dataset of Political Arrests in the Soviet Union (PASU). Like every other dictatorship, the Soviet government punished its citizens for even the slightest expression of dissent towards the regime or its policies. Sometimes such punishments were conducted in a covert manner by extra-judicial institutions without any proper legal proceedings (Gregory, 2009a,b). However, Article 58 of the Soviet criminal code stipulated legal prosecution of citizens on the grounds of ‘anti-state’ and ‘counter-revolutionary’ activities. Such activities included public or
private criticism of the government and its policies, involvement in ‘anti-state’ activities and organizations, public insults to the leaders of the Soviet Union and so on. The cases of the ‘anti-state’ activity that were pursued under Article 58 were meticulously registered and documented.

Since many of the documents of the Soviet era have now been declassified, these legal proceedings provide a unique look into the dynamics of public sentiment regarding the Soviet government and its policies. The PASU dataset was constructed by coding legal documents ‘anti-state activities and anti-state propaganda’ kept at the Soviet prosecutor’s office (Kozlov, 1999b). The PASU dataset contains information from 5185 cases involving 7171 arrestees (some cases involve many persons) from 1953 to 1991.

The activities for which people were arrested ranged from simple expressions of grievances (e.g., “while in a drunk state, the arrestee was cursing the living standards in the USSR and was praising the United States”) to organization of riots or calls for regime change. Other ‘crimes’ concerned expression of nationalistic sentiments or practice of religious beliefs, both of which were seen as forms of anti-state behavior. The PASU dataset contains information about the arrested person’s age, ethnicity, education, profession, place of residence, and type of ‘crime’. However, in this analysis, we only use the information on monthly counts of cases across all ‘crime’ categories.

Figure 1.5 shows the arrest data aggregated by months together with a running five month average, leadership spells, and times of elections to the Supreme Soviets. There are several striking patterns in the data: First, the number of arrests is decreasing in time and is also related with the leadership of the country: the highest number of arrests appear during the last months of Stalin’s rule (data start in January 1953, Stalin died in March 1953). During the tenures of the subsequent leaders, the number of arrests was decreasing until it stabilized around the mid-1960’s. Sec-
ond, dissent also follows a highly cyclical pattern, which cannot be explained by leadership spells since there are multiple cycles within the spell of the same leader.

Why would waves of dissent be cyclical? And what explains the timing of these cycles? As we noted before, our conjecture is that waves of dissent are related to the timing of elections. In the next section, we show that the dissent waves come in cycles because elections come in cycles.

Before proceeding with the analysis, we need to address several important concern about the data. First, the data in Figure 1.6 represent the dates when the case was processed in the court and/or when the person was arrested (we refer to these as arrest dates for brevity). Naturally, since we want to study the dynamics of public dissent, the more appropriate frame of reference would the date of the actual crime. Unfortunately, the date of the actual crime is reported in only one-third of the case. In the upper panel of Figure 1.6, we plotted the data by the arrest and the crime date. Although there are some discrepancies, the general dynamics looks remarkably similar across both series. In fact, our results remain qualitatively the same if we use the crime-dates instead of arrest dates.
The second important concern is whether the data measure the expressions of political dissent or do they actually measure state repression? That is a fundamental problem in researching political dissent in an authoritarian state: the state can arrest people who do rebel against but it can also arrest people even if no ‘crime’ is
committed. How can we separate the two?

One argument in favor of treating the data as representing the incidence of the actual dissent is that it closely follows the general patterns about social stability in the Soviet Union: Khrushchev’s era is generally known to have been socially more volatile than the quiet ‘stagnation’ era of Brezhnev. This pattern is very clear in the data.\(^9\)

Further, though some of the cases in the dataset might be the ones where arrest occurred without the actual crime, there are strong reasons to believe that for the most part that is not the case. If many of the cases in the dataset were instances of framed crimes, one would most likely see that the description of these crimes lack individual detail. Instead, we find that the descriptions of the crimes are rather detailed and contain idiosyncratic references, which would clearly be lacking if the prosecutors were simply making up the crimes.

In addition, we can cross-validate the data by examining how well it correlates with the information on public dissent in the Soviet Union obtained from alternative sources. We consider two such sources. The first sources is an internal memo titled “On Mass Public Disorders Since 1957...” prepared by the head of the KGB in 1987 at the request of Mikhail Gorbachev. The documents lists the exact dates of mass protests and riots that occurred, with the estimated number of participants, the number of people arrested, and killed. In the middle panel of Figure 1.6 we plot the incidences of these events of mass disorders as blue spikes (with the height of the spike proportional to the number of participants). Since these data extend only to 1957, we also include the incidence of mass protests and riots documented by Russian historian Kozlov (1999\(^a\)). The dynamics of arrest counts and the incidence of mass

\(^9\) The data clearly fail to pick up the dissent that started occurring in late 1980’s: it seems that the repressive structure of the state in that period changed dramatically as dissent did happened but people were not arrested. However, excluding post-1985 data from the analysis does not change the results.
disorders appears to be correlated rather well suggesting that the PASU data picks up important trends in the dynamics of the public political dissent in the Soviet Union.

Finally, if the arrest data were merely registering repression and not the underlying expressions of political dissent, we should observe strong correlation between other measures of repression and the dynamics of the political arrests. In the lower panel of Figure 1.6, we plot the arrest count versus the incidence of purges taken from Banks (1996). Political purges in the Soviet Union always had spillover effects into the general population and so, if our data were measuring repression only, we would observe strong correspondence between the incidence of purges and dynamics of arrests for political crimes. Instead, the correlation between the purges and the arrests appears to be weak.

1.6.2 Theoretical Expectations

In an autocratic state, there are few credible means to exchange information about the popularity of a government: the government can claim that it is popular, but the claim has no credibility because it cannot be verified in the absence of free media, assembly rights, and fair elections. The opinion polls might exist but they usually lack credibility as people are afraid to voice their opposition to the government. Public rallies supporting the incumbent might attract large numbers but one is never sure if the participants of the rallies are doing that out of honest loyalty or fear. We argued that even if highly rigged, elections can help in revealing and communicating partially credible information.

This argument has a specific dynamic prediction: relative to the occurrence of elections, political dissent should come in waves. First, the wave of dissent should dissipate as elections approach: since elections might potentially reveal new information, the opponents of the government are better-off waiting for the election outcome
and then, in light of this new information, decide whether it is worth it to expressing the dissent. Second, provided that the incumbent wins them with a substantial margin using optimal repression levels, the wave of dissent should continue to weaken in the aftermath of the elections. However, as time passes, the value of this information diminishes: the government might have been perceived to be popular three years ago, but things could have changed. Thus, another election needs to be held to provide new information and deter potential dissenters by showing them that they are a minority.

The above argument requires that elections are at least potentially informative; that is, they provide at least a technical possibility of political dissent against the incumbent. It may be argued that, in the absence of choice on the ballot, Soviet elections cannot serve as an empirical case for the informational model of elections. However, the fact is that the Soviet voter had a practical possibility to express his dissent though it was costly: according to the election rules, if a voter delivers an unmarked ballot to the urn, such a ballot automatically counts as a vote for the candidate. This way, anyone who takes an effort to mark a ballot is suspected to be disapproving of the candidate and, by default, the regime. Thus, albeit costly, the dissent in the single-party Soviet elections was a possibility. This is important because even a technical possibility of dissent indicates that elections can be informative. For instance, if in the presence of such costs, the government would not receive a super larger margin of votes

Lastly, we should note that the Soviet Union provides a good test case for the effect of elections because their timing can be treated as largely exogenous. As we already noted, the legal basis of the Soviet electoral system was established in the 1936 Constitution and remained unchanged until 1978 when a new constitution was introduced. While the former constitution required elections to be held every four years, the latter constitution extended this to a five year term. Except for one
change, the electoral system remained untouched for half of the century. Thus, in this case, we can treat the timing of elections as largely exogenous to the incidence of anti-state activities.

1.6.3 Statistical Model

The crime counts $y_t$ for months $t = 1, ..., T$ are modeled as an overdispersed Poisson\(^{10}\) process with mean $\mu_t$ represented by the following semi-parametric function:

\[
\ln(\mu_t) = c + \sum_{k=1}^{K} \alpha_k y_{t-k} + f(d(e_t)) + \beta L_t + \tau(t) \tag{1.5}
\]

First, the number of crime cases in any given month $t$ depends on the number of cases in the previous $K$ months, $y_{t-k}$. In our analysis, we set $K = 3$. This choice is a compromise between a model with a single lag of crime counts that takes only very recent past into account ($K = 1$) and a model which includes a large number of lags thereby discarding much of the data at the beginning of the series.

Second, $d(e_t)$ refers to the distance between time $t$ and elections to the Supreme Soviets. There are several intuitive ways to measure distance to elections. One possibility is that only time after elections matters: each time a new election takes place, a clock starts ticking until the next election at which point the clock is reset. This distance function, which we call ‘asymmetric’, is depicted as a solid grey curve in Figure 1.7: it simply measures the time (in months) since the last election.

The asymmetric distance function does not distinguish between the time before and after elections. If actors are making their calculations in expectation of elections, then it may be appropriate to distinguish between the time before and after elections. As an alternative, one could use the negative binomial regression. However, such model may perform very poorly when lagged dependent variable is included in the model. Negative binomial model assumes that variance of the variable is a quadratic function of its expectation, which is very clearly rejected by our data. For these data, the overdispersed Poisson model strongly outperforms the negative binomial model in terms of the predictive power.
The symmetric distance function is represented by the dotted line in Figure 1.7: when elections are approaching, the distance is negative. In the aftermath of elections, the distance becomes positive and stays that way until the upcoming elections appear closer than the past elections. In other words, the negative values of the symmetric distance represent the time to elections, while the positive values represent the time after elections.

Third, in order to capture the cycle-effect of elections, we need a sufficiently flexible and yet identifiable model relating the distance to elections $d(e_{it})$ and the average number of crime counts $\mu_t$. For this purpose, we use a generalized additive model (Wood, 2006). The model assumes that the relationship between $\mu_t$ and $d(e_{it})$ is represented by an unknown smooth function $f(\cdot)$, which we approximate via natural cubic splines with $N$ knots. The number of knots in the spline function is determined using cross-validation analysis. We find that increasing the number of knots above seven does not produce a sizable increase in the model fit; thus, in all the
Table 1.1: Predicting arrest counts as a function of distance to elections. Generalized additive models with overdispersed Poisson link function (quasi-likelihood approach).

<table>
<thead>
<tr>
<th></th>
<th>Symmetric distance</th>
<th>Asymmetric distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>S.E.</td>
</tr>
<tr>
<td>Intercept</td>
<td>3.367*</td>
<td>(0.737)</td>
</tr>
<tr>
<td>$y_{t-1}$</td>
<td>0.003*</td>
<td>(0.000)</td>
</tr>
<tr>
<td>$y_{t-2}$</td>
<td>0.000</td>
<td>(0.001)</td>
</tr>
<tr>
<td>$y_{t-3}$</td>
<td>0.001</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Brezhnev</td>
<td>-1.150*</td>
<td>(0.453)</td>
</tr>
<tr>
<td>Chernenko</td>
<td>-0.228</td>
<td>(0.558)</td>
</tr>
<tr>
<td>Gorbachev</td>
<td>0.529</td>
<td>(0.561)</td>
</tr>
<tr>
<td>Krushchev</td>
<td>0.298</td>
<td>(0.497)</td>
</tr>
<tr>
<td>Year</td>
<td>-0.279</td>
<td>(0.221)</td>
</tr>
<tr>
<td>Year$^2$</td>
<td>-0.695*</td>
<td>(0.225)</td>
</tr>
<tr>
<td>Year$^3$</td>
<td>-0.348*</td>
<td>(0.134)</td>
</tr>
</tbody>
</table>

$\hat{f}(\cdot)^a$ 94.1(df=7) 0.000 78.7(df=7) 0.000

<table>
<thead>
<tr>
<th></th>
<th>453</th>
<th>453</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>4018</td>
<td>4125</td>
</tr>
<tr>
<td>Deviance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$ Wald test statistic and p-value for the null hypothesis that $f(\cdot)$ is flat (all coefficients in the spline function are zero). The effects are in the logarithmic scale. Standard errors in parentheses. * p-value < 0.05.

Analyses, we use a spline function with seven knots. This appears to be sufficiently flexible to capture the cycles of crime counts we observe in the data.

Fourth, $L_t$ is a dummy variable for the leader of the Soviet Union, which can potentially account for variation in the repressiveness of the state. Lastly, $\tau(t)$ is a function of time to account for time trends. For these data, the time trends are well captured by a cubic polynomial function; a higher polynomial does not produce a better fit.
1.6.4 Results

The results of the overdispersed Poisson regressions with symmetric and asymmetric distance functions are presented in Table 1.1. Coefficients of the spline function $f(\cdot)$ are not reported in the table because neither their size nor standard errors can be interpreted individually. Instead, we report the Wald statistic and p-value for the null hypotheses that all coefficients in the function $f(\cdot)$ are zero (in such case, $f(\cdot)$ would be a ‘flat’ function). In both models, the null hypotheses that distance has no effect is clearly rejected. However, this by itself does not say anything about the direction of the effect.

To trace the substantive effect of the proximity to elections, Figure 1.8 shows estimated curves $\hat{f}$ with 95% confidence bounds. Consider the upper panel depicting the expected number of crime cases as a function of time before and after elections (the symmetric distance). As elections approach the expected number of arrests is increasing and peaks at about nine months before elections, at which point it starts to decline. This indicates that dissent comes in waves, and the waves are clearly associated with the timing of elections.

This point is reinforced by the lower panel in Figure 1.8 showing the expected number of crimes as a function of time after elections (the asymmetric distance). In the aftermath of elections, the number of crimes is declining. Expectedly, we do not observe a sharp discontinuous decline in the crime counts. This may be due to inertia – the wave of dissent cannot dissipate in an instant. In about 24 months after the elections, the number of arrests reaches its overall minimum and then starts climbing up again. As time goes by, the information communicated by the last election begins to lose its value, and the wave of dissent starts rising again.

We can also assess the importance of elections in explaining waves of dissent by comparing the fit of a model that includes the distance to elections with the fit of
the model that does not. Figure 1.9 shows in-sample predicted number of counts for the two models. It is clear that the model with the distance to elections significantly outperforms the model without this variable: the predictions of the latter model capture the true dynamics of the data rather inaccurately. Indeed, after 1965, the predictions of the model without the distance variable are almost entirely static,
while the data are clearly dynamic. In contrast, the model that accounts for the distance to elections captures the cyclical nature of the data much better both in the pre- and post-1965 era. Comparison of the residual deviance of the two models also suggests that the timing of elections is very important in accounting for the dynamics of public dissent.

1.7 Discussion

In the summer of 2009, massive post-election protests erupted in Iran. To many, the political havoc was a sign that the elections hurt the country’s leadership. However, a reformist cleric Mehdi Karroubi who was also a candidate expressed a very different opinion. He said: “It is amazing that the people’s vote has turned into an instrument for the government to stabilize itself” (NYT, June 13, 2009). Why would rigged elections stabilize a government?
Our analysis proposes an answer: unfree and unfair elections may communicate to the public that the autocrat is likely to be supported by a critical share of the population and thereby deter threats to his rule. We have argued that if elections are optimally rigged and if they yield a sufficiently large vote-share to the autocrat, then the public will be unable to tell whether it is dealing with a truly popular autocrat or an autocrat who is moderately unpopular. This argument does not assume that the public is somehow ‘fooled’ into changing its mind about the autocrat’s support after elections with little credibility. Remarkably, this ‘anesthetic effect’ of non-democratic elections is consistent with individual rationality.

Unfree and unfair elections are rituals of forced consent: they create a consent or at least its appearance by suppressing the voices of dissent and emphasizing the voices of consent. Thus, the consent resulting from non-democratic elections remains grounded in uncertainty: the public believes that the autocrat is likely to be popular, but it is not allowed to learn whether it is in fact the case. This kind of consent is fundamentally different from the consent that is generated in democratic elections, where free competition allows everyone to learn the true distribution of public support. The outcome of democratic elections is uncertain ex ante, but ex post they result in certainty. The outcome of non-democratic elections is mostly certain ex ante but ex post uncertainty is not resolved.

We emphasized the communicative or informational value of elections. However, there is no reason to believe that elections can play only one role. Our model should be conceived as a contribution to a more complete understanding of electoral autocracies. Indeed, we have suggested that when autocrats face no threat of removal and are disinterested in communicating their popularity, they may call elections that have low informational content. In such instances, the value of elections is perhaps confined solely in managing the elites or distributing patronage.

Elections represent but one among many tools that autocrats may use to com-
municate information about their support. Autocrats are known to force citizens to participate in support rallies and demonstrations or to sanction them for not displaying political symbols that represent support for the regime and pictures of ‘dear’ leaders. Future research could consider elections under authoritarianism in the context of these alternative rituals of forced consent.
A Ballot Under the Sword: Political Security and the Quality of Elections in Autocracies

Most countries in the world nowadays hold national elections. However, a large share of these elections cannot be deemed free or fair by many standards. Of 317 elections that took place in the first five years of the 21st century, 143 involved some form of unequal campaigning rights, opposition intimidation, media bias, or suspicions of ballot fraud. In the developing world, during the same period, three in five elections failed to be completely free and fair.¹ Naturally, valid concerns have been raised about the role of elections in promoting unaccountable governments and political instability (Collier, 2009; Izama and Wilkerson, 2011; Lehoucq, 2003).

Although unfree and unfair elections are common, they are not well understood. Recently, there has been a steep surge in the literature aiming to explain why autocrats hold elections (Geddes, 2006; Gandhi and Lust-Okar, 2009; Fearon, 2011; Magaloni, 2006; Lust-Okar, 2006; Cox, 2009). This literature specifies multiple functions of non-democratic elections but it remarkably fails to address variation in their

¹ These calculations are based on the NELDA dataset by Hyde and Marinov (2012). The “developing world” refers to the set of countries with GDP per capita below the global median.
quality. Non-democratic elections exhibit great variety ranging from reasonably competitive to completely rigged, with brutal opposition harassment or no effective choice of candidates. Why do some governments impose only mild restrictions on electoral competition while others make it all but possible for the opponents win?

This paper proposes an explanation for the variance in the quality of elections in autocracies and nascent democracies and presents empirical evidence supporting this explanation. Our argument focuses on political security of the incumbent governments: In face of uncertainty about their true popular support, incumbents that are not threatened by popular uprisings or coups will hold repressive elections with highly predictable outcomes. On the other hand, autocrats facing a stability crises caused by either low popular support or intensive coup threats, will hold more free and fair (though not necessarily fully democratic) elections with less predictable outcomes.

At first glance, the argument may appear rather simple, but its central implication is actually quite unintuitive: governments are expected to manipulate elections and repress their opponents when a priori they are more confident in having a wide support base in society. This argument goes against the current received opinion that leaders rig elections only because they cannot win them fairly. For instance, Magaloni (2006) argues that when governments have sufficient popular support due to favorable economic performance, they do not have to use fraud to win elections. However, when the economy is performing poorly, “the autocrat increasingly depends on vote buying, electoral fraud, and repression to sustain itself” (p. 22). Although intuitive, this theory fails to address how vote-buying, fraud, and repression may help stabilize the government which is already believed to be unpopular due to bad economic performance.

Instead, we argue that a lack of confidence on the part of the incumbent leads to less repressive and less manipulative elections. A victory in highly unfair elections
can only send a weak signal about the incumbent’s existing support. A weak signal will not help in reducing the existing political insecurity; thus, a more informative signal must be sent. The latter can be achieved only in elections with the critical amount of competitiveness. Thus, ex ante political confidence must be associated with greater, not lower, electoral repression and manipulation. We present robust empirical evidence in support to this theoretical prediction. Among other things, we find that poor economic performance is in fact associated with more democratic elections, contrary to the aforementioned conjecture (Magaloni, 2006).

The goal of this paper is to understand the variation in the quality of elections—not the degree of democracy. Although, it is tempting to equate democracy with high quality of elections and autocracy with low quality elections, it is often inappropriate to do so. As Figure 2.1 illustrates, brute dictatorships hold fewer elections and, when they hold them, the elections are highly repressive. Exemplar democracies hold mostly completely free and fair elections. However, the relationship is far less

**Figure 2.1**: Incidence and quality of elections across Polity IV categories in non-OECD countries, 1946-2006. Data: Hyde and Marinov (2012) and (Marshall and Jaggers, 2002).
clear in intermediate regimes, where democracy does not go fully hand in hand with clean and fair elections (cf. Kelley and Kolev, 2010). This paper mostly contributes to the scholarship on the intermediary or ‘hybrid’ regimes – a highly common and, by some accounts, the least understood types of regimes (Epstein et al., 2006). Our results suggest that polities with similar regime profile vary in the quality of elections and that this variation in part depends on the incumbents’ office security.

2.1 Office Security and the Quality of Elections

To remain durable and effective, every kind of political leadership – whether democratic or autocratic – requires support from society (Arendt, 1963; Wintrobe, 1998). In democracies, leaders are replaced via competitive elections and are rarely able to survive in office without popular support. In autocracies, leaders are replaced during revolutions, uprisings, and military coups. Although formally autocrats do not require popular support to govern, they can do so more safely and more effectively if they appear to have a substantial grassroots support.²

Leaders with low grassroots support may find it difficult to defend themselves against popular uprisings since the army may be reluctant to back an unpopular government. Most recently, this was well demonstrated during the revolutions in Tunisia and Egypt in the spring of 2011. Less intuitive is the possibility that the appearance of low popular support intensifies the hazard of a military coup d’état. Potential coup organizers, if they are forward-looking, may be reluctant to challenge a leader with wide support. A coup against a popular leader is less likely to succeed and can easily escalate into a civil war. Furthermore, even if the coup is successful, a likely counter-coup or an uprising against the new (and less popular) leader is an

² It is a telling fact that even the most brutal dictatorships structure their governance under the notion that they must have a sufficient number of supporters (or sufficiently low number of opponents). Consider the following statement by the high-ranking Soviet official, Grigoryi Zinoviev: “We must carry along with us 90 million out of the 100 million of Soviet Russia’s population. As for the rest, we have nothing to say to them. They must be annihilated” (Pipes, 1995).
equally unattractive possibility (Geddes, 2006).

For instance, in 1936, a coup attempt in Spain escalated into a civil war when the elected government started arming its civilian supporters to resist the military coup (Beevor, 2006). A costly war was the price to be paid for challenging a government with a wide support base. Compare this, for example, with the military coup in Uganda in 1971. General Idi Amin’s coup was greeted with “great popular enthusiasm” even in parts of the country which, prior to the coup, suffered immensely from the very same army that seamlessly grabbed power (Ravenhill, 17, p. 229). While a coup risk depends on the capabilities and incentives of the military (Finer, 1988), a coup is more likely to succeed and be followed by the political ‘honey-moon’ if the existing government has narrow support. This logic has been nicely summarized by Linz (1978, 17): “it seems unlikely that military leaders would turn their arms against the government unless they felt that a significant segment of society shared their lack of belief.”

If appearance of low support presents a political risk, it is reasonable to presume that incumbents should invest into political institutions that can communicate information about their popularity and thereby deter opponents from challenging the status quo. Elections are perhaps the most obvious institution that can serve this purpose, as has been acknowledged in the current literature on nominally democratic institutions in authoritarian regimes (Gandhi and Lust-Okar, 2009; Magaloni, 2006; Sonin and Egorov, 2011). However, this literature has not explained how elections can signal the popularity of the winning party if they are known to be unfree and unfair. And, in turn, why do some incumbents choose to rig elections completely and others permit competition? Since the quality of information that incumbents can communicate through elections depends on their competitiveness, in order to understand the informational value of electoral institutions, it is essential to address the above questions.
Table 2.1: Electoral repression, risk, and information.

<table>
<thead>
<tr>
<th></th>
<th>Low repression</th>
<th>High repression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ex ante electoral risk</strong></td>
<td>High: unpredictable outcome</td>
<td>Low: predictable outcome</td>
</tr>
<tr>
<td><strong>Signal if elections won</strong></td>
<td>Strong positive</td>
<td>Weak positive</td>
</tr>
<tr>
<td><strong>Signal if elections lost</strong></td>
<td>Strong negative</td>
<td>Strong negative</td>
</tr>
</tbody>
</table>

In face of uncertainty, elections present a dilemma to leaders who have an option of using electoral repression. On the one hand, if elections are competitive, they can send a strong signal about the true distribution of popular support: winning such elections will leave no doubts that the incumbent is popular. However, competitive elections are risky because they can be lost, in which case a strong negative signal will be generated.

On the other hand, highly repressive elections almost surely cannot be lost and hence they are not risky. With enough fraud, bribery, intimidation, and media bias, an incumbent can win elections irrespective of his true support. However, the low risk comes at a price: even if won, repressive elections can hardly send a strong signal that the incumbent is popular. Since electoral repression biases election results to the advantage of the incumbent, repressive elections will send a strong negative signal if lost, and only a weak positive signal if won. The dilemma is schematically depicted in Table 2.1.

We argue that the solution to this dilemma depends on the a priori political security of the incumbent. Consider two types of incumbents: A and B. Suppose A’s office is secure – he is believed to have a wide support base, and therefore it is not attractive for the opponents to attempt to remove him. Suppose B’s office is not secure – he is believed to have little support in society and faces a high hazard of an uprising or a coup.

In terms of elections, the fundamental difference between A and B is that the latter needs to change the beliefs about his support levels whereas the former does not. Since a priori his support is believed to be low, B needs to send a strong signal
that he is popular. Highly repressive elections can only deliver a weak positive signal (if won) or a strong negative signal (if lost) but not a strong positive signal. Thus, \( B \) must take a riskier option and allow more free and fair competition. \( B \) needs elections to be informative and hence he cannot use excessive repression.

In contrast, since a priori his support is already believed to be high, \( A \) does not need to send a strong signal that he is popular. \( A \) can therefore take a less risky option and hold more repressive elections. Such elections would be far more predictable (which implies that the probability of a strong negative signal is also low) but also less informative. Importantly, with highly repressive elections, \( A \) cannot send a strong positive signal, but that is precisely the point–\( A \) does not need a strong positive signal, whereas \( B \) does.

From the above argument, we can make the following prediction: incumbents who assess their support base to be weak allow more competitive elections than incumbents who assess their support base to be strong. This prediction is somewhat counter-intuitive: why would a leader who is believed to be popular manipulate elections and thereby risk making them non-credible? The reason is that the leader with high prior support faces a low degree of threat and, hence, he does not need to communicate new information that would deter challengers. In contrast, a leader who is perceived to be unpopular faces a greater threat of removal and needs to communicate strongly to the public that his support base is in fact wide.

There are several conditions upon which our argument depends. The first condition is that electoral repression is a feasible option. If either due to domestic or international commitments, the costs of repressing electoral competition are overwhelmingly high, the argument naturally loses its bite.

The second important condition is that both the incumbent and the opposition do not have complete information about the distribution of popular support. When the assumption of uncertainty fails to hold, some parts of the argument break down. If an incumbent knows for sure that he has sufficient support to win, then by definition, he bears no risk in holding completely free and fair elections. Free and fair elections would send a fully credible signal that incumbent is popular; thus, a fully informed
incumbent who is certain of his victory would have few reasons to use repression. However, in face of uncertainty, holding free and fair elections becomes risky; there is a chance that even a confident incumbent might lose and reveal to everyone that he is unpopular. These conditions have important implications about the set of polities to which the theory can be applied in an empirical setting.

2.2 Empirical Implications

The main theoretical implication of the informational theory of elections is straightforward: politically secure incumbents hold more repressive elections. However, to empirically assess the evidence against the theory we need an operational concept of political security.

Political insecurity could stem from many sources. One such source is the decline in government’s approval prompted by economic underperformance. Economic crises, slow growth, and steep inflation are known to reduce the support base for the incumbent governments (Lewis-Beck and Stegmaier, 2000; Pepinsky, 2009; Remmer, 1991). We can therefore derive the following empirical implication:

**Prediction 1.** *Incumbents facing an economic crisis hold less repressive elections than incumbents facing positive economic performance.*

Another possible source of insecurity is the threat posed by leadership removal via a *coup d'état*. A high coup threat creates an insecure political environment. Thus, leaders who want to increase their security can benefit from elections by communicating their popularity and averting the coups. However, as we argued, elections will not have a stabilizing effect that politically insecure leaders need unless they are informative. The greater is the existing insecurity, the more informative elections should be to reduce it. Since the informational content of elections goes hand in hand with their democratic quality, we can formulate the following prediction:

**Prediction 2.** *A high coup threat is associated with greater democratic quality of elections.*
An empirical measure of coup threat is discussed in Section 2.3.3. Naturally, additional empirical implications could be drawn from the above theory using other empirical concepts representing political insecurity.

2.3 Data and Model Specification

2.3.1 Measure of Electoral Repression

To measure electoral repression, we employ the NELDA dataset by Hyde and Marinov (2012) covering all countries in the world from 1946 to 2006 except micro-states and countries that do not hold elections. The dataset contains multiple measures of the quality of elections ranging from the incidence of media bias to the legality of the opposition and allegations of fraud. Appendix B lists ten indicator variables that we use to build our measure of electoral repression.

To construct a measure of electoral repression, we sum the ten indicator variables listed in Appendix B for each country-election leading to an 11-point scale with a larger score indicating greater electoral repression. For instance, an election with no infringements on electoral competition will have a score equal to zero and an election where competition is infringed on all ten dimensions will have a score of ten. Empirically, the highest score in the dataset is eight, and the modal category is zero. To strengthen the credibility of our results, we also use several alternative measures of electoral repression discussed later in the paper.

2.3.2 Measure of Economic Crisis

The data on the incidence of economic crises are also from the NELDA dataset. The indicator variable Crisis (n18) is equal to one if, at the time of elections, a country is considered to be in an economic crisis. Though these data on economic crises are obtained by subjectively coding the news sources, they have several important advantages over some of the objective measures of economic performance. First, economic crises can appear in various facets (shrinking production, currency depreciation, runaway inflation etc.). Using one particular objective measure may be misleading, and there is no obvious way to aggregate different objective indicators
Figure 2.2: The weighted cumulative measure of coup history, $\lambda(\gamma)$ in Haiti as a function of the history weight $\gamma$. The dark red line is the predicted probability of a coup from the model in (2.2). The vertical grey lines represent the actual coups.

of economic performance into a single measure. Thus, the subjective evaluation of the incidence of crises provides a more comprehensive picture of negative economic performance.

The second, and more important advantage is that the conventional macro-economic data usually come in an annual format, which does not permit distinguishing between pre-election and post-election crises. The indicator measure we use here does not have this problem because it uses an evaluation of economic conditions prior to elections. Notably, our argument holds even if we use the objective indicators of economic stability (e.g., lagged GDP growth and inflation) as proxies for the perceived prior support for the incumbent government.

2.3.3 Coup History as a Measure of Coup Threat

Testing Prediction 2 is challenging as a coup threat is by definition a latent quantity and cannot be measured directly. Therefore, we adopt an indirect approach. One of the strongest findings in the scholarship on coups is that coups tend to cluster and form ‘coup traps’ – the incidence of coups in the past increases the likelihood
of having a coup at present (Londregan and Poole, 1990). We exploit this idea by constructing a measure of coup threat from the history of coups (Belkin and Schofer, 2003, cf.).

The data on coups come from Marshall and Marshall (2009). Importantly, the dataset identifies the exact dates of coup incidence, which allows us to separate coups that happened before elections and after elections (this is a common risk in analyses that use annual data on coups). We measure coup history at time $t$ using the exponentially weighted sum of the past coups.

Formally, let $(c_{i1}, ..., c_{iT_i})$ be a sequence of binary variables, where $c_{ik} = 1$ refers to a coup in a country $i$ during the $k^{th}$ month of the series and let $T_i$ refer to the number of months we observe country $i$ in the dataset. The variable Coup history, which we denote by $\lambda_{it}$, is defined as follows:

$$\lambda_{it}(\gamma) = \sum_{j=1}^{t-1} \gamma^{t-j} c_{ij}, \text{ for } t = 1, ..., T_i$$

(2.1)

where parameter $\gamma \in [0, 1]$ is the ‘weight of the past.’ If $\gamma$ is small, then the impact of past coups on present coup hazard is small. As $\gamma$ increases, so does the impact of history on the present threat of a coup. In the special case where $\gamma = 1$, the measure $\lambda_{it}(1)$ is simply the cumulative sum of coups in a country $i$ up until time $t - 1$.\footnote{Note that $\lambda_{it}$ includes information only up to time $t - 1$.} As an illustration, Figure 2.2 shows an example of $\lambda_{it}(\gamma)$ for different values of $\gamma$ applied to coup data in Haiti.

Ideally, we would want to let $\gamma$ be a free parameter estimated in the model. However, this option is not tenable since, without additional assumptions, it would lead to an unidentified statistical model. Instead, we use the following approach. First, we use $\lambda_{it}(\gamma)$ to predict coup incidence by running the following random-effects probit model:

$$\Phi^{-1}\left(\Pr(c_{it} = 1|c_{i1}, ..., c_{i(t-1)})\right) = b\lambda_{it}(\gamma) + \alpha_i + \mu_y + \beta'x_i,$$

(2.2)
where \( c_{it} = 1 \) refers to an incidence of a coup in a country \( i \) at month \( t \), \( \alpha_i \) and \( \mu_y \) are country- and year-level random effects, and \( \mathbf{x} \) is a vector of confounders. The latter includes lagged log GDP per capita (from Gleditsch (2002)) and lagged Polity IV score (from Marshall and Jaggers (2002)).

Second, we evaluate the model 10 times varying the parameter \( \gamma \) and select such \( \gamma \) that maximizes the fit of the model as measured by the Aikaike’s Information Criterion (AIC). We find that the model fit is the best when \( \gamma = 0.99 \). This high value implies that the history of coups has a rather extended impact on the present coup threat. The predicted probability curve in Figure 2.2 shows that, even accounting for the level of democracy and economic wealth, there is remarkable correspondence between coup incidence and the measure of coup history \( \lambda(0.99) \).

In substantive terms, we find that for a non-democratic country with average economic wealth, going from \( \lambda = 0 \) to \( \lambda = 0.36 \) (one standard deviation) increases the risk of a coup by 27% with a standard deviation of 6%.\(^4\) Thus, coup history is a good predictor of coup incidence, suggesting that the use of \( \lambda \) as a measure of the coup threat is well-justified.

2.3.4 Regime Type Conditionality

As we noted, the predictions of the informational theory of elections are conditional on the uncertainty about the distribution of support and the exogenous costs of electoral repression. If the uncertainty about the distribution of support is sufficiently small, the predictions of the theory lose some bite. If electoral repression is costly or not feasible, then naturally there is little that our theory can predict. An empirical test of the theory must account for these conditions.

We suggest that regime type prior to elections is a good proxy for both the degree of uncertainty and the costs of electoral repression. Leaders in democracies are bound by domestic and international interests that may find the use of electoral repression unacceptable. Further, in democracies, there are credible means – free

\(^4\) Coup history \( \lambda(0.99) \) is also a good predictor of the incidence of coup attempts (both successful and failed): one standard deviation increase in \( \lambda \) is associated with 37% increase in the probability of a coup attempt with a standard deviation of 5%.
media, assembly rights, high quality opinion polls – to aggregate and exchange information about political support for competing political factions. By contrast, the dearth of information about the distribution of support is a defining feature of autocracies (Wintrobe, 1998; Kuran, 1995). Thus, we expect that economic crises and coup threats will affect the quality of elections in non-democracies, and will have no effect in democracies.

In addition, regime type is also an important confounder in the analysis. It is by definition correlated with the quality of elections (democracies by definition hold free and fair elections but not vice versa), and it may also be correlated with higher coup incidence and worse economic performance (Feng, 1997; Quinn and Woolley, 2001).

We employ several measures of democracy. First, we use the dichotomous measure of democracy by Cheibub, Gandhi and Vreeland (2010). Second, we use an age-adjusted version of the dichotomous measure: we classify a country as a democracy if, prior to elections, it had been a democracy for five years or more. We find the latter measure conceptually more appealing in the context of our theory: a country that just became democracy is not fundamentally different in terms of informational environment and repression costs from an autocracy. Admittedly, only after a polity has remained in the state of democracy for at least one electoral term, can we expect it to be qualitatively different from a non-democracy. Third, we use the composite Polity IV score of democracy (Marshall and Jaggers, 2002). To avoid trivial endogeneity bias, the measures of democracy are lagged by one year.

5 The uncertainty about the distribution of support should not be confused with the uncertainty about the election outcome. The latter type of uncertainty is essential for a definition of democracy (Przeworski et al., 2000). Election outcomes in autocracies are more predictable than in democracies because elections are unfair, not because the distribution of support is known more precisely. Our argument is that the information about the distribution of popular support is more abundant in democracies than in autocracies. This, however, does not imply that elections in autocracies are less predictable.
2.3.5 Control Variables

We control for several potential confounders. First, wealth may be correlated with the quality of elections as well as the incidence of economic crises and coup threats. It is known that richer countries tend to be more democratic (Epstein et al., 2006; Przeworski et al., 2000) and they might also be less susceptible to economic crises. It is also known that poor countries are more susceptible to coups (Londregan and Poole, 1990). Thus, we include the log of GDP per capita from Gleditsch (2002). To avoid endogeneity bias (the quality of elections might affect economic productivity), the GDP variable is lagged by one year.

We also control for the reliance on foreign aid. Countries facing an economic crisis may receive greater foreign aid, which in turn (through conditionality clauses in aid agreements) may affect the quality of elections. The variable Foreign aid is equal to one if, at the time of elections the country is said to substantively rely on foreign aid (NELDA variable n19). Previous research has extensively focused on the effects of foreign aid on democratization (Alesina and Dollar, 2000; Knack, 2004; Wright, 2009). Our theory implies that foreign aid may have perverse effects on the quality of elections: since it constitutes a non-tax based revenue, foreign aid can be freely distributed to enlarge or strengthen the ruling coalition of the incumbent, thus reducing the incentives to hold higher quality elections. Therefore, for the evidence to be consistent with the informational theory of elections, foreign aid should be positively associated with the degree of electoral repression.

In addition, electoral repression and exposure to coup threats might naturally depend on the state’s repressive capacity. Therefore, we also estimate a model including the Political terror variable from Gibney, Cornett and Wood (2009). Finally, we include regional variables and cubic polynomials of years to account for regional effects and time trends in the quality of elections. Other control variables (an indicator for legislative election, a measure of ethnic fragmentation, and population size) were included in alternative models. Since these variables had no effect on the results, we do not include them in the models reported here.
2.3.6 Statistical Model

Our analysis is based on variants of the following baseline model:

\[ \Pr(r_{it} \leq m) = \mathcal{T}_\nu(\eta_m - \mu_{it}), \quad \text{for} \quad m = 0, ..., 7; \]

\[ \mu_{it} = u_i + \beta_1 C_{it} + \beta_2 C_{it} \times D_{i,t-1} + \beta_3 \lambda_{it} + \beta_4 \lambda_{it} \times D_{i,t-1} + \beta_5 D_{i,t-1} \]

\[ u_i \sim \mathcal{N}(0, \sigma^2). \]

Here, \( r_{it} \) is the level of electoral repression in a country \( i \) and election \( t \), \( C \) and \( D \) are the indicators of economic crises and democracy respectively; finally, \( \lambda \) represents the coup threat. The interaction terms are included to account for the conditionality of the effects of crises and coup threats on regime type.

The model is an ordinal regression with a Student’s \( t \) link function with \( \nu \) degrees of freedom. When \( \nu = \infty \), the model above becomes the standard ordinal probit. A model with small \( \nu \) is less sensitive to outliers in the data (Gelman and Hill, 2007, p.124). For our data, we find that the Cauchy distribution function (Student’s \( t \) distribution with \( \nu = 1 \)) provides a considerably better model fit than the probit model; thus, we use it in the analysis.

Due to the hierarchical nature of the data, we also include a country-level random intercept \( u_i \). The more popular ‘fixed effects’ model is not suitable for these data because the response variable does not vary across some of the units (e.g., all elections in a country are free and fair: \( r_{it} = 0 \) for all \( t \) and some \( i \)) leading to unreliable fixed-effects estimates. The hierarchical model specification takes into account unobserved country-level heterogeneity, thereby alleviating potential concerns of omitted variable bias.

The response variable \( r_{ij} \) has nine categories (\( r \in \{0, ..., 8\} \)), so the model includes eight threshold points \( (\eta_0 < ... < \eta_7) \) while the intercept is set to zero for identifiability. Some models in this analysis could not be estimated in the classical framework because the maximum likelihood estimates were unstable, thus we employed the Bayesian approach with vague priors.\(^6\) Markov chain Monte Carlo

\(^6\) The regression coefficients are given normally distributed priors with zero mean and the co-
Table 2.2: Predicting levels of electoral repression: robust ordinal regressions (with Cauchy link function) and country-level random intercepts.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>S.E.</td>
<td>$\hat{\beta}$</td>
<td>S.E.</td>
</tr>
<tr>
<td>In non-democracy$^a$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>-0.95 0.20</td>
<td>-0.80 0.20</td>
<td>-0.88 0.18</td>
<td>-0.69 0.26</td>
</tr>
<tr>
<td>Coup history</td>
<td>-1.05 0.17</td>
<td>-1.28 0.19</td>
<td>-0.90 0.18</td>
<td>-1.68 0.41</td>
</tr>
<tr>
<td>In democracy:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>0.17 0.22</td>
<td>-0.33 0.24</td>
<td>-0.53 0.36</td>
<td>-0.28 0.44</td>
</tr>
<tr>
<td>Coup history</td>
<td>0.95 0.41</td>
<td>0.63 0.43</td>
<td>0.76 0.97</td>
<td>-0.27 0.66</td>
</tr>
<tr>
<td>Political terror$_{t-1}$</td>
<td></td>
<td></td>
<td></td>
<td>0.39 0.11</td>
</tr>
<tr>
<td>Democracy$_{t-1}$</td>
<td>-3.95 0.28</td>
<td>-3.47 0.29</td>
<td>-2.28 0.27</td>
<td>-2.93 0.42</td>
</tr>
<tr>
<td>Log(GDP)$_{t-1}$</td>
<td>-0.24 0.16</td>
<td>-0.17 0.15</td>
<td>-0.48 0.22</td>
<td></td>
</tr>
<tr>
<td>Foreign aid</td>
<td>0.37 0.15</td>
<td>0.11 0.14</td>
<td>0.43 0.24</td>
<td></td>
</tr>
<tr>
<td>Years (cubic)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Regions</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>RE’s variance $\sigma^2$</td>
<td>4.05 0.71</td>
<td>3.04 0.62</td>
<td>2.81 0.62</td>
<td>3.55 0.93</td>
</tr>
<tr>
<td>Elections</td>
<td>1933</td>
<td>1788</td>
<td>1788</td>
<td>939</td>
</tr>
<tr>
<td>Countries</td>
<td>149</td>
<td>147</td>
<td>147</td>
<td>145</td>
</tr>
<tr>
<td>DIC</td>
<td>4749</td>
<td>4297</td>
<td>4497</td>
<td>2183</td>
</tr>
<tr>
<td>Correct predictions$^b$</td>
<td>73%</td>
<td>74%</td>
<td>72%</td>
<td>76%</td>
</tr>
</tbody>
</table>

$^a$ In Models 3-4, an age-adjusted definition of democracy is used.

$^b$ The rate of correct predictions within one point from the observed values from the posterior predictive distribution.

...
2.4 Empirical Findings

The first set of results is given in Table 2.2. Model 1 is the baseline model with no control variables. In this model (as well as in Model 2), democracies include both nascent and established democracies. In non-democracies, the incidence of economic crises and coup threats reduce the level of electoral repression as indicated by the negative coefficients for Economic crisis and Coup history. The standard errors are about four to six times smaller than the coefficients indicating strong statistical evidence of a negative association between political insecurity and electoral repression.

In an autocracy with no coup history, the incidence of economic crisis reduces the average predicted level of electoral repression by 0.74 points, with a standard deviation of 0.15. Since the sample standard deviation of the response variable is approximately two points, the predicted change of 0.74 units indicates a substantive effect. Similarly, in a non-democracy that does not face an economic crisis, one unit increase in the variable Coup history is associated with a 0.82 point reduction in the average predicted score of electoral repression (SD = 0.13). The joint effects of these two variables are even more remarkable: an average non-democracy with no economic crisis and no coup history is predicted to hold almost twice as repressive elections as a country that had a coup twelve months ago and is facing an economic crisis – the ratio of the predicted scores is 1.88 (SD=0.17). In sum, the data are highly supportive of the hypothesis that ex ante political insecurity is associated with higher quality elections.

In Model 2, we add a set of control variables. We also estimated the model where the control variables were interacted with lagged regime type, not shown here. In contrast to the effects of crises and coup history, the effects of wealth and foreign aid are not conditional on regime type. Thus, we report only the more parsimonious model with no interactions between the control variables and regime

variance matrix \( n(X'X)^{-1} \), where \( n \) is the number of observations in the dataset. \( \sigma^2 \) is given an inverse gamma prior with shape and scale equal to 1e-4 and the cut-off points are given a normal zero-mean prior with variance equal to 100. The results are not sensitive to the prior distributions.
type. Remarkably, the model fit increases only marginally once we add the set of control variables, and the estimates from Model 1 remain largely intact.

Model 3 replicates the analysis in Model 2 with a different measure of regime type. Here, we code a country as a democracy if it has been in the state of democracy for five years or more. Having experimented with different threshold points, we found that the results are not sensitive to this choice. Using a five year threshold allows an easy interpretation: in autocracies or in countries that have not been democracies for more than one average electoral cycle, economic crises and high coup threats lead to a more competitive electoral system. By contrast, in democracies that have survived for at least one electoral cycle, neither of these factors is associated with the quality of elections. In the following analyses, we use the latter ‘age-adjusted’ definition of democracy.

Finally, Model 4 includes the lagged Political terror variable to account for the repressive capacity of the state. Political terror is positively associated with electoral repression, but including this variable does not change the estimates either for the effects of crisis or the effects of coup history.

Further, there is some evidence to suggest that countries receiving substantial foreign aid hold more repressive elections. The latter finding is at odds with the previous research on the effects of foreign aid on democratization (Alesina and Dollar, 2000; Knack, 2004; Wright, 2009). Instead, our findings suggest perverse effects of foreign aid on the quality of elections. These perverse effects are easily explained by the informational theory of elections: aid enables governments to buy political support thereby reducing the threat to their rule, thereby reducing the incentives to hold riskier (more democratic) elections.

What could explain the difference between the empirical findings? We believe that the main reason is that our explanandum is not democratization but the quality of elections. It is entirely possible that foreign aid affects the regime change in one way but, conditional upon regime type, it has the opposite effect on the quality of elections.

We conducted additional analyses to ensure that our findings are not driven by a
Table 2.3: Predicting levels of electoral repression in the different subsets of data.

<table>
<thead>
<tr>
<th></th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-OECD countries</td>
<td>Non-transitional elections</td>
<td>No free &amp; fair elections</td>
</tr>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>S.E.</td>
<td>$\hat{\beta}$</td>
</tr>
<tr>
<td>In non-democracy:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>-0.81</td>
<td>0.19</td>
<td>-0.70</td>
</tr>
<tr>
<td>Coup</td>
<td>-0.86</td>
<td>0.19</td>
<td>-0.94</td>
</tr>
<tr>
<td>In democracy:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>-0.73</td>
<td>0.37</td>
<td>-0.64</td>
</tr>
<tr>
<td>Coup</td>
<td>2.02</td>
<td>1.13</td>
<td>0.81</td>
</tr>
<tr>
<td>Democracy$_{t-1}$</td>
<td>-2.05</td>
<td>0.29</td>
<td>-2.40</td>
</tr>
<tr>
<td>Log(GDP)$_{t-1}$</td>
<td>-0.14</td>
<td>0.16</td>
<td>-0.35</td>
</tr>
<tr>
<td>Foreign aid</td>
<td>0.09</td>
<td>0.16</td>
<td>0.20</td>
</tr>
<tr>
<td>Years (cubic)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Regions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RE’s variance $\sigma^2$</td>
<td>2.55</td>
<td>0.59</td>
<td>2.46</td>
</tr>
<tr>
<td>Elections</td>
<td>1295</td>
<td>1681</td>
<td>989</td>
</tr>
<tr>
<td>Countries</td>
<td>121</td>
<td>146</td>
<td>124</td>
</tr>
<tr>
<td>DIC</td>
<td>3949</td>
<td>4135</td>
<td>3028</td>
</tr>
<tr>
<td>Correct predictions</td>
<td>66%</td>
<td>73%</td>
<td>67%</td>
</tr>
</tbody>
</table>

specific subset of cases. The results are reported in Table 2.3. First, since the dataset includes both established and rich democracies as well as nascent democracies and autocratic regimes, we may run the risk of comparing incomparable units. In Model 5, we exclude the OECD countries. There are no tractable effects of this exclusion.

Second, economic crisis may foster the breakdown of an autocratic regime (Geddes, 2004; Pepinsky, 2009). Thus, it could be argued, that our results are driven by the founding (or transitional) elections. In Model 6, we exclude transitional elections. Transitional elections were defined in two different ways. First, if at time $t - 1$ a
country was non-democracy and at time $t$ it became democracy, we code the elections at time $t$ as transitional. Second, we used NELDA variable n10 indicating whether the country is governed by a ‘transitional leadership’. The two measures yield very similar results and we report estimates from the former model. This exclusion also does not affect the qualitative nature of the results.

Third, Model 7 excludes completely free and fair elections from the dataset. The purpose of this was to check whether our results were not driven by comparison of two different populations: countries that hold fully free and fair elections and countries that deviate from this norm. Although, the estimated effects of both crises and coup threats are naturally smaller in this subset of data, the effects remain negative and statistically significant.

There might be valid concerns that our results about the effects of coup history may also be driven by a different mechanism than implied by our theory. For instance, the association between electoral repression and coup history might be an artifact of post-coup elections: leaders who gain power by coups attempt to legitimate themselves by holding elections – by some accounts, an increasingly common trend (Goemans and Marinov, 2008). Although post-coup elections are not frequent (in our dataset, 7% of elections occurred within one year after a coup), the concern that the negative effect of Coup history is due to this subset of cases seems reasonable. We address this concern in two ways. First, we remove from the analysis elections that took place within one year after a coup. The estimates remain very similar, and coup history still has a negative effect on electoral repression. Second, we used an indicator variable equal to one if the election occurred within twelve months after the coup instead of the Coup history variable. The estimated coefficient for the indicator variable was -0.42 (SE = 0.30), suggesting that coup history is associated with the quality of elections, whereas the post-coup status of elections is not.

2.5 Robustness to Alternative Measures

In this section, we evaluate the robustness of our results to alternative measures of electoral repression, regime type, and the proxy measures of popular support. First,
our measure of electoral repression is an additive index of ten indicators of different manipulation and repression technologies. A valid question can be raised: ‘Would the results change if the construction of the index of electoral repression employed a different subset of indicators?’

To address that, we conduct the following sensitivity analysis. First, we distinguish three indicators that are clearly essential for any measure of electoral repression: if opposition is not allowed in the country (n3), if there is only one legal party (n4), or if there is no choice of candidates on the ballot box (n5), then elections are evidently uninformative and can only send a weak signal. In other words, the information about other methods of electoral repression is relevant only if we know whether elections allowed any kind of competition. One does not need to use voter intimidation and fraud to win elections that are already non-competitive.

Second, we use these three indicators plus all possible combinations of the remaining seven indicators listed in Appendix B to construct $2^7 - 1 = 127$ measures of electoral repression. Each such measure represents a different subset of indicators. Third, 127 models are estimated using the specification in Model 3 each time employing a different combination of the indicators. If the main coefficients of interest turn out to be zero or positive in a large share of these estimations, then the reported results are not robust.

Figure 2.3 displays the results of the sensitivity analysis for the estimates of the Crisis and Coup threat effects in non-democracies. The figure shows the distribution of t-values in each of the 127 models. In all models, the t-values are negative and considerably below the usual threshold of statistical significance (-1.96). This indicates that economic crises and coup threats are negatively associated with levels of electoral repression irrespective of the combination of variables used to construct the measure of electoral repression. The blue vertical lines in Figure 2.3 indicate the t-values of the corresponding coefficients in Model 3. In both cases, the measure that uses all ten dimensions of the quality of elections represents the ‘average’ model among all of the alternative models.

To further assess the robustness of our results, we also re-estimate the model
Figure 2.3: Sensitivity analysis: the distributions of t-values for the coefficient of *Economic crisis* and *Coup threat* using 127 different combinations of the ten NELDA variables used to construct the measure of electoral repression. The blue vertical line represents the t-value from Model 2.

using an entirely different measure of the quality of elections from the Quality of Elections Dataset (QED) by Kelley and Kolev (2010). The QED dataset has a variable measuring the ‘overall pre-election political conditions’ (*sr11cheat*) obtained by coding the U.S. State Department’s election reports. Political conditions are judged to be problematic if they “violate the international standards of a proper pre-election environment.” Such violations include substantial financial advantage of the incumbent, interference by executive authorities in political campaigns, restrictions on freedom of assembly and campaign rights, as well as harassment of the media and the opposition.

The results of the analysis using the QED measure of electoral repression are reported as Model 8 in Table 2.4. Although the number of observations is substantially smaller than before, the chief result prevails: economic crises and coup threats are associated with lower levels of election quality. The positive association between political insecurity and higher quality elections is robust under various measures of the quality of elections.

Model 9 in Table 2.4 reports analysis based on the composite lagged Polity IV
score instead of the dichotomous democracy indicator. Remarkably, the results are highly consistent with those of the previous analysis. Here, the linear coefficients *Crisis* and *Coup history* represent the effects of these variables for intermediate regimes (with the lagged Polity IV score equal to zero). To get a sense of how these effects change for different levels of democracy, we plotted the marginal effects of both variables in Figure 2.4. Economic crises and coup threats have a negative effect on levels of electoral repression in countries with a low democracy score; moreover, those effects weaken as the level of democracy increases. Once a country becomes sufficiently democratic (around 1-3 points on the Polity IV scale), economic crises and coup threats cease to have statistically tractable effects on the quality of elections.

As an additional robustness check, we employ two alternative proxy measures for the incumbent’s public support. First, we use the *Economic decline* indicator instead of the economic crisis variable. The indicator is constructed using annual GDP growth figures (from Heston, Summers and Aten, 2002). It is equal to one if, during the year prior to elections, a country has suffered a growth rate one standard deviation below the country’s average growth rate. This measure takes into account...
Table 2.4: Ordinal regression estimates using alternative measures of election quality, democracy, and economic shocks.

<table>
<thead>
<tr>
<th></th>
<th>Model 8</th>
<th>Model 9</th>
<th>Model 10</th>
<th>Model 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>QED$^a$</td>
<td>$\hat{\beta}$ S.E.</td>
<td>$\hat{\beta}$ S.E.</td>
<td>$\hat{\beta}$ S.E.</td>
<td>$\hat{\beta}$ S.E.</td>
</tr>
<tr>
<td>Crisis</td>
<td>-0.65 0.30</td>
<td>-0.40 0.15</td>
<td>-0.47 0.21</td>
<td>-0.83 0.22</td>
</tr>
<tr>
<td>Coup history</td>
<td>-1.97 0.55</td>
<td>-0.44 0.18</td>
<td>-0.57 0.20</td>
<td></td>
</tr>
<tr>
<td>Decline$_{-1}$</td>
<td></td>
<td></td>
<td></td>
<td>-0.48 0.17</td>
</tr>
<tr>
<td>Inflation$_{-1}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democracy$_{-1}$ $\times$</td>
<td>3.44 1.23</td>
<td>0.08 0.03</td>
<td>1.22 1.15</td>
<td>1.33 1.08</td>
</tr>
<tr>
<td>Coup history</td>
<td>2.16 0.57</td>
<td>0.05 0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth$_{-1}$</td>
<td></td>
<td>0.65 0.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation$_{-1}$</td>
<td></td>
<td></td>
<td></td>
<td>0.24 0.41</td>
</tr>
<tr>
<td>Democracy$_{-1}$</td>
<td>-3.36 0.47</td>
<td>-0.31 0.02</td>
<td>-1.79 0.27</td>
<td>-1.74 0.28</td>
</tr>
<tr>
<td>Log(GDPpc)$_{-1}$</td>
<td>-0.73 0.28</td>
<td>-0.20 0.13</td>
<td>-0.02 0.20</td>
<td>-0.01 0.17</td>
</tr>
<tr>
<td>Foreign aid</td>
<td>-0.35 0.43</td>
<td>0.33 0.14</td>
<td>0.38 0.17</td>
<td>0.39 0.19</td>
</tr>
<tr>
<td>RE’s variance $\sigma^2$</td>
<td>4.59 1.19</td>
<td>2.44 0.44</td>
<td>3.23 0.70</td>
<td>3.21 0.69</td>
</tr>
<tr>
<td>Elections</td>
<td>870</td>
<td>1903</td>
<td>1629</td>
<td>1478</td>
</tr>
<tr>
<td>Countries</td>
<td>142</td>
<td>147</td>
<td>142</td>
<td>142</td>
</tr>
<tr>
<td>DIC</td>
<td>1370</td>
<td>4575</td>
<td>3960</td>
<td>3623</td>
</tr>
<tr>
<td>Correct predictions</td>
<td>86%</td>
<td>75%</td>
<td>73%</td>
<td>74%</td>
</tr>
</tbody>
</table>

$^a$ Using pre-election cheating variable (sri1cheat) from the Quality of Elections Dataset by (Kelley and Kolev, 2010) as the dependent variable.

$^b$ Using Polity IV score of democracy; otherwise, the age-adjusted dichotomous democracy score is used.

the contextual evaluation of economic performance, as economic decline is defined relative to the country’s average economic performance and its volatility.

Second, as an additional proxy variable for political insecurity we use the variable **Inflation shock**: this indicator is equal to one if the price inflation rate during the year prior to elections is one standard deviation above the average inflation rate of the country. The data on inflation are from the World Development Indicators (from
Teorell et al., 2009). One can reasonably argue that *Economic decline* and *Inflation shocks* as defined above are associated with lower incumbent approval and, therefore, we expect, lower levels of electoral repression.

The results are reported in Models 10 and 11. Incumbents in non-democracies, tend to use less electoral repression when their economies are underperforming in terms of lower than usual growth and higher than usual inflation as indicated by the negative coefficients for *Economic decline* and *Inflation*. In sum, our key finding that incumbents with greater expected public support hold more repressive elections remains robust across different expected model specifications and measures of the independent and dependent variables.

2.6 Causality and the Causal Mechanism

Although the previous section demonstrates a robust association between the proxy measures of political insecurity and the quality of elections, the causal nature of this relationship is far less certain. Although one must be highly cautious in making causal claims from observational data, we use several techniques to assess if there is strong evidence against the causal interpretation of the above results.

In the following discussion, we focus on the causal effects of the economic crises. Coup history is a contextual variable, not an ‘intervention’, and it is not obvious how its causal effect can be defined in the first place. Furthermore, since we have already determined the association between political insecurity and the quality of elections to be conditional on regime type, to simplify the following analysis, we focus our attention on the causal effects of economic crises in non-democracies only.

2.6.1 Causal Effects of Crises via Matching

A major concern in drawing causal inference from observational data is that, contrary to a randomized experiment, treatments are not randomly assigned (Holland, 1986; Rubin, 2005). To remedy this problem, scholars have increasingly applied matching methods. A matching procedure selects and compares observations that are

\[ \text{7 See Holland (1986) for a discussion on causality and manipulability.} \]
most similar on all the covariates except the treatment. Under certain assumptions, matching allows estimating the causal effect of a treatment defined as the difference between the observed outcome and its counterfactual (Rubin, 1973; Sekhon, 2008). In addition, matching helps in reducing model dependence and thus leads to a more robust estimation (Ho et al., 2007).

We use the genetic matching algorithm (Sekhon, 2011), which, for our data, balances the covariates considerably better than the propensity score matching. Three types of estimates are reported in Table 2.5. First, the non-parametric estimate of the average treatment effect (ATE) – the effect of economic crisis on the entire population represented in the sample. Second, we report the non-parametric estimate of the average treatment effect on the treated (ATT) – the effect of economic crises on countries that have experienced crises prior to elections. Third, we fit the robust ordinal regression model on the balanced dataset and report the estimated effect of the economic crisis. The latter parametric model allows for partial pooling among the country-specific intercepts and takes into account the ordinal nature of the response variable.

Although the ATE of economic crises falls slightly short of the conventional levels

---

8 Since unobserved country-level factors are not taken into account in the non-parametric procedure, we run a risk of omitting important confounders. To deal with this problem, we center the response variable around its country-level mean. This way, we avoid comparing two countries that have different baseline levels of electoral repression due to some unobserved factors.
of statistical significance, other matching-based estimates of the causal effect of crises are consistently in favor of the proposed theory. In the presence of economic crises, governments hold less repressive elections than they would in the absence of crises, as indicated by negative coefficients and relatively small standard errors of both the ATT and the ordinal regression estimate. The ordinal regression estimate is especially remarkable given that the matched dataset contains only 560 observations, and the model includes country-level random effects.

2.6.2 Probing the Causal Mechanism

The results of our empirical analysis are yet insufficient to conclude that the relationship between economic crises and quality of elections is consistent with the informational theory of elections. We argued that economic crises induce autocrats to hold more competitive elections because, in times of crises, support for the incumbent government is expected to be low. Alternatively, however, one could argue that crises deprive autocrats of the resources to repress (Greene, 2007; Pepinsky, 2009). This explanation would account for the association between economic crises and lower electoral repression without recourse to the informational model of elections.

The resource-based explanation is wanting on several grounds. First, many forms of electoral repression (e.g, banning opposition candidates, restricting free media, or
harassing opposition voters) do not require extensive material resources. Even extremely poor regimes can afford to manipulate elections quite effectively: Zimbabwe and Ethiopia are among the poorest countries in the world with an exemplar record of electoral repression. Second, if it were the case that electoral repression can be afforded only by rich governments, we would observe a positive association between wealth and electoral repression. However, the empirical evidence speaks to the contrary: the effects of GDP on electoral repression are negative in all of the models that we estimated.

One could make a stronger case for the informational theory of elections by showing that economic decline reduces confidence in support levels, which in turn reduces electoral repression. In fact, we argued that incumbents who are more confident in winning elections are expected to use more electoral repression. The difficulty establishing this connection is that confidence is endogenous to repression: naturally, leaders who hold more repressive elections should be more confident in winning them.

The causal mechanism proposed by this argument is represented in Figure 2.5. Economic performance increases confidence, which in turn increases electoral repression. However, repression also breeds confidence because the less competitive are the elections, the more certain is the victory. If the data are consistent with the proposed theoretical mechanism, we should observe the following: conditional upon an incumbent’s prior confidence, there should be no association between economic crises and levels of electoral repression. This would indicate that electoral repression decreases in times of crises not, for example, due to depleting resources (or some other intermediary factor) but due to shrinking support.

To study the role of prior confidence, we use NELDA variable (n12) indicating whether there is evidence that an incumbent is confident in winning the elections. Indicators of confidence include high approval in opinion polls, fragmented and disorganized opposition, absence of pre-election protests against the government, and, importantly, the competitiveness of elections. If confidence were not endogenous to repression, we could simply regress electoral repression on the measure of economic crises and prior confidence. To deal with the endogeneity problem, we estimate the
following system of equations:

\[ Z^a_{it} = u_{iz} + \beta_1 R^a_{it} + \beta_2 C_{it} + \beta_3 \lambda_{it} + \beta' x^{(z)}_{it} + \epsilon_{iz} \quad (2.3) \]

\[ R^a_{it} = u_{ir} + \eta_1 Z^a_{it} + \eta_2 C_{it} + \eta_3 \lambda_{it} + \eta' x^{(r)}_{it} + \epsilon_{ir}, \quad (2.4) \]

where \( Z^a \) represents the latent score on confidence and \( R^a \) represents the latent score on electoral repression. The coefficients \( \beta_1 \) and \( \eta_1 \) represent the contemporaneous feedback effects between levels of electoral repression and the prior confidence in winning elections. Letting \( \epsilon_{iz} \)'s and \( \epsilon_{ir} \)'s be Cauchy random variables makes the model in (2.3) and (2.4) robust binary and robust ordered regression, respectively.

Each equation has one endogenous variable on the right-hand side. To identify the structural model, we need at least one variable in \( x^{(z)} \) that does not appear in \( x^{(r)} \) and vice versa. The instrumental variable in \( x^{(z)} \) must be exogenous to confidence but related to levels of electoral repression. We employ two instruments to identify equation 2.3: First, if a country has strong economic and diplomatic ties with Western governments and intergovernmental organizations, it should hold cleaner elections because of higher political and possibly economic costs of repression. Levitsky and Way (2010) provide extensive evidence to that effect. However, a country’s ties with the West should not directly affect the prior confidence of the government (although naturally the effect could run through repression).

Second, international election monitors (IEMs) are known to disclose and deter irregularities in elections (Hyde, 2007; Kelley, 2009). However, it is reasonable to argue that IEM’s do not have a direct effect on voting outcome (and hence the prior confidence of the incumbent), except through the reduced incidence of fraud. In sum, we use variables Western linkages and Election monitors (NELDA variables \( n53 \) and \( n45 \)) as the instruments to identify equation (2.3).

To identify equation (2.4), we use a dummy variable for the second round elections. If elections reach the second round, then ceteris paribus incumbents should be less confident in winning them. First, not winning outright victory in the first round may mobilize opposition supporters. Second, since the second round elections have
fewer candidates, the opposition is forced to unite and present a stronger front. Although greater uncertainty in the second round could affect the quality of elections, there is no reason to believe that the second round elections should be ipso facto less/more repressive.

We estimate structural parameters of the model in (2.3)-(2.4) using a two-stage regression approach. Note that both equations are not linear and include random intercepts, which complicates estimation of the standard errors in the classical two-stage least squares framework. In the Bayesian framework, this problem can be approached straightforwardly: using simulation methods, we integrate the second stage estimates over the posterior distribution of the predicted endogenous variables. The details are available upon request.

Results are reported in Table 2.6. Note that all three instruments are strong: incumbents in the second round elections are less confident in winning them, and

### Table 2.6: Structural parameter estimates of the system in (2.3) - (2.4).

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Confidence</th>
<th>Repression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>S.E.</td>
</tr>
<tr>
<td>Repression</td>
<td>0.87</td>
<td>0.28</td>
</tr>
<tr>
<td>Confidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>-1.76</td>
<td>0.46</td>
</tr>
<tr>
<td>Coup history</td>
<td>-0.29</td>
<td>0.38</td>
</tr>
<tr>
<td>Log(GDPpc)$_{t-1}$</td>
<td>0.49</td>
<td>0.24</td>
</tr>
<tr>
<td>Foreign aid</td>
<td>-0.28</td>
<td>0.38</td>
</tr>
</tbody>
</table>

**First-stage estimates of the IV’s:**
- Election monitors: $-1.26$, S.E. 0.22
- Foreign linkages: $-1.54$, S.E. 0.21
- Round: $-1.63$, S.E. 0.47

<table>
<thead>
<tr>
<th>RE’s variance $\sigma^2$</th>
<th>4.60</th>
<th>1.91</th>
<th>1.95</th>
<th>0.47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elections</td>
<td>843</td>
<td>843</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>114</td>
<td>114</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 2.6: Predicting electoral repression in the model without Confidence variable (black) and the structural model with Confidence variable (dark red). Posterior average estimates and 95% HPD intervals.

there is less repression in elections where foreign monitors are present and in countries with strong Western linkages.

The estimates of the structural parameters lend strong support for the hypothesized causal mechanism: First, economic crises reduce a priori confidence as indicated by the negative coefficient for Crisis in the first equation. Second, once we account for a priori confidence, economic crisis does not have an effect on the level of electoral repression as indicated by the near-zero coefficient for Crisis in the second equation. We also see that prior confidence increases repression and repression increases confidence.

To aid interpretation, Figure 2.6 shows the estimates of equation (2.4), and the estimates of the same model that does not include the endogenous Confidence vari-
able. In the absence of information about a priori electoral confidence, economic crisis is negatively associated with electoral repression. However, once we add information about a priori confidence, the effects of economic crises vanish. In conclusion, economic crises appear to reduce electoral repression through their negative effect on a priori electoral confidence, but not directly.

2.7 Discussion

This study presented a theoretical argument about how an incumbent’s political security shapes the democratic quality of elections. We have argued that in an environment where information about the distribution of political support is scarce, and electoral repression is a feasible option, politically insecure incumbents hold more free and fair elections than their secure counterparts. Employing economic crises and coup threats as proxies for political insecurity, we have found substantial evidence for the proposed theory in autocracies and in young democracies – the set of polities where the conditions of the proposed theory are most likely to hold. The chief result of the paper remains robust to multiple model specifications, and alternative measures of the dependent and the independent variables.

The analysis dispels one widespread myth that electoral repression is a tool used by unpopular autocrats who expect to lose free and fair elections. If anything, the evidence we present points in a completely different direction: autocrats enjoying good economic performance use more electoral repression compared to the ones suffering from economic decline. We have also found evidence that poor economic performance reduces electoral repression through its negative effect on the incumbents’ a priori confidence, but not directly. This indicates that information plays a crucial role in the mechanism relating economic decline and the quality of elections.

These findings have important implications for understanding the role of economic performance and political stability in the survival of authoritarian politics. The first implication concerns modernization theory. According to this theory, economic prosperity creates a politically active middle class and thus income growth in the long run should lead to more democratic politics (Boix and Stokes, 2003; Epstein et al.,
2006; Lipset, 1959; Moore, 1966; Przeworski et al., 2000). However, the short-term consequences of economic growth have been somewhat neglected in the debates on modernization theory. This analysis proposes a mechanism of how negative economic shocks in the short run increase the autocrats’ incentives to permit more political competition. Thus, there seems to be some tension between the short- and long-term effects of economic decline (and growth) on democratization which may be an important topic for the future research.

The second implication concerns the role of political instability. Ever since Huntington’s seminal work on political order (Huntington, 1968), political instability manifesting though revolutions, coups, and conflicts is perceived as an impediment to democratization. We find that (again, in the short run at least) coup threats create incentives to hold free and fair elections. To sum up, if the road to a stable democracy is paved by a sequence of free and fair elections (e.g., Lindberg, 2006a), then economic crises and coup threats are not obstacles but catalysts of democratization.
A loser’s consent is an established custom of a stable democracy. According to this custom, the winners receive a legitimate mandate to govern while the losers retreat and wait for another election to claim power. The culture of democracy is unthinkable without the commitment to submit to the results of voting. Some refer to this commitment as “the miracle of democracy” (Przeworski, 2005, p. 270).

Unfortunately, in many places the “miracle of democracy” fails to materialize. Governments often restrict electoral competition and the losers of elections often refuse to acknowledge the mandate of the winners. Instead of concession speeches, one often sees threats, protests, riots, and conflicts. Data recently collected by Hyde and Marinov (2012) indicate that one-fifth of elections in non-established democracies result in protests and riots. From 1969 to 2003, only one in three elections in Sub-Saharan Africa saw the losers fully approving the winners (Lindberg, 2006a).

The political and social consequences of the losers’ dissent range from innocuous to grievous. Dissent may be confined to symbolic boycotting of an elected legislature
(Bratton and van de Walle, 1997, 205). The losers may also mobilize public protests that challenge or even topple incumbents, as happened in the post-communist ‘colored revolutions’ (Kuzio, 2005; Tucker, 2007). Most importantly, post-election dissent might result in vehement backlashes. Violence in the aftermath of elections in Ethiopia (2005), Azerbaijan (2005), Kenya (2007), and Iran (2009) are only a few recent examples of the human cost of post-election instability.

While policymakers often see elections as means of political progress, some influential political scientists have long been skeptical about the value of elections. Samuel Huntington famously argued that “in many, if not most, modernizing countries, elections serve only to enhance the power of disruptive and often reactionary social forces and to tear down the structure of public authority” (Huntington, 1968, p. 7). Half a century later, Paul Collier similarly concluded that elections in the developing world often lead to uncertainty, instability, and violence (Collier, 2009). One recent account of African politics suggested that “elections may be the single most important precipitator of instability” (Izama and Wilkerson, 2011, p. 76).

This view that elections serve as a destabilizing force stands in stark contrast to the literature on elections under authoritarianism. This literature has consistently argued that elections serve to stabilize political authority and extend the survival of leaders (Cox, 2009; Gandhi and Lust-Okar, 2009; Magaloni, 2006; Lust-Okar, 2006; Schmitter, 1978). How can the discord between these two literatures be resolved?

We contend that post-election political stability can be better understood by focusing on properties of the electoral process rather than the occurrence of elections per se. We provide a theoretical argument and empirical evidence for the case that elections lead to a stable political environment (in the sense that a government mandate is not openly questioned) if they communicate to the public and the political elites that the winning party has sufficient popular support. Otherwise, if elections fail to communicate the winning party’s popularity, they might have a destabilizing
effect: the losers might deny the winners the right to govern and lock the political system in a cycle of uncertainty.

Despite its apparent importance, post-election stability has not yet received adequate attention in the literature. Most of the existing scholarship on post-election politics focuses on the instability created by elections in economically underdeveloped and ethnically diverse societies (Huntington, 1968; Collier, 2009; Snyder, 2000) or the design of electoral institutions that reduce the risk of conflict (Horowitz, 1991; Reynolds and Sisk, 1999; Reilley, 2001). While these approaches are enlightening, they fail to account for variation in political stability across countries with similar economic, social, and institutional profiles. The account of post-election stability provided in this paper aims to overcome this shortcoming and show that depending on the informational content of the electoral process, even countries with similar economic and social profiles may face variable post-election outcomes.

We make two contributions to the scholarship on post-election stability. First, we propose a theory exploring the informational role of elections. In this theory, elections are treated as informational devices used by competing parties to learn and communicate their relative public support. In turn, the acquired information is used in the calculus of post-election dissent. The key question then becomes ‘When do the losers infer that their own true support is larger than the electoral results indicate, and therefore, when would it pay off to undertake a costly action to challenge the winners?’ Using formal theory, we derive a set of predictions about how the winner’s vote-share and the quality of elections interactively affect such calculus of dissent.

The second contribution consists of two empirical analyses showing how the electoral process affects the beliefs and strategic calculations of political actors in accepting or rejecting voting outcomes. First, employing a global dataset on elections in nascent democracies and autocracies, we study the occurrence of post-election protests and riots. Second, using data on Sub-Saharan Africa, we identify properties
of the electoral process that prompt the losers to deny the electoral mandate to the winners.

3.1 Previous Literature

The theoretical literature on post-election stability is sparse. Przeworski (2005) analyzed how election results affect the dissent of losers after democratic elections. The results of democratic free and fair elections are highly informative about the distribution of popular support. Hence, this model of post-election dissent does not focus on the problem that is crucial for understanding political dynamics in elections marred by repression and fraud: namely, when do the losers reject the election outcome, which is known to be only a distorted representation of true public opinion?

Magaloni (2006) studied the incentives of opposition parties to coordinate their efforts in rejecting election results but did not derive predictions about the properties of the electoral process that can foster such coordination. Cox (2009) analyzed elections under authoritarianism from an informational perspective. In his model, an incumbent autocrat holds elections in order to learn the capacity of the opposition to mobilize and uses this information in deciding whether to avoid a violent conflict. However, in the model by Cox (2009), elections only provide information about the capacity of the opposition to mobilize during election campaigns – election results are assumed to play no role in the model. We argue that even unfree and unfair elections may provide some information about the relative levels of support for competing factions. The difference in these assumptions has substantial implications: our model enables us to hypothesize about the post-election political dynamics conditional on the observed election results. In contrast, the model by Cox (2009) cannot generate such predictions.

Empirical literature on post-election dissent is equally sparse. Analyzing post-
communist democracies, Anderson et al. (2005) found that citizens whose favorite candidate lost elections are more likely to disapprove of the entire electoral process. In their brief account of post-election politics in Africa, Bratton and van de Walle (1997, 205-206) document how election losers disapprove the electoral process when it is marred by the incumbent’s interference (also see Magaloni, 2006). Kuhn (2011) argues that post-election protests occur when elections are unfree or when they are won by slim margins. While these studies suggest the effects of the winner’s vote-share and the quality of elections are additive and linear, we find these effects to be interactive and non-linear.

3.2 A Model of Post-Election Dissent

To model post-election dissent, we employ the canonical framework of conflict analysis set forth by Fearon (1995). In this framework, two actors may either resolve their disagreements peacefully or through a mutually costly confrontation. When actors are well informed about the strength of their opponents, a costly confrontation can be avoided. However, even rational actors can engage in a costly conflict when such information is scarce. Our analysis focuses on the following question: ‘How does information transmitted in elections affect the calculus of the losing party in deciding to protest and risk a costly confrontation with the winner?’

3.2.1 The Setting

Suppose there are two actors – an incumbent leader A (or government) and his opponent B. Being a government gives a payoff equal to one and being in the opposition gives a payoff equal to zero. B can choose to rebel against the incumbent or acquiesce. The term ‘rebel’ is used in a very general sense to include both peaceful and military means of dissent. Clearly, different types of rebellion induce different costs but for now we abstract from these particularities.
We assume that the opposition’s rebellion can succeed only if supported by a majority of citizens. This assumption might appear wanting as most leaders are removed in complicit coups, not popular uprisings (Tullock, 1987). However, the assumption we make only requires that the rebelling opponents can \textit{count} (not necessarily rely) upon wide popular support. A coup might escalate into a civil conflict rendering the distribution of popular support essential (Geddes, 2006).\footnote{A paradigmatic example of that is the Spanish Civil War which escalated from a coup that did not have a sufficient backing in the population (Beevor, 2006).} This may explain why even brutal tyrants are obsessed with feeling popular (Wintrobe, 1998).

Formally, let $\theta$ denote the share of population that supports $A$. We assume that $A$ can be toppled in a rebellion if and only if $\theta < w/2$. Here, $w \in \{0, 1\}$ represents $A$’s weakness: If $A$ is weak ($w = 1$), $B$ will win against him if $\theta < 1/2$ and will lose otherwise (the majority rule is binding). If, however, $A$ is strong ($w = 0$), then $B$’s rebellion will always be unsuccessful (the majority rule is not binding).

For example, if a government can rely on the military to crackdown on a protest ($w = 0$), the regime opponents should not expect a successful revolt even if they are highly popular. We assume that $A$ knows his type while the opposition believes that $\Pr(w = 1) = \mu$.

Further, we assume that neither $A$ nor $B$ know the true support for the incumbent, $\theta$. In autocratic regimes, citizens have strong incentives to misrepresent their political preferences (Kuran, 1995) and neither government nor its opponents have reliable means to collect and exchange information about the regime support (Wintrobe, 1998). Both players have common prior beliefs about the incumbent’s popularity represented by a distribution $F$. For tractability, we assume that $F(x) = x/(b-a)$.

Now suppose that $A$ and $B$ are placed in a post-election environment and can use the results of elections to update their beliefs about each other’s true popularity. We are particularly interested in how information about the incumbent’s popularity...
is affected when it is known that elections have been unfree and unfair, as it often happens outside established democracies (Schedler, 2006). In particular, let $v = v(\theta, r)$ be the vote-share received by the incumbent (hence, $1 - v$ is the vote-share of the opposition). We use the following vote-production function:

$$v(\theta, \rho) = \theta + \rho(1 - \theta)$$

where $\rho$ is the level of electoral repression (or unfairness of elections). One can see from the expression that $\rho$ is the share of votes taken away from the opposition. The parameter $\rho$ is intended to capture a variety of methods that governments use to manipulate election results (ballot stuffing, bribery, intimidation, fraud etc.).

Notice several attractive properties of this model: First, the greater is the incumbent’s true support $\theta$, the higher is the vote-share he receives. Second, when elections are free and fair ($\rho = 0$), $A$’s vote-share represents his true popular support, $v(\theta, \rho) = \theta$. When elections are unfair ($\rho > 0$), the voting outcome will be skewed to the benefit of $A$. Third, as elections become increasingly unfair ($\rho \to 1$), their results cease being related to $A$’s true support $\theta$.

Further, we assume that the government knows the true level of unfairness $\rho$, while the opposition receives a noisy signal $r$ positively correlated with $\rho$. For tractability, the signal $r$ is assumed to be a draw from the distribution uniform on the interval $[0, \rho]$. It is common that a random event provides the public with information about the potential extent of election fraud. In the 1986 elections in the Philippines, fraud was uncovered when 30 vote counters announced the official numbers to be false. In the 2004 presidential elections in the Ukraine, the staff of the losing candidate (Viktor Yushchenko) obtained an audio recording in which the campaign team of his opponent (Vladimir Yanukovich) allegedly discuss how to rig the election.

The structure of the game is represented in Figure 3.1: 1) the Nature chooses
the autocrat’s true popularity $\theta$, which is not observed by either player; 2) both parties observe election result $v(\theta, \rho)$, and the opposition receives a signal $r$ from the distribution $\pi(r|\rho);$ 3) $B$ decides whether to dissent against $A$ or accept the election result; 4) if $B$ dissents, $A$ decides whether to concede or retaliate. In the event of retaliation, both parties face a ‘confrontation’, which incurs costs $c_a$ and $c_b$ for $A$ and $B$, respectively.

Notably, parties will incur the cost of post-election dissent only if the loser rebels and the winner retaliates against such rebellion. The loser can express his dissent without any cost if he suffers no retaliation for his actions. For example, a peaceful protest that removes a leader from office is not a costly activity if the protesters are not physically threatened by the state. Naturally, there might be additional costs related protest coordination; however, adding such extra cost to the model does not yield additional insights.

### 3.2.2 Analysis and Predictions

Let $k(v, r) = \Pr(\theta < w|v, r)$ refer to $B$’s updated belief that $A$ is sufficiently unpopular given the election result $y$ and the signal of unfairness $r$. Similarly, let $k(v, \rho)$ be $A$’s posterior belief that he would win in retaliation against $B$, if the latter decided

\footnote{In a companion theoretical paper, we consider a model where the choice of $\rho$ is endogenous. Though such model is more realistic, it does not yield predictions at odds with the one presented in this paper. Since the main purpose of this analysis is to understand the strategic interaction given the information revealed in elections and not the incumbent’s choices made prior to elections, we use a simplified version of the model where $\rho$ is given and not endogenously chosen.}
to rebel. Note that $B$’s updated belief depends on a noisy signal $r$, whereas $A$’s updated belief depends on the true known value $\rho$. After elections, the incumbent becomes better informed about the distribution of support than his opponent.

The following Proposition states that in equilibrium, $B$ will dissent against $A$ only if he believes that $A$ is sufficiently unpopular. How great this belief must be depends on the expected costs of retaliation from the incumbent $A$. All proofs are in Appendix A.

**Proposition 6.** In a Bayesian Nash equilibrium, $B$ protests against $A$’s election if and only if $k(v, r) \geq \gamma(c_b, \mu)$, where $\gamma(c_b, \mu)$ is decreasing in $\mu$ and increasing in $c_b$.

Here, $\gamma$ refers to the expected cost of confrontation (again, this cost is only incurred if the winner retaliates against the dissenting loser). In a democracy, the cost is expected to be low: the military is less likely to interfere in the dispute settling (high $\mu$), the government is more sensitive about using repression (low $c_b$). In an autocracy, the military is more likely to support the government in suppressing the dissent ($\mu$ is low), and the opposition can expect harsher punishment (high $c_b$).

When can the winning party induce the losing one to consent with the election outcome? For this to happen, two conditions must hold: First, the winning party must be able to credibly threaten retaliation in the event of dissent. Second, the losing party must believe that its chances of winning the confrontation are too low to be worth the risk. The question is: When are these conditions more likely to hold? The following Proposition states how the quality of elections and the results of voting may affect post-election stability.

**Proposition 7.** There is $v'$ such that $k(v, r)$ is increasing in $r$ for $v \leq v'$ and is constant in $r$ for $v > v'$. Further,

$$\frac{\partial}{\partial v} k(v, r) = \begin{cases} \leq 0 & \text{if } v \leq \eta(r) \\ > 0 & \text{if } v > \eta(r) \end{cases}$$ (3.2)
where $\eta(\cdot)$ is an increasing function.

The model yields a set of interactive and non-linear predictions. The first prediction concerns the effects of electoral repression and can be stated as follows:

**Prediction 3.** The likelihood of post-election protest increases in the perceived unfairness of elections. However, when elections are won by sufficiently large margins, unfairness of elections ceases to affect post-election stability.

Figure 3.2 illustrates this prediction. The intuition behind this result can be explained as follows: if, for example, a winner receives 55% of votes, then even a slight signal that elections were unfair can put the victory in doubt. It would suffice to suspect that at least 5% of votes are due to unfair competition or fraud to infer that the winner is not supported by a majority of voters. In contrast, if
Figure 3.3: Probability that the incumbent is supported by less than a majority of citizens as a function of election result, \( v \).

The winner receives 95% of votes, then the direct information about the degree of electoral repression becomes largely irrelevant. The high margin of victory itself becomes sufficient evidence that elections have not been clean. Notably, we do not claim that dissent should not take place after elections won by large margins. Rather, the prediction states that when the margins of victory are large, the likelihood of dissent will be unrelated to the unfairness of elections \( r \).

The second prediction of the model concerns the effects of the winner’s vote-share. In Figure 3.3, we show how the posterior beliefs of the losers change as the winner’s vote-share increases from a bare majority to complete victory. Interestingly, these effects are non-linear. Winners who acquire the office by very slim margins face a shaky future – the losers are almost certain to reject the voting outcome. As
we already discussed, when margins of victory are small, even the slightest suspicion that elections were not clean might throw the outcome of voting into disbelief. Thus, greater margins of victory make the losers more comfortable with the idea that they indeed lost to a more popular party.

However, at some point, when the winner’s vote-share becomes exceedingly high, increasing it further makes the losers less and less likely to accept the outcome of voting. This result is not obvious and requires some explanation. An extra large victory margin reveals that elections have not been fair even if the signal of fraud, $r$, was low. A very large vote-share itself becomes evidence of high fraud. For instance, if the winner receives 100% of votes when it is known that at least 20% of voters support the opposition, then it is clear that at least 20% of the winner’s votes were received due to unfair competition. But if the election result per se suggests that such a large number of votes were certainly fraudulent and this fraud was not detected directly, then it is highly likely that many more votes were fraudulent without being detected.

An example of this logic is provided in the following statement by the President of Belarus Alexander Lukashenko regarding the 2006 presidential elections. Asked by the press whether the elections were free and fair, he responded, “93 percent voted for me in the last election. I then admitted when coming under pressure that we had falsified the election results. I said bluntly, ‘Yes, we falsified them’. I ordered that the 93 percent should be replaced with something around 80 percent (I don’t remember exactly how much). Because it is psychologically hard to accept a percent higher than 90.” The example speaks well to the fact that autocrats recognize the importance of managing beliefs to induce post-election consent and that those beliefs depend on the margin of victory in the way hypothesized by the model.

This argument raises a question: ‘Why do leaders hold highly rigged elections yielding unrealistically large margins of victory, thereby placing the voting results
in great doubt? We contend that this is so because winning by small margins is inherently more risky than winning by extra-large margins — while disbelief in the popularity starts to increase when the margins are very large, it never reaches a level comparable to that of low margins, as can be readily seen in Figure 3.3. If incumbents knew their true popular support, they could optimally choose levels of repression that assure intermediate and safe margins of victory. Yet, in the absence of such knowledge, it may appear more desirable to over-repress and win by wide margins rather than under-repress and win by slim and risky margins.

Furthermore, Figure 3.3 depicts the post-election beliefs of the losing party, but empirically, we can only observe its decision to dissent or not. This decision depends both on the beliefs about the winner’s true popularity and on the expected cost of confrontation ($\gamma$). This has important consequences for the empirical content of the model: At large margins of victory, though the curve representing the posterior belief that the winner is unpopular is increasing, it never reaches high levels. This implies that in order to observe a protest after elections won with large margins, we need the expected cost of confrontation ($\gamma$) to be sufficiently low. In contrast, this constraint is not needed for small margins of victory where disbelief in the election result can reach high levels and overweigh even a high expected cost of confrontation. Thus, the following observable implication is in place:

**Prediction 4.** If the losers are facing a highly repressive regime, then the likelihood of a post-election dissent is monotonically decreasing in the winner’s vote-share. If the losers are facing only a mildly repressive regime, the effect of the winner’s vote-share is non-monotonic provided that elections were at least moderately fair.

Lastly, the model also identifies the point at which the election result starts losing credibility even in the absence of clear evidence that elections were unfree and unfair. Notice that the threshold point $\eta(r)$, where the curves in Figure 3.3 start to increase,
depends on the signal of fraud $r$: the higher is $r$, the higher is the threshold $\eta(r)$ above which the election result loses credibility.

**Prediction 5.** The higher is the signal of unfairness ($r$), the less it is likely that election results will be perceived as incredulous.

Given a sufficiently high signal $r$, any election result becomes ‘credible’ (in the sense of being expected, not in the sense of being perceived as a true representation of public opinion).

### 3.3 Empirical Evaluation

How well does the model explain the empirical patterns of post-election dissent? To address this question, we first study how the quality of elections and their results affect the likelihood of post-election protests and riots across new democracies and electoral autocracies. Second, focusing on Sub-Saharan Africa, we study when election losers are more likely to deny the mandate to the winners. The two analyses are distinct in that they employ different dependent variables. A sheer rejection of election results is, admittedly, a less consequential and less risky form of dissent than a post-election protest. Yet, both of these forms of dissent are important manifestations of political disorder.

#### 3.3.1 Data for the Analysis of Post-election Protests

In our study of post-election protests and riots, we employ the NELDA data set by (Hyde and Marinov, 2012). The data set contains multiple measures of the quality of elections and post-election outcomes for most non-established democracies and autocracies from 1945 to 2006. In this analysis, the dependent variable *Protest* is an indicator for the occurrence of post-election protests or riots (NELDA variable q29).
To measure the quality of elections, we use ten indicator variables from the NELDA dataset listed in Table B.1 in Appendix B. The ten indicators were summed for each country-election resulting in the variable Rigged, representing the parameter $r$ in our theoretical model. Thus, a score of zero indicates free and fair elections while a higher score indicates more rigged elections (empirically, the highest score in the dataset is 7). To assure our results are not sensitive to the choice of indicators measuring Rigged, we conducted a set of robustness analyses reported in section S.1 of Supplementary Materials.

The theory of post-election dissent predicts a set of empirical patterns, which depend on the parameter $\gamma(c_b, \mu)$ – the cost of confrontation. Though there is no direct way to measure this variable, it is reasonable to assume that the costs of confrontation are correlated with regime type. An autocratic country can rely on the military (low $\mu$) and use cruel means (high $c_b$) in suppressing dissent; thus, increasing the confrontation costs (we have shown that $\gamma$ is increasing in $c_b$ and decreasing in $\mu$). In contrast, a democratic country will not be able to wage a cruel retaliation against a protesting opposition without incurring high reputation costs (low $c_b$). In sum, $\gamma$ should be higher in autocracies than in democracies. Thus, we use Polity IV democracy scores as a proxy measure for the confrontation costs $\gamma$.\footnote{One potential criticism of using Polity IV democracy scores is that, conceptually, democracy presumes clean elections. Thus, Polity IV and $r$ would be measuring the same underlying quantity and the analysis could suffer from collinearity. Empirically, however, that is not the case: correlation between the Polity IV scores and the measure of unfairness of elections $r$ is moderate (-0.62).}

However, to assess robustness, we also replicate our results using Political Terror scale by Gibney, Cornett and Wood (2009) as another proxy measure for retaliation cost $\gamma$. Our results are consistent across these different proxy measures (see section S.2 of the Supplementary Materials).

The quality of elections, the winner’s vote-share, and confrontation costs are the three key variables necessary to test our theory. However, we also include a
set of control variables representing the structural characteristics of countries. In particular, earlier literature indicated that wealth could be an important predictor of political instability (Huntington, 1968; Przeworski, 2005; Collier, 2009), and thus we control for the log-GDP per capita. We also control for Ethnic diversity defined as the probability that two randomly chosen citizens belong to different ethnic groups Wacziarg et al. (2003). Previous research also suggested that the effects of ethnic diversity and economic development could be interactive (Collier, 2009); thus, we include an interaction term between log-GDP per capita and ethnic diversity.

In addition, legislative elections often result in power-sharing through coalitions and committees. In contrast, power sharing in the aftermath of the presidential elections is rarely an option. The very fact that power cannot be shared might prompt the losers to resort to challenging the incumbent by non-constitutional means. To account for this possibility, we add a dummy variable Legislative equal to one if the election is legislative and zero otherwise.

Losers may also dissent against the winners simply because they did not participate in elections. Thus, we also control for the degree of opposition participation by including an indicator variable Boycott (NELDA variable q14). Finally, to account for time-trends in the frequency of post-election protests, we add a cubic polynomial of years.

Since our goal is to explain protest against the majority-vote winners, we only consider elections where the winner received at least 50% of votes (this constitutes about 75% of the data). The logic of political dynamics after elections where none of the candidates won a majority of votes is a topic in its own right. Our theory does not make clear predictions about these types of cases. Notably, this exclusion does

---

4 The power-sharing agreement in Zimbabwe is a rare exception to this rule.

5 We have also controlled for election turnout, which appears not to have any effect on our results (see section S.2 of the Supplementary Materials).
not constitute a selection bias as we are interested in the determinants of political stability in the elections that do have a majority winner.

### 3.3.2 Statistical Model

Let $z_{ij}^*$ denote a latent propensity to dissent in a country $j$ and election $i$. $z_{ij}^*$ is modeled as a function of the winners vote-share $v_{ij}$, electoral repression $r_{ij}$, confrontation cost $\gamma_{ij}$ (Polity IV scores as a proxy), and control variables $x_{ij}$. Our theory predicts that the effects of $r_{ij}$ depend on $v_{ij}$ and that the effects of $v_{ij}$ are non-monotonic and dependent on $r_{ij}$ and $\gamma_{ij}$. Thus, the following model is used:

$$
\text{Protest}_{ij} = \begin{cases} 
0 & \text{if } z_{ij}^* \leq 0 \\
1 & \text{if } z_{ij}^* > 0
\end{cases} \quad (3.3)
$$

$z_{ij}^* = u_i + \beta_v v_{ij} + Bv_{ij}^2 + \beta_r r_{ij} + \beta_\gamma \gamma_{ij} + \beta' x_{ij} + e_{ij} \quad (3.4)$

where $B = \beta_{v^2} + \beta_{r^2} r_{ij} + \beta_{\gamma^2} \gamma_{ij}$,

$$
u_i \sim N(\alpha_0 + \alpha' x_i, \sigma^2) \text{ and, } e_{ij} \sim t_\nu
$$

$u_i$ is a country-level random intercept with the mean dependent on a vector of time-invariant variables $x_i$ (i.e., ethnic fragmentation) and the variance $\sigma^2$, which is estimated from the data. Such country-specific intercept is required due to the hierarchical nature of the data. Also, this allows us to control for unobserved confounding country-level factors that could potentially bias the estimates.

Further, note the interactive structure of the model: the quadratic term of the winner’s vote-share is interacted both with the unfairness of elections $r$ and the regime type $\gamma$. The theory predicts that we will be able to observe the non-linear effects of the winner’s vote-share only if elections are relatively free and fair ($r$ is low), and the regime is not too repressive ($\gamma$ is low). Otherwise, the effects of the winner’s vote-share will be linear. The interactive structure allows us to account for such a contingency.

The errors $e_{ij}$ are assumed to follow the Student’s $t$ distribution with $\nu$ degrees of
freedom. This assumption leads to a robust version of binary regression (Liu, 1996). The usual probit model is just a special case of the robust regression with $\nu = \infty$. The robust model is less sensitive to outliers in the data. We estimated the models by setting $\nu = (1, 3, 5, 7, 15, \infty)$ and found that the results are generally robust to the choice of $\nu$. Also, we have found that in all instances, models with $\nu = 3$ or $\nu = 5$ outperform the probit model ($\nu = \infty$) in terms of goodness-of-fit as measured by the deviance information criterion, DIC. In reporting the results, we present the estimates of the model with the best in-sample model fit.

3.3.3 Composite Hypotheses

Our theory of post-election dissent yields non-linear and interactive predictions. Thus, straightforward interpretation of the coefficients will not suffice in weighing the evidence. To properly assess the evidence, we need to test a set of composite hypotheses.

Prediction 3 states that unfairness of elections increases the likelihood of post-election protest, but the magnitude of this effect decreases in the margin of victory. Formally, this is equivalent to the following set of conditions:

$$
\frac{\partial}{\partial r} z^* > 0 \quad \text{and} \quad \frac{\partial^2}{\partial r \partial v} z^* < 0
$$

(3.5)

It is easily demonstrated that these two conditions hold if and only if $\beta_r > 0$ and $\beta_{rv^2} < 0$. Thus, we report the joint posterior probability $\Pr(\beta_r > 0 \& \beta_{rv^2} < 0)$ — if it is high, then it serves as evidence that Prediction 3 is supported by the data.

Further, according to Prediction 4, increasing the winners vote-share $v$ reduces the likelihood of dissent in a monotonic fashion when either $r$ is large (elections are highly unfair) or $\gamma$ is small (a country is highly autocratic — the Polity IV score is low) or both. Otherwise, if $r$ is sufficiently small and $\gamma$ is sufficiently large, the
effect of $v$ is non-monotonic but U-shaped. If we set $r = 0$ and $\gamma = 0$ (free and fair elections in mildly repressive regime), then the prediction about the U-shaped relationship holds if the posterior probability $\Pr(\beta_v < 0 \& \beta_v^2 > 0)$ is large.

Lastly, Prediction 5 states that the point at which the winner’s vote-share becomes incredulous is increasing in unfairness of elections $r$. Formally, let $\eta(r)$ be a critical point of the function $z^*(v)$: $\eta(r) \equiv \arg \min_v z^*$. It is easily shown that

$$\eta(r) = \frac{-\beta_v}{2(\beta_v^2 + \beta_{rv^2} r + \beta_{rv^2} \gamma)}.$$  \hspace{1cm} (3.6)

Since $\frac{d}{dr} \eta(r) \geq 0$ if and only if $\beta_v \times \beta_{rv^2} > 0$, the joint posterior probability $\Pr(\beta_v \times \beta_{rv^2} > 0)$ will be used to assess the evidence for Prediction 5.

3.3.4 Explaining Post-Election Protest

Table 3.1 presents the results. Model 1 is a baseline model which includes only the variables specified in our theory and country-level random intercepts. In Model 2, a set of control variables is included. Note that both models have excellent in-sample predictive power as indicated by the large area under the Receiver Operating Characteristic (ROC) curve. In both specifications, the results are consistent with the theoretical predictions.

First, unfairness of elections raises the hazard of post-election protest (the coefficient for the variable $\textit{Rigged}$, $r$ is positive), but this effect becomes smaller as the winner’s vote-share grows (the coefficient for the variable $r \times v^2$ is negative). The posterior probability $\pi_1$ is equal to 0.98 indicating strong support for Prediction 3.

To see the substantive size of this effect, consider Figure 3.4. After a slim victory (55% of votes), going from fully free and fair ($r = 0$) to highly rigged elections ($r = 7$) means going from an almost certainly stable post-election environment to an almost certain protest or riot. In contrast, when the margin of victory is wide (95%),
Table 3.1: Predicting post-election protests and riots: robust binary regressions (Student’s $t$ link function with $\nu = 3$) with country-level random intercepts. Average posterior estimates and 95% highest posterior density (HPD) intervals. Model 2 also includes a cubic polynomial of years.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>95% CI</td>
<td>$\hat{\beta}$</td>
<td>95% CI</td>
</tr>
<tr>
<td>I</td>
<td>6.83</td>
<td>(-0.87, 14.76)</td>
<td>7.55</td>
<td>(-1.94, 17.1)</td>
</tr>
<tr>
<td>Voteshare, $v$</td>
<td>-28.54</td>
<td>(-51.99, -5.25)</td>
<td>-27.52</td>
<td>(-54.63, -0.04)</td>
</tr>
<tr>
<td>$v^2$</td>
<td>20.82</td>
<td>(3.73, 37.85)</td>
<td>20.19</td>
<td>(0.70, 41.01)</td>
</tr>
<tr>
<td>Rigged, $r$</td>
<td>1.17</td>
<td>(0.63, 1.76)</td>
<td>1.42</td>
<td>(0.71, 2.19)</td>
</tr>
<tr>
<td>$r \times v^2$</td>
<td>-1.10</td>
<td>(-2.1, -0.06)</td>
<td>-1.55</td>
<td>(-2.9, -0.29)</td>
</tr>
<tr>
<td>Polity, $\gamma$</td>
<td>-0.25</td>
<td>(-0.42, -0.09)</td>
<td>-0.21</td>
<td>(-0.40, -0.02)</td>
</tr>
<tr>
<td>$\gamma \times v^2$</td>
<td>0.46</td>
<td>(0.12, 0.82)</td>
<td>0.36</td>
<td>(-0.06, 0.76)</td>
</tr>
<tr>
<td>$\ln(GDP)$</td>
<td></td>
<td></td>
<td>-0.14</td>
<td>(-0.64, 0.32)</td>
</tr>
<tr>
<td>ELF</td>
<td></td>
<td></td>
<td>-0.19</td>
<td>(-2.17, 1.74)</td>
</tr>
<tr>
<td>$\ln(GDP) \times$ ELF</td>
<td>1.31</td>
<td>(0.22, 3.11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legislative</td>
<td></td>
<td></td>
<td>-0.38</td>
<td>(-1.01, 0.21)</td>
</tr>
<tr>
<td>Boycott</td>
<td></td>
<td></td>
<td>0.28</td>
<td>(-0.50, 1.08)</td>
</tr>
</tbody>
</table>

$\pi_1 = \Pr(\beta_r > 0 \& \beta_{rv^2} < 0)$ = 0.99

$\pi_2 = \Pr(\beta_r < 0 \& \beta_{rv^2} > 0)$ = 0.99

$\pi_3 = \Pr(\beta_r \times \beta_{rv^2} > 0)$ = 0.98

$\sigma^2 = 1.17$ (0.64, 1.74) = 1.36 (0.65, 2.06)

AIC = 510

DIC = 338

ROC = 0.91 (0.88, 0.94)

Elections (countries) = 516 (100) = 497 (97)

Increasing $r$ has no traceable effect on post-election protest. Slim margins of victory lead to a political environment highly sensitive to the perceptions of unfairness, whereas wide margins render those perceptions irrelevant.

This empirical pattern is consistent with our theoretical prediction that the unfairness of elections is less informative about the winner’s true popularity when the
Margins of victory are large. This suggests that post-election protest is not a morally driven reaction to unfair electoral competition. If it were such, we would observe many protests after highly rigged elections irrespective of the winners vote-share. Instead, the effect of election unfairness is conditional on the winner’s vote-share. This suggests that when arriving to their decision to dissent, the losers evaluate their popularity vis-a-vis the winners of elections. The idea that people are driven to the streets by sheer discontent with the quality of the electoral process is inconsistent with the data.

Second, consider the effects of the Winners vote-share. In both models, the coefficient estimates as well as the posterior probability $\pi_2$ indicate a very high degree of support for Prediction 4. Increasing the winner’s vote-share does reduce the likeli-
Figure 3.5: Predicted probabilities of post-election protest as a function of the winner’s vote-share. The horizontal line is the average probability of protest in the dataset. Other covariates are set to their mean values.

hood of post-election protest as indicated by the negative coefficient $\beta_v$. In addition, the 95% HPD interval for the estimate of $\beta_v^2$ is in the positive area suggesting that the effects of the winner’s vote-share is non-linear. Since the interaction effects $r \times v^2$ and $\gamma \times v^2$ are also statistically significant, the results indicate that the effects of the winner’s vote-share are non-linear only for certain values of $r$ and $\gamma$.

Figure 3.5 depicts the relationship between the winners vote-share and the predicted probability of a protest under several scenarios. In a repressive country (Polity IV = - 5), the likelihood of a protest is monotonically decreasing in the winners vote-share. By contrast, in a relatively democratic country (Polity IV = 5), the effects of the winners vote-share are non-monotonic. At first, increasing the winner’s vote-share reduces the chances of a post-election protest. However, once the winner’s vote-share becomes sufficiently large, its effect is reversed – it starts to encourage political instability.

When elections are perceived as only mildly unfair, they leave little uncertainty
about the true distribution of public support. Protests after such elections can occur only in rare instances: First, when a country is non-democratic and the winner’s vote-share is only slightly greater than a majority (below 55%), as indicated in the left panel of Figure 3.4. Second, when a country is not highly repressive and the winner’s vote-share is overwhelmingly high (above 95%), as indicated in the right panel of Figure 3.4.

It is interesting to compare Models 1 and 2. Remarkably, adding a set of potentially confounding structural variables does not produce any tractable change in the estimates. None of the added variables are significant at conventional levels: neither a country’s wealth nor ethnic diversity affect the risk of a post-election protest. Remarkably, the predictive power of the model also does not increase once we add the set of control variables – the area under the ROC curve remains nearly the same. In fact, the Aikake’s information criterion (AIC) is smaller in the second model, indicating that additional variables do not contribute enough to the model fit to outweigh the increase in the model complexity.

This leads to the conclusion that processual rather than structural factors are the main driving force behind political instability in developing democracies and autocracies. It is not poverty or ethnic divisions that are responsible for post-election political instability. It is the very electoral process that leads the losers to believe they are more popular than the winners that leads to political instability.

3.3.5 Explaining Mandate Denial

Public protest against a recently elected government is an evident symptom of instability. A less pronounced and yet important symptom of political instability is mandate denial – when the losing party refuses to accept the voting outcome. To take a recent example, after losing the Ugandan presidential elections in February 2011, a coalition of four opposition parties declared that they “categorically reject
the outcome of the elections” and will seek means as to “how to bring an end to the illegitimate government” (McGregor and Ojambo, 2011). Such mandate denials create political uncertainty and sometimes encourage violent backlashes. Violence in the Democratic Republic of Congo in 2006 or in Kenya in 2007 are but a few recent cases of spiraling post-election violence prompted by mandate denial.

How well does the informational model explain variation in the mandate denial? To address this question, we use the data by Lindberg (2006a) on elections in Sub-Saharan Africa from 1969 to 2003. The data set includes a three-category measure of the mandate denial: (1) all main players immediately accepted the result of voting; (2) some but not all of the main players accepted the results or accepted them later; (3) none of the main players accepted the result.

In our analysis, we employ the same statistical model and the same measures as in the analysis of the previous section. The only difference is that now the outcome variable is a three-category measure, which requires estimating a threshold parameter $\kappa$ to yield a robust ordinal regression.

Table 3.2 shows the results from robust ordinal regression models predicting the degree of mandate denial in Sub-Saharan Africa. Model 1 estimates the baseline model, while Model 2 includes a set of structural confounders - wealth, ethnic diversity, and election type. Although the evidence for Predictions 3 and 5 is not particularly strong as indicated by the posterior probabilities $\pi_1$ and $\pi_3$, both models indicate support for the informational model of post-election stability.

First, when elections are highly rigged, the losers are more likely to deny the mandate to the winner but less so when the winner’s vote-share is large. For instance, after elections where the winner has received 55% of the votes, going from mildly rigged ($r = 1$) to highly rigged ($r = 4$) elections increases the probability that the winner’s mandate is denied by all losing parties by 0.25($\pm$0.12) units. In contrast, if the winner receives 95%, this probability increases by 0.01($\pm$0.11) units; thus, the
Table 3.2: Predicting the losers’ reaction to election results in Sub-Saharan Africa: 0 - all accepted results; 1 - some rejected; 2 - all rejected. Robust ordinal regression (Student’s $t$ link with $\nu = 5$) with country-level random intercepts. Model 2 also included a cubic polynomial of years.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>95% CI</td>
</tr>
<tr>
<td>Intercept</td>
<td>9.91 (3.07, 16.78)</td>
<td>18.15 (8.26, 27.23)</td>
</tr>
<tr>
<td>Voteshare, $v$</td>
<td>-30.27 (-50.48, -10.18)</td>
<td>-34.22 (-57.88, -11.39)</td>
</tr>
<tr>
<td>$v^2$</td>
<td>23.24 (8.32, 37.25)</td>
<td>25.09 (9.00, 42.67)</td>
</tr>
<tr>
<td>Rigged, $r$</td>
<td>0.38 (-0.05, 0.78)</td>
<td>0.37 (-0.11, 0.82)</td>
</tr>
<tr>
<td>$r \times v^2$</td>
<td>-0.44 (-1.20, 0.36)</td>
<td>-0.39 (-1.25, 0.50)</td>
</tr>
<tr>
<td>Polity, $\gamma$</td>
<td>-0.16 (-0.30, -0.02)</td>
<td>-0.14 (-0.29, 0.02)</td>
</tr>
<tr>
<td>$\gamma \times v^2$</td>
<td>0.18 (-0.12, 0.48)</td>
<td>0.16 (-0.16, 0.50)</td>
</tr>
<tr>
<td>$\ln(GDP)$</td>
<td>-0.23 (-0.68, 0.20)</td>
<td>-0.23 (-0.68, 0.20)</td>
</tr>
<tr>
<td>ELF</td>
<td>-3.09 (-5.23, -0.96)</td>
<td>3.34 (0.74, 6.06)</td>
</tr>
<tr>
<td>$\ln(GDP) \times$ ELF</td>
<td>-0.73 (-1.18, -0.25)</td>
<td>-0.73 (-1.18, -0.25)</td>
</tr>
<tr>
<td>Legislative elections</td>
<td>-0.62 (-1.20, -0.04)</td>
<td>-0.62 (-1.20, -0.04)</td>
</tr>
<tr>
<td>Opposition participation</td>
<td>1.22 (0.98, 1.45)</td>
<td>1.36 (1.11, 1.62)</td>
</tr>
<tr>
<td>Threshold, $\kappa$</td>
<td>0.58 (0.27, 0.93)</td>
<td>0.61 (0.26, 0.96)</td>
</tr>
<tr>
<td>$\sigma^2$</td>
<td>0.86</td>
<td>0.81</td>
</tr>
<tr>
<td>AIC</td>
<td>399</td>
<td>388</td>
</tr>
<tr>
<td>DIC</td>
<td>169 (40)</td>
<td>168 (40)</td>
</tr>
</tbody>
</table>

unfairness of elections does not influence mandate denial when the winner’s vote-share is sufficiently large.

Second, there is very strong support in the data for the second prediction of the model stating the U-shaped relationship between the winner’s vote-share and post-election dissent, as indicated by the posterior probability $\pi_2$. After rigged elections ($r = 4$), all else being equal, the winner who has received 70% of votes will be denied
the mandate by all the losers with a probability of 0.34(±0.11). However, if the same incumbent has received either 51% or 90% of votes, he will be denied the mandate with a probability of 0.64(±0.27). All else being equal, the intermediate victories assure greater post-election stability than either very slim or very large victories.

Adding a set of control variables to the model does not produce any significant change in the results, except that the probabilities \( \pi_1 \) and \( \pi_3 \) slightly decrease. However, in contrast to the analysis of post-election protest, the control variables do have statistically tractable effects on mandate denial. Presidential elections are more likely to be rejected by the losers than legislative ones. This does make sense because legislative power can be shared, while presidential power generally cannot be shared. Also, a greater involvement of the opposition in elections reduces the hazard of mandate denial. We do not find a statistically traceable effect of economic development on mandate denial. However, economic development does have an important role to play in the interaction with a country’s ethnic heterogeneity as we explain below.

Ethnic heterogeneity does have an effect on the rejection of election results, but its magnitude highly depends on the degree of economic development: In a country with $500 GDP per capita, going from a society with two equally populous ethnic groups \((ELF = 0.5)\) to a country with four equally populous ethnic groups \((ELF = 0.75)\) reduces the predicted probability that all losers reject the election result by 0.59 units \((±0.1)\). By comparison, in a country with $5000 GDP per capita, the same change in ethnic diversity produces only a 0.07 unit \((±0.15)\) reduction in the predicted probability. Thus, ethnic diversity reduces the likelihood of post-election dissent in poor societies, and it does not have a traceable effect in richer ones. We would surmise that this is due to prohibitively high costs of cross-ethnic coordination in poor societies. This result is somewhat unexpected and therefore more research is needed to determine the role of ethnic diversity on post-election stability.
3.4 Discussion

We proposed a theory of post-election political stability that focuses on the beliefs, interests, and strategies of the elites and citizens. Controlling for important structural cofounders like the level of economic development and ethnic fractionalization, we found that information about the popularity of competing parties exerts an independent effect on post-election political dynamics. This research draws attention to the fact that even structurally similar polities may experience variable post-election histories.

It is indeed a predominant thought in the literature that unfair elections should lead to post-election dissent, but we do not really know why. This paper provides an explanation: unfair elections induce the losers to believe that their ranks are more populous than those of the winners. However, we also find that the relationship between the unfairness of elections and post-election dissent is non-monotonic: it increases the likelihood of dissent when incumbents win with small or moderate margins, but once the margin of victory is sufficiently high, the perceived unfairness of the electoral process ceases to have any effect.

What do these findings mean for the debate about the value of elections in ascertaining political stability? The main lesson is that it is insufficient to focus only on the occurrence of elections. Elections can both stabilize and destabilize political authority depending on their fairness and the results of voting. Most susceptible to post-election instability are moderately democratic polities – those that have partially liberal state institutions and still hold unfair elections. In such polities, post-election instability is likely both when margins of victory are very low or very high. The least susceptible to post-election instability are either fully democratic countries that hold clean elections or autocratic countries that hold rigged elections and can credibly threaten violence in the event of protest. The former are susceptible
to post-election disorder when the margins of victory are suspiciously high, while the latter when the margins of victory are unexpectedly low.

Finally, our story about the effects of information on post-election political stability may contribute to a greater understanding of the general phenomenon of elections under authoritarianism (Gandhi and Lust-Okar, 2009). An important question in this literature concerns the added value of elections in promoting the survival of governments. The evidence seems to suggest that post-election stability is greatest in repressive regimes that hold highly rigged elections and win with large margins. However, when elections are held in less repressive states, they can lead to political instability under a wide variety of circumstances. Moreover, those circumstances depend on highly uncertain outcomes (e.g., How free and fair will elections be perceived? What will the winner’s vote-share be?). In ‘mild’ autocratic states where elections are neither fully free nor fully restrictive, much depends on the outcome of the election and perceptions of its unfairness. Since ex ante these cannot be predicted, in mildly autocratic regimes, the effectiveness of elections in securing political stability is inherently unpredictable.

Our analysis also raises a number of questions for future research. We focused on post-election dissent in situations where there is a majority winner. When no majority winner exists, post-election stability might greatly depend on the losers’ capacity to cooperate by forming a majority coalition against the plurality winner. Under what conditions can such cooperation succeed? This question could be addressed by extending the theoretical and empirical strategy proposed in this paper.

Another interesting issue relates to the dynamics of political stability: is the losers’ consent a custom that becomes established through a series of repeated elections with stable post-election outcomes? A dynamic analysis of post-election dissent, in which the losers’ dissent and the state’s reaction to dissent in the previous elections inform the current strategic calculations, could open further important research
venues.
An Experimental Study of Fraudulent Elections and the Post-Election Protest

In established democracies, elections are typically surrounded with an uncertainty as to who is going to be the winner of the race. The *ex ante* uncertainty about the election result is essential for any definition of democracy (Przeworski, 1991, 13). However, many elections in newly democratic and semi-autocratic governments do not carry this important property. Incumbents ban popular opponents from running, curtail their campaigning rights, harass voters, or manipulate the results; thereby, making the outcome of elections nothing short of predictable.

Another feature of an institutionalized democracy is that the losers of elections accept the results of voting (Przeworski, 2005). Indeed, there is little purpose in holding elections if the parties cannot commit to accepting the result whatever it turns out to be. Outside the established democracies, this norm frequently fails. In the post-war era, about one-fifth of elections outside the OECD countries have been followed by public protests or riots. In sub-Saharan Africa, the results of more than two-thirds of elections ended up being reject by their losers (Lindberg, 2006a).

We can therefore distinguish between two kinds of elections: Democratic elections
Table 4.1: Elections and uncertainty.

<table>
<thead>
<tr>
<th>Democratic elections</th>
<th>Ex ante uncertainty</th>
<th>Ex post uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High: mostly unpredicted outcome as elections are competitive</td>
<td>Low: losers accept election outcomes</td>
</tr>
<tr>
<td>Non-democratic elections</td>
<td>Low: predictable outcome due to manipulation and repression</td>
<td>High: losers are less likely to accept the outcome</td>
</tr>
</tbody>
</table>

carry substantial *ex ante* uncertainty as to who is going to win. However, once the winner is announced, the uncertainty fades away – losers accept the result and wait for another chance to claim office. In non-democratic elections, there is little *ex ante* uncertainty as to who is going to win but there is uncertainty as to what is going to happen *ex post*, that is, after the winner is announced. Will the losers reject the election? Will they woo their supporters to go out into the streets and protest? Will the government retaliate in face of protest or give up? Table 4.1 summarizes these differences schematically.

There seems to be a paradox here: If non-democratic elections are predictable, why do they so often lead to protests? It would seem that due to their predictability, rigged elections should be insignificant events, rituals that reveal no new information; hence, they should neither encourage nor discourage protests. What do rigged elections do to instigate public protest, a costly and risky activity? When can we expect elections to result in a public protest? Conversely, when are citizens unlikely to protest *even* even if they know that the elections have been rigged?

Although the loser’s consent is crucial for the institutionalization of democratic culture, it has not been given adequate attention by students of elections in nascent democracies. Most of the existing scholarship on post-election political dynamics focuses on either the general effects of elections on civil conflict (Collier, 2009; Snyder, 2000) or the design of electoral institutions that reduce the risk of conflict in
ethnically diverse societies (Horowitz, 1991; Reynolds and Sisk, 1999; Reilley, 2001).

Can the results of rigged election communicate to citizens the popularity of the elected party? Under what conditions does such communication succeed and when does it fail? These are central questions in the scholarship of elections under authoritarianism. The progress in this area has been slow due to dearth of data and theoretical models with weak empirical grounding. This study uses a laboratory experiment to investigate how information about election results and the level of rigging affects citizens’ beliefs about the popularity of the government.

The purpose of this paper is to study how the electoral process affects individual incentives to participate in protest activities. First, applying a simple decision-theoretic framework, we draw a set of theoretical predictions as to how citizens are expected to update their beliefs about the popularity of the government in the aftermath of rigged elections and how this updated information can affect their calculus of participating in a public protest. These predictions about individual behavior are then tested on data generated in a laboratory experiment.

There are several reasons we adopt an experimental method to study post-election protests. First, understanding post-election protest in the real world requires analyzing its two separate dimensions – the individual and the collective. On the individual level, in order for there to be a protest, some critical mass of citizens must want to protest (or must want the outcome at which the protest is aimed, e.g., to remove the government) and must believe that it is possible to do so. On the collective level, once individual preferences and beliefs are in place, a set of collective action problems must be solved for the protest to happen.

This convolution of individual beliefs and incentives and collective action problems creates a difficult problem for empirical analysis. If a protest occurs, then we know that both the individual preferences and collective capabilities were in place. However, if a protest does not occur, we cannot know if this is due to the lack of individual incentives or collective capabilities. To understand the micro-logic behind post-election protest, we need to separate these two sides of the phenomenon. This is very difficult to do in an observational setting. However, in a laboratory setting,
we can study the formation of individual preferences for protest in isolation of the collective action problems.

This research also contributes to a broader literature on non-democratic elections and in particular to the question as to why non-democratic elections are held. One common explanation of non-democratic elections is that they ‘legitimize’ the incumbent government (Barkan and Okumu, 1978; Magaloni, 2006; Schedler, 2006; Pepinsky, 2007). The idea of the legitimating effect is frequently criticized on the grounds of inconsistency: if everyone knows that elections are non-democratic, how can the leaders who win them claim legitimacy? To believe the argument of the legitimating effect, one would need to assume that everyone except the leadership that is holding the elections (that is, the domestic public and the international community) are gullible fools.\footnote{See Cox (2009, p. 5), Schmitter (1978, p. 149), Bueno de Mesquita et al. (2003, p. 6), and Lust-Okar (2006, p. 460).}

The above criticism of elections under authoritarianism is grounded only in the absence of a theoretical mechanism that would explain this ‘legitimating’ effect of elections. Here we show that, theoretically, under a wide set of conditions, believing in the popular mandate of a leader elected in rigged elections is perfectly compatible with individual rationality. We also specify the conditions under which such legitimating effect of elections is bound to fail, thus revealing the inherent risk in elections. This way, we are able to provide a rationale for non-free and non-fair elections.

The latter part is important because any theory of post-election protest must also provide an explanation for rigged elections. The reason is the following: protests are costly to leaders (the ultimate cost is their removal from power, but there are also economic and long-term political costs even if removal does not occur) and if elections foster public protests, it begs the question of why one would hold elections. For example, Tucker (2007) argues that post-election protests occur when fraudulent elections are held in face of a wide discontent with the existing government. The discontent creates incentives for citizens to protest while the rigged elections serve as focal points that aid the opposition in coordinating its efforts. In somewhat
similar fashion, Fearon (2011) presents a model of elections as focal points for anti-government rebellions and protests that induce a government’s accountability.

While these insights clearly capture an important role of elections as focal points, they beg the obvious question: Why would a corrupt and unpopular government hold rigged elections if such elections result in protests? If the focal-point theory of elections is right, then the existence of rigged elections is a clear puzzle. A theory I propose in this paper does not yield such a contradiction. It shows how elections can be useful (in expectation) for leaders to communicate their support and reduce the risks of electoral loss as well as how (ex post) elections might turn out to be detrimental to leaders’ political survival.

4.1 Theoretical Model

Suppose a society consists of \( n \) individuals and let \( s \in \{a, ..., b\} \) be the number of citizens that, for one reason or another, prefer the incumbent government to its opposition. Here, \( s \) is unknown but each person \( i = 1, ..., n \) has a prior belief represented by a distribution function \( \pi_i(t) = \Pr_i(s \leq t) \). Notice that, a priori \( s \) is bounded between \( a > 0 \) and \( b < n \); thus, there are at least \( a \) and at most \( b \) citizens that support the government.

Let \( w \in (a, b) \) be a commonly known threshold of popularity needed to preserve the stability of the government. In other words, if \( s < w \) and if citizens decide to protest against the government, they will win; if, however, \( s \geq w \), they will lose. Further, let \( c \in (0, 1) \) denote the cost of the protest. We say that a citizen \( i \) is a priori willing to protest against the government if and only if \( \pi_i(w) > c \) - the probability that the government is sufficiently unpopular (which is simply the probability that a protest, were it to occur, would be successful) is greater than the cost of the protest.

We consider a model of elections as informational mechanisms that may provide a common signal about the true support for the government, \( s \). Suppose elections are held where each citizen reports his support to the government or its opposition. Let \( y_i = 1 \) and \( y_i = 0 \) denote that the citizen votes for the government and the
opposition respectively, with \( Y = \sum_i y_i \) being the number of votes in favor of the government.

### 4.1.1 Manipulation Model

The are many technologies that governments use to rig elections and it is perhaps impossible to have a theoretical model that incorporates every such technology individually. It is even more difficult to design an experiment that takes into account the whole variety of manipulation technologies. After considering many candidate options, we have settled on the following model of electoral manipulation that is easy to represent in an experimental setting and, as we argue, implicitly corresponds to many real life election manipulation technologies: A government can take any subset of votes cast in elections and switch it to be votes for itself, irrespective of whether the votes were cast for the government or the opposition.

Let \( m \) denote the number of votes switched in this manner. This model represents the following election manipulation technologies:

1. Miscounting the votes: \( m \) is the number of votes counted in favor of the government when they could have been votes for the opposition.

2. Harass or bribe voters: e.g., \( m \) is the number of people who were exposed to harassment or bribery; some of the exposed citizens might be true opponents but some would perhaps vote for the government even in the absence of a violent threat or a monetary pay-off.

3. Disenfranchise a subpopulation of voters: \( m \) is the number of extra votes the opposition would have been likely to receive in the absence of disenfranchisement.

4. Prevent popular opposition candidates from running: when \( m \) is high, then even a popular opposition candidate is receiving fewer votes in the final count.

It is easily demonstrated that the above model of manipulation yields the following mathematical representation of the vote-production function:
\[
\Pr(V = v | s, m) = \frac{\left( \frac{b - s}{v - s} \right) \left( \frac{s - \overline{a}}{m - v + s} \right)}{\left( \frac{\overline{b} - \overline{a}}{r} \right)}
\]  

(4.1)  

for \( \max\{s, m + \overline{a}\} \leq v \leq \min\{\overline{b}, m + s\} \)

where \( \overline{a} \) and \( \overline{b} \) are both functions of \( v \) and \( m \). For example, if \( m = n \), then it must be the case that \( \overline{a} = 0 \) and \( \overline{b} = n \). Similarly, if \( y > b \), then \( \overline{b} = n \).

Of course, \( s \) is not known exactly and thus the number of votes that the incumbent gets in elections by repressing at level \( m \) is given by

\[
\Pr(V = v | m) = \sum_{s=a}^{b} \Pr(V = v | s, m) \Pr(S = s).
\]  

(4.2)  

It is easy to show that the expectation and the variance of the latter distribution decreases in \( m \). Specifically, as \( m \) increases, the distribution \( \Pr(V = v | m) \to 1(V = n) \) and, as \( m \) decreases, \( \Pr(V = v | m) \to \Pr(V = v) \). As the level of manipulation grows, the election result becomes more predictable and biased in favor of the government.

Conversely, as elections become more free and fair \((m \to 0)\), the outcome of elections becomes increasingly uncertain. In fact, elections where \( m = 0 \) are completely free and fair elections, since they yield outcome \( V = s \) with probability equal to one. In such democratic elections, the result of voting is a genuine representation of the people’s political preferences. The uncertainty about the result of free and fair elections comes from the uncertainty about the true support levels. Loosely speaking, in fully rigged elections, the election outcome is independent of the true support distribution, whereas in fully free and fair elections, those two quantities are perfectly correlated.

4.1.2 Belief-Updating

When elections take place, each citizen observes the result \( v \), the degree of manipulation \( m \), and then updates her beliefs about the popularity of the government.
Figure 4.1: Comparing prior beliefs about the support levels \(\Pr(S)\), prior risks about the election result given the manipulation level \(m\), \(\Pr(V|m)\), and posterior distributions of \(S\) given different election outcomes and manipulation levels, \(\Pr(S|v,m)\).

Figure 4.1 shows the relationship between electoral manipulation, prior risk about the election outcome, and posterior information generated in elections.

In the upper panel, we have elections with mild manipulation \((m = 20)\). Since there is little manipulation, the incumbent’s belief distribution over the election outcome is very similar to the distribution over his support levels. Elections with mild repression are risky because their outcome is more dependent on the true distribution of support. However, these elections are highly informative: the posterior distributions have lower variance than the prior distributions and, in both cases (when \(v = 60\) and when \(v = 80\)), the posterior beliefs are concentrated close to the
election outcome.

Compare this with the case where electoral repression is high \((m = 50)\). Here, elections are far less risky: the prior distribution over the election outcome is very different from the prior distribution over support levels. However, in contrast to the previous case, the incumbent can benefit from such manipulative elections only when he wins a large vote share \((v = 80)\); otherwise, even if he wins elections with a low margin \((v = 60)\), the posterior beliefs will be worse than the prior beliefs. Intuitively, if an incumbent manipulates elections extensively and still does not win with an overwhelming margin, then his true support levels must be really low. Notice also that even if elections are won with larger margin, the variance of the posterior distribution is still relatively large implying low informational value of elections.

More formally, the posterior probability that the government is actually unpopular given the observed information \((v, m)\) can be derived using Bayes theorem:

\[
\pi_i(v, m) = \Pr(s > w|v, m)
\]

\[
= \frac{\pi_i \Pr(V = v|s > w, m)}{\pi_i \Pr(V = v|s > w, m) + (1 - \pi_i) \Pr(V = v|s \leq w, m)}
\]

\[
= \left[1 + \frac{(1 - \pi_i) \Pr(V = v|s \leq w, m)}{\pi_i \Pr(V = v|s > w, m)}\right]^{-1} = \left[1 + \frac{(1 - \pi_i)}{\pi_i} R(v, m) \right]^{-1}.
\]

The term \(R(y, m)\) is the likelihood ratio of the observed election result. Simple algebraic manipulation yields

\[
\ln \left[\frac{1 - \pi_i(v, m)}{\pi_i(v, m)}\right] = \ln \left[\frac{1 - \pi_i}{\pi_i}\right] + \ln R(v, m).
\]

This way, the logarithm of the posterior odds that the government is unpopular is expressed as an additive function of the idiosyncratic prior odds that the government is unpopular and the common information communicated in elections, represented by \(R(v, m)\). As \(R(v, m)\) increases, so do the posterior odds that the government is unpopular.

121
The key issue is to determine how \( R(v, m) \) changes as a function of information \((v, m)\). The following Proposition specifies three important properties of the function \( R(v, m) \):

**Proposition 8.** It is the case that

1. \( R(v, m) = 1 \) for \( v > v' \) and \( m > m' \) for some \((v', m')\).

2. \( R(v, m) \to 0 \) as \( v \to v'' \) and \( m < m'' \) for some \((v'', m'')\).

3. \( R(v, m) \to \infty \) as \( v \to a \) for any \( m \).

The first part of the proposition says that if elections are sufficiently manipulative and are won with a sufficiently large margin, they do not provide new information: since \( R(v, m) = 1 \), the posterior is identical to the prior. This is an intuitive conclusion: if elections are highly manipulative, they yield a high margin with probability equal to one. However, if elections are predictable, they cannot be informative.

The second and the third part of the proposition specifies conditions when elections are informative. The second part says that elections change beliefs to favor the government if they are won with a sufficiently large margin using sufficiently little repression. Again this makes intuitive sense: as the level of manipulation decreases, the elections become more informative of the true support levels; hence, if informative elections are won with a sufficient margin, they communicate clearly the true popularity of the winning party.

Finally, the third part of the proposition says that the posterior beliefs will be worse for the government than the prior beliefs if the incumbent receives too few votes for any level of manipulation. Consider the case where manipulation is low: if the incumbent loses elections with little manipulation, he reveals his low support by virtue of having informative elections. Now consider the case where manipulation is high: losing such elections or winning them by only a small margin reveals to everyone that the incumbent is unpopular – if one cannot win unfree and unfair elections, one surely cannot win free and fair elections.
From this discussion, a sufficient margin of victory appears an important factor in the success of manipulative elections. It is in line with the empirical regularity that elections in non-democratic regimes typically yield greater margins of victory than elections in democracies (Simpser, 2004).

4.1.3 Hypotheses

Based on the above analysis, one can draw several hypotheses to be tested on experimental data. The first hypothesis concerns the positive change in citizens’ beliefs about support for the government.

**Hypothesis 1.** *Victory in mildly manipulative elections will increase the posterior security of the incumbent relative to the prior security if the winner’s vote-share is sufficiently high relative to the level of manipulation.*

This hypothesis specifies the conditions under which elections should reduce citizens’ propensity to protest against the government relative to the propensity to protest prior to elections. Following Schmitter (1978), we call this positive effect of elections the ‘anesthetic effect’.

**Hypothesis 2.** *If won by large margins, highly manipulative elections will not change the posterior beliefs relative to the prior beliefs.*

According to this hypothesis, a government can become *more* stable only when it holds at least minimally competitive elections. With no competition in place, elections cannot produce any change in public beliefs about the government’s support.

**Hypothesis 3.** *If lost or won by only slim margins, highly manipulative elections will reduce the posterior security of the incumbent relative to the prior security and will encourage post-election protest.*

This hypothesis specifies conditions under which elections have an effect converse to the anesthetic one. Notably, this hypothesis does not rely on the normative assumption about people’s dislike of electoral manipulation. The likelihood of a protest increases with manipulation not because people find cheating unacceptable
but because manipulative elections that do not yield large margins of victory inform about the support deficit.

4.1.4 Statistical Model

To test these hypotheses empirically, define the change in individual \(i\)'s beliefs as

\[
\delta_i(y, m) = \pi_i(y, m) - \pi_i. \tag{4.5}
\]

If \(\delta_i(y, m) > 0\), then the information \((y, m)\) has an ‘anesthetic’ effect, as individual \(i\) believes that the government is more popular a posteriori than a priori. If \(\delta_i(y, m) < 0\), then the information transmitted in elections suggests that the government is less popular than was thought a priori. Finally, if \(\delta_i(y, m) \approx 0\), then the information transmitted in elections does not have any effects on the beliefs of citizen \(i\) for given \((y, m)\).

Our primary objective is to evaluate the quantity \(\delta(y, m)\), representing the average change in beliefs across the experimental subjects for a given treatment \((y, m)\). For brevity, let \(t_j = (y_j, m_j)\) refer to a treatment (notice that the treatment in this experiment is a two-tuple), and let \(T\) refer to the set of all admissible treatments. Then,

\[
\delta(t_j) = \frac{1}{n(t_j)} \sum_{i \in n(t_j)} \delta_i(t_j) \text{ for all } t_j \in T. \tag{4.6}
\]

Here, \(n(t_j)\) is the set of subjects that received the treatment \(t_j\). This function can be estimated in a regression framework using the following specification:

\[
\delta_i(t_j) = \beta_0 + \sum_{j=1}^{[T]} \beta_j t_j + u_i + e_{ij}. \tag{4.7}
\]

Here, \(\delta_i(t_j)\) is the difference between the subject’s posterior beliefs given the treatment \(t_j = (y_j, m_j)\) and the subject’s prior beliefs. The term \(u_i\) represents the individual-level random effect. Since the same subjects are exposed to different sets
of treatments, we are dealing with repeated observations. The term $u_i$ captures unobserved heterogeneity in updating rules since subjects might vary in their sensitivity to new information. Finally, the term $e_{ij}$ is white noise.

4.2 Experimental Protocol

The experiment is based on simulating a society where citizens belong to two groups represented by two colors. The following description of the environment is given at the start of the experiment:

The figure below shows a group of 100 people. Each person supports either the RED or BLUE team. 10 people announced they support the
RED team. 20 people announced they support the BLUE team. The remaining 70 people have not revealed which team they support.

Figure 4.2 shows a visual snapshot from the experiment. This description is intended to represent the partial uncertainty about the distribution for the two groups. We did not use the political language of ‘government’ and ‘opposition’. Since such language is politically loaded, it could potentially contaminate the process of belief-updating. Our main purpose is to learn how people update their beliefs irrespective of their political convictions, so we avoided politically-laden language as much as possible.

Based on this description, each subject forms her own prior beliefs about the true support for each of the teams. Note that the only raw information is given in terms of the lower and upper bound of support. Each subject may therefore have her own idiosyncratic prior beliefs about the distribution of support across the teams.

The experiment proceeds in three stages: First, in the prior measurement stage, we measure the prior beliefs of the participants. Second, in the election stage we present them with information about elections. Third, in the posterior measurement stage we measure the posterior beliefs of the participants. We now describe these three stages in detail:

1. **Measuring prior beliefs**: Participants are asked several questions intended to measure their prior beliefs about the distribution of support across the two teams:

   - 1a. What is the chance that there are more participants in the RED team than in the BLUE team?
   - 1b. A second way to measure the prior beliefs is to offer the following game:

   $$
   \begin{array}{c|cc}
   & RED > BLUE & BLUE > RED \\
   \hline
   \text{Play} & $1 & -$0.5 \\
   \text{Not play} & $0 & $0 \\
   \end{array}
   $$

   Here $R > B$ means that there are more people in the RED team than in the BLUE team. This is intended to approximate a gamble that protesters might
be making: we will win if there are many of us but will lose and bear the costs of repression if there are too few of us. The choice of PLAY is treated here as an equivalent of a public protest.

- 1c. Further, the participants are asked: How many people are there in the RED team? Make your best guess. This is intended to measure their prior expectations.

2. Election stage: Participants are told the following:

“Elections were held where each of the 100 individuals secretly voted for either the RED or BLUE team. These were the results:

RED team – \( Y \) votes
BLUE team – \( 100 - Y \) votes

However, the elections were not entirely fair. The counter took \( M \) votes from persons colored in grey and automatically counted them as votes for the RED team. Some of these \( M \) miscounted votes could have been votes for the RED team and some could have been votes for the BLUE team.”

We also used an alternative, semantic description of the degree of repression. Instead of saying how many votes could have been rigged, it said the following:

“The RED team bribed and intimidated many [some] people to vote for the RED team. These practices were [not] widely spread. Also, the BLUE team was not allowed to campaign freely.”

Here the words in the square brackets are the alternative treatments, representing high [low] level of electoral manipulation. The semantic definition of manipulation has an advantage of being more realistic. The disadvantage, however, that it imposes scale heterogeneity on subjects: the interpretation of ‘many’ and ‘some’ differs across subjects, which introduces an additional layer of noise in the experimental data.
Table 4.2: The distribution of treatments in the experiment. NA refers to an inadmissible combination of treatments, and T refers to a combination of treatments that yields trivial posterior distributions; thus, they were not used in the experiment.

<table>
<thead>
<tr>
<th>Winner’s vote</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>low</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>35</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>71</td>
<td>72</td>
</tr>
<tr>
<td>70</td>
<td>0</td>
<td>78</td>
<td>76</td>
<td>89</td>
<td>73</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>80</td>
<td>T</td>
<td>90</td>
<td>86</td>
<td>119</td>
<td>89</td>
<td>87</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>90</td>
<td>T</td>
<td>T</td>
<td>0</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>0</td>
<td>34</td>
<td>NA</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>100</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>0</td>
<td>34</td>
<td>0</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

However, comparing the effects of both types of treatments across subjects and across treatment groups is interesting in its own right.

3. Updated post-election beliefs: The set of questions 1a-1c are asked again. Each question is primed with the reminder about the election results and the degree of manipulation.

The experiment varied quantities $Y$ and $M$, representing the votes of the winning candidate and the amount of manipulation. Each subject was exposed to between 9 and 13 treatments (two-tuples $(Y, M)$) presented in a random order. Each treatment was presented to the subjects as a new experiment; that is, each time we described the environment by the same parameters only changing the colors and the graphics to signal the fact that the experiments were independent. No information about the performance of a subject was disclosed until the end of the experiment. Table 4.2 shows the distribution of treatments.

Participants of the experiment received a fixed fee for taking part in the study plus a bonus fee of up to $10 that depended on their performance. The bonus was intended to dis-incentivize random responses. The bonus scheme was arranged so that participants would gain money for good guesses and lose money for bad guesses. The bonus scheme was adjusted so that the expected bonus of answering questions at random would be close to zero. The accrued bonus amount was reported to the
participants only at the very end of the study.

On average, each participant answered a batch of questions for 9 treatments, with an average session lasting for about 35 minutes. Out of 123 participants, 62 were Duke University students and 61 were a non-student residents of Durham, North Carolina.

4.3 Internal Validity of the Data

An important issue in any experiment involving numbers, probabilities, and distributions is the internal validity of the generated data. There are several questions that are important in this context. First, do the participants correctly identify the quantities presented in the experiment? For instance, in one of the questions we ask ‘What is the probability that there are more member in the RED team than in the BLUE team?’ Since admittedly not everyone is familiar with the concept of probability, there is a risk that the question might generate garbage data for a subset of participants.

Second, are there important heterogeneities in the experimental population? In our case, the experiment university students and local residents. Although the questions we asked cannot be answered by computation and intuition must be used, good computational capabilities might help in coming up with a reasonable intuition. Thus, the information updating might be different across these two subpopulations.

To evaluate the internal validity of the data, we first look at the correlation of the responses between two sets of questions: the question about the probability that the RED team has more supporters than the BLUE team and the question asking for the best guess about the number of RED team supporters. Figure 4.3.a plots these two quantities for students and non-students. Generally, there seems to be fairly strong correspondence between the probabilities and expectations. On average, both subpopulations are similar in that regard. However, the data for non-student participants are more noisy suggesting that there are validity concerns for this subset of participants.

Do responses on the main quantity of interest – the difference between the pos-
Figure 4.3: Internal validation of the experimental data: a) probabilities versus expectations (upper panel); b) differences in the prior and posterior probabilities for students and non-students.

Posterior and prior beliefs – differ across the subpopulations? Figure 4.3.b shows the distribution of the variable across students and non-students. In this regard, there is no indication that the two subpopulations are different: in both groups, the mean of the distribution is above zero (indicating that on average the posterior beliefs that
Figure 4.4: Internal validation of the experimental data: a) Probability that the government is popular vs the predicted probability of protest (upper panel); b) Best prediction of the number of the government’s supporters vs the predicted probability of protest (upper panel).

The probability that the government is popular are greater than the prior beliefs. The variance of the two distributions is also very similar.

Finally, we investigate the internal validity of the data by checking how well a
respondent’s belief that the RED team has more supporters is correlated with the willingness to play the game yielding him/her a positive payoff if that belief is correct. If the probability of the event is not related with the choice to play or abstain, then there can be little trust in the data generated by the experiment.

We fit two models with the response variable equal to one if the respondent chooses to play and zero otherwise. In the first model, the independent variable is the respondent’s reported subjective probability that he will win a positive payoff if he chooses to play the game. In the second model, the independent variable is the respondent’s best guess about the distribution of support across teams. In both models, we let the coefficient vary for students and non-students. Figures 4.4.a and 4.4.b plot the predicted probabilities of the two models. In both cases, the relationship is statistically significant although it is more pronounced for students than non-students.

In sum, the data generated in the experiment have reasonable internal validity: the probabilities are related to the expectations, and both of these are related to the actions. However, the data appear far less noisy for the student participants than they are for the non-student participants. There is more randomness and less consistency in the responses of the latter group. This should be taken into account when interpreting the results of the experiment.

4.4 Results

The first set of results is presented in Figure 4.5. It shows the effects of treatments on the difference between the posterior and prior beliefs that the government is popular, broken down by the definition of electoral manipulation. If the difference is large and positive, then the treatment has an ‘anesthetic’ effect on the participants.

When the numeric definition of manipulation is used, we observe the following pattern: increasing vote-share is associated with a higher positive change in beliefs across all levels of electoral manipulation. This positive effect is present except in the treatments where the vote-share is low relative to the degree of manipulation. Though statistically significant, these effects are modest at high manipulation levels
compared to low manipulation levels.

When the semantic definition of manipulation is used, the pattern is similar with some important exceptions: First, under low levels of manipulation, elections produce positive change in beliefs across all election outcomes. Though the differences are short of statistical significance, a higher vote-share implies a greater change in beliefs (as we also observed in the case with the numeric definition of manipulation). Second, under high levels of manipulation, the pattern diverges from the one we saw with the numeric definition of electoral manipulation: here, the positive effect also increases with the vote-share, but it decreases once the vote-share reaches 100%.

The latter pattern is consistent with the first hypothesis that highly manipulative elections that are won with large margins should not change prior beliefs. However, the fact that the treatment \((1, high)\) produces a somewhat lower change in beliefs relative to that produced by the treatments \((0.9, high)\) and \((0.8, high)\) is somewhat puzzling: indeed, given the same level of electoral manipulation, the effects of the latter treatments should be lower than that of the treatment \((1, high)\).

We conjecture that this might stem from the interpretation of the term ‘high levels of manipulation.’ The size (or the effect) of manipulation might be interpreted in the context of the election results; that is, the semantic definition of high manipulation

---

**Figure 4.5:** The difference between the posterior and prior probability that the government is more popular than the opposition.
did not vary across the vote-shares, but its interpretation might have varied. It could
be the case that when a respondent is told “The RED team won 80 votes but the
elections were highly manipulative”, he/she interprets the term ‘highly manipulative’
differently than when he/she is told that “The RED team won 100 votes but the
elections were highly manipulative.” It is not unreasonable to think that the assumed
levels of manipulation could be higher in the latter case compared to the former
case. If an effect of this kind is actually driving the pattern, then this would be an
interesting avenue to pursue in future research. However, it is not clear how one
would analyze this kind of mechanism experimentally.

Figure 4.6: Changes in the protest propensity depending on the treatment \((v, m)\). Dependence variable is defined as \(Protest \text{ a posteriori} - Protest \text{ a priori}\). A linear
factor model with respondent-level random intercepts.
The second set of results is presented in Figure 4.6. These plots show the coefficients with 95% confidence intervals of the random effects regression where the dependent variable is constructed as follows: it is equal to -1 if a respondent was willing to protest (choose PLAY) a priori but was not willing to protest after receiving a treatment \((v, m)\); it is equal to 0 if there were no changes in prior propensity to protest compared to the posterior; and 1 if the respondent was not willing to protest a prior but switched to protesting a posteriori. The negative effect of a treatment indicates the presence of electoral anesthesia.

Following our discussion on the heterogeneity of the experimental population, we break down the analysis by the students and non-students. There are only a few clear patterns in the responses of the non-students. The only treatment with a statistically significant effect is \((v = 0.6, m = 0.2)\): consistent with the first hypothesis, winning elections with moderate levels of manipulation reduces protest propensity. Consistent with the third hypothesis, one can also notice a mild tendency of increasing propensity for post-election protest if elections are won with low margins and high levels of manipulation (e.g., treatments \((v = 0.6, m = 0.5)\) and \((v = 0.7, m = 0.6)\)); however, the effects fall short of conventional levels of statistical significance.

The results for the student respondents are more clear-cut. The propensity to protest is reduced when elections are won with low levels of electoral manipulation (relative to the margin of victory). This is consistent with the first hypothesis. There is also evidence that experimental behavior is consistent with the second hypothesis: treatments \((v = 0.9, m = 0.9)\) and \((v = 1, m = 1)\) have no effect on the change in protest propensity.

However, we do not find strong evidence for the third hypothesis: highly manipulative elections that are won with slim margins do not increase the propensity to protest. The average treatment effect of the treatments \((v = 0.6, m = 0.5)\) and \((v = 0.7, m = 0.6)\) is positive but not significant at conventional levels. It seems that when manipulation levels are high, the information communicated in elections gets completely obfuscated: there is no change in posterior behavior after \(m\) exceeds 0.7 for any election outcome.
Lastly, Figure 4.7 presents an analysis similar to the above, only using the semantic definition of electoral manipulation. With the semantic definition of manipulation, we did not have a single case where a respondent who chose not to protest a priori would choose to protest a posteriori. In other words, irrespective of the treatment, elections always either reduced the propensity to protest or left it at prior levels.

How this propensity changes as a function of treatments is depicted in Figure 4.7. Again, the patterns across the two subpopulations differ, though, there are also important similarities. Non-students are less likely to switch from protest to
non-protest when the vote-share of the winner was small (0.7). It is interesting that the propensity to switch from protest to non-protest is somewhat smaller when manipulation level is low compared to when it is high (even though this difference is not statistically significant, there is statistically significant reduction in the switching propensity only when \( m \) is low).

Further, the only two treatments that come close to increasing the switching propensity in the non-student population are \((0.8, \text{low})\) and \((1, \text{high})\). Both cases are curious: first, given the same level of manipulation, one would expect the treatments \((0.9, \text{low})\) or \((1, \text{low})\) to be associated with a higher switching propensity; second, the treatment \((1, \text{low})\) is certainly more informative of the incumbent’s popularity than than treatment \((1, \text{high})\). Since the data for the non-student population are quite noisy, it is not warranted to draw any strong conclusions but the patterns we observe are not easily explained in the theoretical framework suggested in this paper.

The results for the student population are more intuitive. First, high vote-shares with low manipulation – \((0.9, \text{low})\) and \((1, \text{low})\) are associated with a greater propensity of switching from protesting to not protesting (this effect is only significant at 0.1 level). On the other hand, a low vote-share with high manipulation – the treatment \((0.7, \text{high})\) – is associated with lower switching propensity. In line with the theory, there is no effect of elections when both vote-shares of the winner and levels of manipulation are high. However, in contrast to the theory, we do not observe an increased propensity for a post-election protest under treatments where it is expected to occur.

4.5 Discussion

This paper employed a laboratory experiment with human subjects to analyze how rigged elections might inform citizens’ calculus of protest. Based on a simple model of manipulative elections we argued that elections can either discourage or encourage public protests depending on the result of elections and the amount of manipulation. Three hypotheses were evaluated using the experimental data.
First, moderately rigged elections can work as ‘anesthetics’ against a popular protest: citizens who were willing to protest against the government a priori may decide not to protest a posteriori provided that the elections are won with a sufficiently large vote-share using sufficiently little manipulation. Since in the experimental setting other environmental factors are absent, we can be confident that the produced effect is due to the informational content of elections: even rigged elections can provide some information to citizens and affect their calculus of protest.

Second, the anesthetic effect of elections disappears once elections are sufficiently repressive and are won with large margins. In this case, post-election protest occurs when citizens have been already willing to protest against the government before the elections. Third, we do not find evidence for the hypothesis that elections encourage protest if they are manipulative and won by slim margins. In fact, we could not find a treatment which would encourage a post-election protest. In all instances, we observed either a positive anesthetic effect or no effect. It is an open question whether the latter finding is due to the experimental protocol employed in the study.

These findings can provide some insight as to why post-election protest is not part of democratic culture. After all, the “miracle of democracy” (Przeworski, 2005) — the ability of the losing party to accept the outcome of voting — is not so miraculous: the losing side concedes to the result of voting because the elections show that it is in fact the weak side, the one supported by a smaller segment of the society. In contrast, when elections are rigged (or at least when there are suspicions that they are rigged), they do not resolve the uncertainty about the distribution of popular support: if opponents of the incumbent were willing to protest before the elections, they will continue to do so after the elections; if, before the elections, they were sufficiently intimidated not to protest, the timidity will prevail in the aftermath of the elections as well. This argument implies that the leaders will rig elections to the extent that it is necessary for them to change public beliefs. Future research should therefore consider an experimental setting with an endogenous choice of electoral manipulation.

The results of the experiment are inconclusive in several regards. First, we note
that there are some important differences in the response patterns depending on the language used to describe electoral manipulation. We employed politically neutral language that expressed the levels of manipulation in numeric terms. We also employed a relatively politically laden language of ‘repression’, ‘intimidation’, and ‘restrictions on campaigning activities.’ There are advantages and disadvantages to both conceptualizations. The fact that they yield somewhat different results makes it difficult to assess the external validity of the experiment.

The second concern for the external validity of the experiment is the nature of the experimental population. The assumption behind the current study was that the decision problems should not depend on cultural and social characteristics of the respondents. However, that does not appear to be the case. The differences in the response patterns across students and non-students are stark. This raises the following question: ‘Which of these populations is more relevant in understanding post-elections protests in the real world?’ A follow up experiment could therefore use the following sampling approach to select subjects for a study: (1) Using empirical research on protests, identify the types of people that are most likely participate in protests or riots (e.g., Scacco, N.d.); and (2), select subjects for the experimental study that fit the profile established in step (1).

This study has other limitations that should be resolved in future research. First, an important assumption in both the proposed theory and the experiment is that citizens have fairly precise information about the degree of manipulation (importantly, however, they do not have precise information about the effect of manipulation on the voting outcome). It is not difficult to adjust the theory so that citizens are uncertain about the degree of manipulation used in elections. However, it is not clear how such uncertainty could be accommodated in experimental design. Importantly, our intention here was to study how people update their information about the winner’s true support when they know that elections were rigged. It is, however, a valid question as to whether the results would extend to the case with uncertainty about the degree of manipulation.

Second, both the theory and experiment were conducted in a decision-theoretic
framework. Hence, neither considered possible strategic interaction between protest and repression. A more realistic setting would incorporate strategic effects by having citizens face an elected incumbent who can strategically decide to either retaliate in the event of protest or step down.
Appendix A

Proofs for Chapter 1

Lemma 1. A’s vote-share in a large electorate is defined as

$$y(\theta, r, z) = \lim_{n \to \infty} y_n(\theta, r, z) = \lim_{n \to \infty} \frac{1}{n} \sum_{i=1}^{n} y_i,$$

(A.1)

where $y_i$ is a Bernoulli trial (a vote for $A$) with the success probability $\Pr(y_i = 1) = \Pr(y_i = 1|s_i = 1) \Pr(s_i = 1) + \Pr(y_i = 1|s_i = 0) \Pr(s_i = 0) = \theta + r(1 - \theta)$. Further, since $A$’s votes cannot exceed $n\overline{y}$, $Y = \sum_i y_i$ follows the truncated binomial distribution with $n$ trials, the success probability $\theta + r(1 - \theta)$, and the upper truncation limit $n\overline{y}$. The probability mass function of the variable $Y/n$ is

$$\Pr(Y/n = y^*) = \frac{\Pr(Y'/n = y^*)}{\Pr(Y'/n \leq \overline{y})} = \frac{\Pr(Y'/n = y^*)}{\Pr(Y'/n < \overline{y}) + \Pr(Y'/n = \overline{y})},$$

(A.2)

where $Y'$ is a binomial random variable with the expectation $n[\theta + r(1 - \theta)]$. Now suppose $\theta + r(1 - \theta) < \overline{y}$. By the weak law of large numbers, $\Pr(Y'/n < \overline{y}) \to 1$ while $\Pr(Y'/n = y^*) \to 1$ if $y^* = \theta + r(1 - \theta)$ and $\Pr(Y'/n = y^*) \to 0$ if $y^* \neq \theta + r(1 - \theta)$. 

141
Conversely, if $\theta + r(1 - \theta) \geq \overline{y}$, then $\text{Pr}(Y'/n < \overline{y}) \to 0$, and so $\text{Pr}(Y/n = \overline{y}) \to 1$ if $\overline{y} = \overline{y}$ and $\text{Pr}(Y/n = \overline{y}) \to 0$ if $\overline{y} \neq \overline{y}$. Hence, $y(\theta, r, z)$ is the maximum of $\theta + r(1 - \theta)$ and $\overline{y}$.

Lemma 2. If $r \leq \eta(\overline{y}, w)$, then $\tau(r) \equiv 0 < \pi$. If $r \in (\eta(\overline{y}, w), \eta(\overline{y}, a)]$, then by the definition of $y$, $f(\theta|y = \overline{y}, r) = f(\theta|\theta \geq \eta(\overline{y}, r), r)$ and hence,

$$
\tau(r) = \int_{\eta(\overline{y}, r)}^{w} f(\theta|\theta \geq \eta(\overline{y}, r)) d\theta = \int_{\eta(\overline{y}, r)}^{w} \frac{f(\theta)}{F(b) - F(\eta(\overline{y}, r))} d\theta
$$

$$
= \frac{F(w) - F(\eta(\overline{y}, r))}{1 - F(\eta(\overline{y}, r))} < \pi.
$$

Proposition 1. If $r = \emptyset$, then $Eu_A(r) = 1 - \pi - c$. Suppose $r \neq \emptyset$ and let $R^*(y, r) = 0$ iff $\pi(y, r) \leq c$. Since $y$ depends on the random variable $\theta$, before $y$ is learned, $\pi(y, r)$ is also a random variable. Let $\alpha(r) = \text{Pr}[\pi(y, r) \leq c]$ and let $\alpha_c(r) = \text{Pr}[(c < \pi(y, r) < 1 - c]$. Further, let $\alpha_w = \text{Pr}[\pi(y, r) \in (c, 1 - c) \& \theta < w)$ and $\alpha_{\overline{y}} = \text{Pr}[\pi(y, r) \in (c, 1 - c) \& \theta \geq w]$, the ex ante probabilities that there will be a post-election revolt and $A$ will lose or win respectively. Note that if $\alpha_c(r) = 0$, then $\alpha_w = \alpha_{\overline{y}} = 0$. $A$ must choose $r$ that maximizes the ex ante expected payoff

$$
Eu_A(r) = \alpha(r) - c\alpha_w(r) + (1 - c)\alpha_{\overline{y}}(r)
$$

(A.3)

Functions $\alpha(r)$, $\alpha_w(r)$, and $\alpha_{\overline{y}}(r)$ are discontinuous so we consider different cases.

Case 1: $r \in [0, \eta(\overline{y}, w)]$. Note that $\pi(y, r) \in \{0, 1\}$ for $y < \overline{y}$, thus $\alpha_c(r) = 0$. Further, if $y = \overline{y}$, then $\pi(y = \overline{y}, r) = 0$ implying that $Eu_A(r) = \alpha(r) = \text{Pr}(y = \overline{y}|r) = 1 - F(\eta(\overline{y}, r))$, which is increasing in $r$, thus $\max_r Eu_A(r) = 1 - \pi$.

Further, let $\tilde{r}$ be the largest $r$ for which $\tau(r) \leq c$; note that $\tilde{r} \in (\eta(\overline{y}, w), \eta(\overline{y}, a))$. 

142
Case 2. $r \in (\eta(\bar{y}, w), \bar{r}]$: $\alpha_c(r) = 0$ if $y = \bar{y}$ since $\tau(r) \leq c$ and hence $E u_A(r) = \alpha(r) = \Pr(\theta \geq \eta(\bar{y}, r))$, and thus $\max_r E u_A(r) = 1 - F(\eta(\bar{y}, \bar{r}))$.

Case 3. $r \in (\bar{r}, 1]$: if $y = \bar{y}$, then $\alpha(r) = 0$ since $\tau(r) > c$; if $y < \bar{y}$, then $\alpha(r) > 0$ iff $w < \theta < \eta(\bar{y}, r)$ but this contradicts the assumption that $r > \eta(\bar{y}, w)$.

Thus, $E u_A(r) = -c\alpha_w + (1 - c)\alpha_w$. Further, since $\tau(r) < \pi < 1 - c$, we have $\alpha_w = \Pr(y = \bar{y} \& \theta < w) = \pi - F(\eta(\bar{y}, r))$ and $\alpha_w = \Pr(y = \bar{y} \& \theta \geq w) = 1 - \pi$.

Thus, $\max_r E u_A(r) = 1 - \pi - c + cF(\eta(\bar{y}, \bar{r}))$.

Comparing the expected payoffs in all three cases, we conclude that $r^* \in (\eta(\bar{y}, w), \bar{r}]$ and, since $1 - F(\eta(\bar{y}, r))$ is increasing in $r$, $r^* = \bar{r} = \tau^{-1}(c)$. Using the proof of Lemma 2, $r^*$ must solve $\frac{\pi - F(\alpha(\eta(\bar{y}, r))}{1 - F(\eta(\bar{y}, r))} = c$. The solution exists and is unique because for $r \in (\eta(\bar{y}, w), \eta(\bar{y}, a))$, $\tau(r)$ is continuous on $(0, \pi)$ and increasing.

$R^*(y, r) = 0$ if $\pi(y, r) < c$ is the equilibrium strategy because $R(y, r) = 1$ yields a negative expected payoff if $\pi(y, r) < c$ and a positive expected payoff if $\pi(y, r) > c$.

Lastly, we claim that if $\pi(y, r^*) = c$, then $R^*(y, r^*) = 0$. If $R^*(y, r^*) = 1$ after $\pi(y, r^*) = c$, then $E u_A(r^*) = 1 - \pi - c + cF(\eta(\bar{y}, r^*))$. But if, for example, $r' = 0$, then $E u_A(r') = 1 - \pi > E u_A(r^*)$.

Finally, consider the action of $B$ at Stage 2. We claim (proof omitted) that $R^*(r) = 0$ for $r < \eta(\bar{y}, a)$ and $R^*(r) = \{0, 1\}$ for $r \geq \eta(\bar{y}, a)$.

Proposition 2. Omitted (similar to Proposition 1).

Proposition 3. Let $c < \pi$. $E u_A(r^*) = \alpha(r^*) = \Pr(\theta \geq \eta(\bar{y}, r^*)) = \Pr(\eta(\bar{y}, r^*) \leq \theta < w) + \Pr(w \leq \theta < b) = \tau(r^*) + 1 - \pi$. If $r = \emptyset$, $E u_A(r) = 1 - \pi - c$, so the expected gain is $\tau(r^*) + c$. Let $\pi \leq c$, then $r^* \geq \eta(\bar{y}, a)$ and $E(r^*) = E(r = \emptyset) = 1$.

Further, from definitions of $\tau(\cdot)$ and $r^*$, we have $\frac{\partial \tau(r^*)}{\partial w} = \frac{\partial \tau(r^*)}{\partial r^*} \frac{\partial r^*}{\partial w} > 0$.

Proposition 4. Omitted (similar to Proposition 1).

Proposition 5. Let $f_t = \Pr(\psi(y) \neq y|t)$ for $t \in \Theta(r)$ and let $f = 0$ iff $\psi(y) = y$.

Consider PBE’s after every history $r$. 143
Case 1: \( r \in [0, \eta(y, w)] \). We have \( I(r) = \{w, \bar{w}\} \), since \( \pi(y, r) \in \{0, 1\} \) if \( y < \bar{y} \) and \( \tau(r) = 0 \) for \( y = \bar{y} \). Further, \( \Pr(t = w|r) = \Pr(\theta < w) = \pi \). Let \( \sigma = (\alpha_w, \alpha_{\bar{w}}) \).

After elections \( B \)'s posterior beliefs \( \pi_B(r, s, \sigma) \) are given by

\[
\Pr(\theta < w|s, \sigma) = \sum_{t \in \{w, \bar{w}\}} \Pr(\theta < w|s, \sigma, t) \Pr(t|s, \sigma) = \Pr(w|s, \sigma),
\]

(A.4)

since \( \Pr(\theta < w|s, \bar{w}) = 1 \) and \( \Pr(\theta < w|s, w) = 0 \). If \( s = 1 \), then \( B \) knows that fraud was committed so \( \Pr(s = 1|t, \sigma) = f_t \). Further, the Bayes rule yields

\[
\Pr(\theta < w|s = 1, \sigma) = \Pr(w|s = 1, \sigma) = \frac{f_w \pi}{f_w \pi + f_{\bar{w}}(1 - \pi)}
\]

(A.5)

If \( s = 0 \), then it is possible that there was fraud but it was not detected. We have

\[
\Pr(s = 0|t, \sigma) = \sum_{f = \{0, 1\}} \Pr(s = 0|f, t, \sigma) \Pr(f|t, \sigma) = 1 - pf_t.
\]

(A.6)

Therefore, by Bayes rule,

\[
\Pr(\theta < w|s = 0, \sigma) = \frac{(1 - pf_w) \pi}{(1 - pf_w) \pi + (1 - pf_{\bar{w}})(1 - \pi)}
\]

(A.7)

Let \( \sigma = (1, 1) \). \( \pi_B(r, s, \sigma) = \pi \) for any \( s \). But this implies that \( R^*(s, \cdot) = 1 \) for any \( s \). Thus, the payoff to type \( w \) is \(-c\). If instead, \( f_{\bar{w}} = 0 \), and hence \( \psi(y) = y \) (that is, \( A \) concedes), his payoff is 0. Thus \( \sigma^* \neq (1, 1) \).

Let \( \sigma = (0, 0) \). On the equilibrium path, \( \Pr(\theta < w|s = 0, \sigma) = 1 \) if and only if \( \psi < w + r(1 - w) \), thus \( R^*(s = 0, \psi) = 1 \) if and only if \( \psi < w + r(1 - w) \). This implies that type's \( w \) payoff is zero. We claim that type \( w \) will want to deviate from his strategy given any off-equilibrium best response of \( B \). If \( R^*(s = 1, \cdot) = 0 \), then by playing \( f_w = 1 \), type's \( w \) expected payoff is \( p > 0 \). If \( R^*(s = 1, \cdot) = 1 \), then type's
\( w \) expected payoff is \( 1 - p - cp \). For \( p < 1/(1 + c) \), this expression is strictly positive; thus, \( \sigma^* \neq (0, 0) \).

Let \( \sigma = (0, 1) \). \( \Pr(\theta < w|\sigma, s = 1) = 0 \), thus \( R^*(s = 1, \sigma) = 0 \), and type's \( w \) payoff is 0. If, however, \( f_w = 1 \), then his expected payoff is \( p > 0 \); thus, \( \sigma^* \neq (0, 1) \).

Let \( \sigma = (1, 0) \). \( \Pr(\theta < w|\sigma, s = 1) = 1 \) and hence \( R^*(s = 1, \cdot) = 1 \). Further,

\[
\pi_B(r, s = 0, \sigma) = \frac{(1 - p)p}{(1 - p)\pi + 1 - \pi} \leq c \quad \text{iff} \quad p \geq \frac{\pi - c}{\pi(1 - c)} \tag{A.8}
\]

Hence, \( R^*(s = 0, \cdot) = 0 \) and so the expected equilibrium payoff to \( w \) is \( 1 - p - cp \), thus for \( p < 1/(1 + c) \), type \( w \) does not deviate. Type \( w \)'s payoff is 1, so he cannot deviate profitably. We conclude that if \( p \in \left[ \frac{\pi - c}{\pi(1 - c)}, \frac{1}{1 + c} \right) \), then after history \( r \leq \eta(\bar{y}, w), \sigma^* = (1, 0) \) is the only PBE. Lastly, \( \max_r Eu_A(r) = 1 - \pi p(1 + c) \).

**Case 2:** \( r \in (\eta(\bar{y}, w), \eta(\bar{y}, a)) \). Here, \( I(r) = \{w, u\} \). Further, \( \Pr(t = w|r) = \Pr(\theta < \eta(\bar{y}, r)) = F(\eta(\bar{y}, r)) \). Let \( \sigma = (f_w, f_u) \). We have

\[
\pi_B(r, s, \sigma) = \Pr(w|s, \sigma) + \Pr(u|s, \sigma) \tau(r)
\]

After deriving \( \Pr(w|s) \) and \( \Pr(u|s) \) following the same steps as in Case 1, we have

\[
\pi_B(r, s = 0, \sigma) = \frac{1 - pf_w}{1 - pf_w} F(\eta(\bar{y}, r)) + \frac{1 - pf_u}{1 - pf_u} (\pi - F(\eta(\bar{y}, r)))
\]

\[
\pi_B(r, s = 1, \sigma) = \frac{f_w}{f_w} F(\eta(\bar{y}, r)) + \frac{f_u}{f_u} (\pi - F(\eta(\bar{y}, r)))
\]

Let \( \sigma = (1, 0) \). \( \pi_B(r, s = 1, \sigma) = 1 \), thus \( R^*(s = 1, \sigma) = 1 \). Further, \( R^*(s = 0, \sigma) = 0 \) iff \( \pi_B(r, s = 0, \sigma) = \frac{\pi - pF(\eta(\bar{y}, r))}{1 - pF(\eta(\bar{y}, r))} \leq c \), which is the case iff

\[
r \leq \eta(\bar{y}, K), \quad \text{where} \quad K = F^{-1} \left( \frac{\pi - c}{p(1 - c)} \right) \tag{A.9}
\]
Type \( w \) expects to get \( 1 - p - cp \) if \( \sigma \) is played and he receives zero by deviating to \( f_w = 0 \). Thus, for \( p \leq 1/(1 + c) \) the deviation is not profitable. Type \( u \) receives maximum possible payoff (since \( R^*(s = 0, \sigma) = 0 \)), and thus cannot deviate profitably. We conclude that \( \sigma = (1, 0) \) is a PBE after history \( r \in (\eta(\overline{y}, w), \eta(\overline{y}, a)) \). We omit the proof that no other equilibria exist after this history. Hence, \( Eu_A(r) = 1 - pF(\eta(\overline{y}, r))(1 + c) \). This expression is increasing in \( r \) and hence, from (A.9), \( r^* = \eta(\overline{y}, K) \). Simple algebra shows that \( F(\eta(\overline{y}, r)) = \frac{1}{p} \frac{\pi - c}{1 - c} \) implying that \( Eu_A(r^*) = 1 - \frac{\pi - c}{1 - c}(1 + c) \). Note that while the optimal level of repression depends on \( p \), the ex ante expected payoff does not.

**Case 3.** If \( r \in [\eta(\overline{y}, a), 1] \), then \( f(\theta|y, r) = f(\theta) \), hence \( R^*(\cdot, r) = 1 \) (only ‘babbling’ equilibria exist in this sub-game). Thus, \( Eu_A(r) = 1 - \pi - c \).

Compare the maximum \textit{ex ante} payoffs in all three cases: for \( p > \frac{\pi - c}{\pi(1 - c)} \), \( 1 - \frac{\pi - c}{1 - c}(1 + c) > 1 - p\pi(1 + c) > 0 \). We conclude that \( r^* = \eta(\overline{y}, K) \). Using the same procedure, one can prove the proposition for \( p \notin \left[ \frac{\pi - c}{\pi(1 - c)}, \frac{1}{1 + c} \right) \).
Appendix B

Measuring the Quality of Elections

Table B.1: The list of NELDA variables (Hyde and Marinov, 2012) used to construct a measure of electoral repression. Variables with an asterisk were recoded (0 = 1 and 1 = 0) so that the higher score corresponds to greater unfairness of elections.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>n3</td>
<td>Opposition not allowed</td>
<td>0.15</td>
<td>0.36</td>
</tr>
<tr>
<td>n4</td>
<td>Only one party legal</td>
<td>0.16</td>
<td>0.37</td>
</tr>
<tr>
<td>n5</td>
<td>No choice of candidates</td>
<td>0.10</td>
<td>0.30</td>
</tr>
<tr>
<td>n11</td>
<td>Concerns that elections will not be free and fair</td>
<td>0.41</td>
<td>0.49</td>
</tr>
<tr>
<td>n13</td>
<td>Opposition prevented from running</td>
<td>0.23</td>
<td>0.42</td>
</tr>
<tr>
<td>n15</td>
<td>Opposition harassed</td>
<td>0.18</td>
<td>0.38</td>
</tr>
<tr>
<td>n16</td>
<td>Allegations of media bias</td>
<td>0.25</td>
<td>0.44</td>
</tr>
<tr>
<td>n28</td>
<td>Reports critical of the government’s handling of the election reached large numbers of people</td>
<td>0.38</td>
<td>0.49</td>
</tr>
<tr>
<td>n47</td>
<td>Foreign monitors allege fraud</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>n48</td>
<td>Monitors denied entry</td>
<td>0.02</td>
<td>0.12</td>
</tr>
</tbody>
</table>
Appendix C

Proofs for Chapter 3

**Proposition 1.** Let \( R_w(v, \rho) \in \{0, 1\} \) be the best response of type \( w \) of player \( A \) in the aftermath of election yielding a result \( v \). Evidently, \( R_0(v, \rho) = 1 \) – the strong type will always want to retaliate. The weak type, however, will only want to retaliate if \( k(v, \rho) = 0 \) (note that if \( \rho \) is known, then \( \theta \) can be inferred exactly from \( v(\theta, \rho) \); thus, \( k(v, \rho) \in \{0, 1\} \)).

Given his prior belief \( \Pr(w = 1) = \mu \), \( B \) must believe that the probability of a retaliation is \( \rho(v, r) = \Pr_\rho(k(v, \rho) = 0|v, r) = \Pr_\theta(\theta > 1/2|v, r) = 1 - k(v, r) \). Thus, \( B \) will prefer to dissent if and only if

\[
- \mu k^2 + (1 + \mu + c_b)k - c_b \geq 0, \tag{C.1}
\]

This inequality is satisfied for \( k(v, r) \geq \gamma(c_b, \mu) \), where \( \gamma \) is decreasing in \( \mu \) and increasing in \( c_b \).

**Proposition 2.** For convenience, define a function \( \lambda(x_1, x_2) \equiv (x_1 - x_2)/(1 - x_2) \). Using the definition of \( v(\cdot) \) and probability calculus, we have
where the latter equality follows from the fact that \( \Pr(v < v(w, r)|v, r, \rho) = 1 \) if \( r > \lambda(v, w) \) and 0 otherwise. By Bayes rule,

\[
\pi(\rho|v, r) = \frac{\pi(v, r|\rho)\pi(\rho)}{\int \pi(v, r|\rho)\pi(\rho)d\rho} = \frac{\pi(v|\rho)\pi(r|\rho)\pi(\rho)}{\int \pi(v|\rho)\pi(r|\rho)\pi(\rho)d\rho} \tag{C.3}
\]

where the last equality follows from the fact that \( \theta \) and \( \rho \) are independent and therefore, \( v(\theta, \rho) \) and \( r \) are independent conditional on \( \rho \). The density \( \pi(v|\rho) \) is obtained by transforming the prior density \( \pi(\theta) \):

\[
\pi_{\rho}(v|\rho) = \pi_{\theta}(v^{-1}(v, \rho)) \cdot \left| \frac{\partial v^{-1}(v, \rho)}{\partial v} \right| = \frac{1}{1 - \rho} \mathbb{1}(v(a, \rho) < v < v(b, \rho)) \tag{C.4}
\]

Further, since \( \pi(r|\rho) = 1/\rho \) and \( \pi(\rho) = 1 \), we have

\[
\pi(\rho|v, r) \propto \frac{1}{\rho(1 - \rho)} \mathbb{1} \left( \max\{r, \lambda(v, b)\} < \rho < \lambda(v, a) \right) \tag{C.5}
\]

Thus, we have:

\[
k(v, r) = \int_{\max\{r, \lambda(v, w/2)\}}^{\lambda(v, a)} \frac{1}{\rho(1 - \rho)} d\rho \bigg/ \int_{\max\{r, \lambda(v, b)\}}^{\lambda(v, a)} \frac{1}{\rho(1 - \rho)} d\rho
\]

\[
= \frac{L(\lambda(v, a)) - L(\max\{r, \lambda(v, w/2)\})}{L(\lambda(v, a)) - L(\max\{r, \lambda(v, b)\})} \tag{C.6}
\]
where \( L(x) = \ln(x) - \ln(1 - x) \). It is easily verified that (C.6) has the properties stated in the proposition.
Appendix D

Robustness of Empirical Results

D.1 Alternative measures of electoral repression

The measure of the unfairness of elections, \( r \), we use in the paper is an additive measure consisting of ten indicator variables given in Table 3. One could raise the following question regarding this measure: ‘Would the results hold if we used an alternative measure of \( r \), which would include only a subset of the ten indicator variables?’

To check the robustness of our results to the choice of the indicators, we conducted the following analysis. First, we distinguish three indicators that are clearly essential for any measure of the quality of elections: \( q3 \), \( q4 \), and \( q5 \). Second, we use these three indicators plus all possible combinations of the remaining seven indicators to construct \( 2^7 = 128 \) measures of \( r \). Thus, each measure represents a different subset of indicators. Third, 128 models are estimated each time employing a different combination of the indicators.

Figure D.1 shows the distribution of the absolute values of \( t \) statistics from the 128 analyses employing different subsets of indicators of the quality of elections.
Figure D.1: Distribution of the absolute value of $t$ statistics from 128 analyses employing different subsets of indicators measuring the quality of elections. Red vertical lines represent the usual cut-off points of 1.96.

Generally, most $t$ statistics are above the 1.96 threshold indicating that the results are generally robust to the choice of indicators measuring the quality of elections.

We have also experimented with an alternative aggregation strategies. First, we applied an item-response model was applied to the matrix of scores. However, the correlation between the two aggregation strategies was exceedingly high (0.96) and hence we employed the simpler approach. Second, we have also tested how robust our results are to the choice of the NELDA variables we include in the analysis. This was done by drawing a random subset of measures from the list of the ten variables we employ and comparing the $t$-statistics of the final results. It appears that our results are robust to the choice of the variables used to measure electoral repressiveness $r$. 
D.2 Alternative Proxy for Retaliation Cost $\gamma$

Table D.1 gives the summaries of the posterior distributions for the models that used an alternative proxy for the cost of retaliation $\gamma$. In contrast to the analysis in the main part of the paper that uses Polity IV scores as a (reciprocal) proxy measure for $\gamma$, here we use Political Terror scale. These two models also control for the turnout. The results generally remain consistent: we observe interactive and non-linear effects of the winner’s vote-share and the unfairness of elections. Also, all three predictions are supported by the data as indicated by the posterior probabilities $\pi_1$, $\pi_2$, and $\pi_3$. 
Table D.1: Using Political Terror scale as a proxy for retaliation cost $\gamma$ and controlling for turnout. Robust binary and ordinal regressions. Coefficient estimates and highest posterior density intervals.

<table>
<thead>
<tr>
<th></th>
<th>Protests and Riots</th>
<th>Mandate Denial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}$</td>
<td>$95%$ CI</td>
</tr>
<tr>
<td>Intercept</td>
<td>10.44</td>
<td>(-0.54, 23.33)</td>
</tr>
<tr>
<td>Winner’s vote-share, $v$</td>
<td>-33.85</td>
<td>(-70.44, -0.06)</td>
</tr>
<tr>
<td>$v^2$</td>
<td>26.56</td>
<td>(2.21, 56.12)</td>
</tr>
<tr>
<td>Rigged, $r$</td>
<td>2.03</td>
<td>(1.14, 3.06)</td>
</tr>
<tr>
<td>$r \times v^2$</td>
<td>-2.77</td>
<td>(-4.66, -1.22)</td>
</tr>
<tr>
<td>Terror, $\gamma$</td>
<td>-0.13</td>
<td>(-0.99, 0.82)</td>
</tr>
<tr>
<td>$\gamma \times v^2$</td>
<td>-0.07</td>
<td>(-2.06, 1.74)</td>
</tr>
<tr>
<td>ln(GDP)</td>
<td>-0.40</td>
<td>(-0.93, 0.16)</td>
</tr>
<tr>
<td>Ethnic diversity, ELF</td>
<td>0.07</td>
<td>(-1.82, 2.1)</td>
</tr>
<tr>
<td>ln(GDP)$\times$ELF</td>
<td>2.22</td>
<td>(0.19, 4.41)</td>
</tr>
<tr>
<td>Legislative</td>
<td>-0.50</td>
<td>(-1.18, 0.26)</td>
</tr>
<tr>
<td>Boycott</td>
<td>-0.20</td>
<td>(-1.26, 0.75)</td>
</tr>
<tr>
<td>Opposition participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turnout</td>
<td>0.56</td>
<td>(-1.72, 3.22)</td>
</tr>
<tr>
<td>Threshold, $\kappa$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma$</td>
<td>1.27</td>
<td>(0.58, 2.02)</td>
</tr>
<tr>
<td>$\nu$</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>$\pi_1$</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>$\pi_2$</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>$\pi_3$</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>491.18</td>
<td></td>
</tr>
<tr>
<td>DIC</td>
<td>241.82</td>
<td></td>
</tr>
<tr>
<td>ROC</td>
<td>0.91</td>
<td>(0.87, 0.94)</td>
</tr>
<tr>
<td>Elections</td>
<td>368.00</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>94.00</td>
<td></td>
</tr>
</tbody>
</table>
Bibliography


Biography

Arturas Rozenas was born on 5 June 1979 in Vilnius, Lithuania. He holds B.A. degree in Philosophy from Vilnius University (2001), M.A. degree in Political Philosophy (with distinction) from the University of York, UK (2003), M.S. degree in Statistics and Decision Sciences from Duke University (2010), and Ph.D. degree in Political Science from Duke University (2012). Before starting his graduate studies, Arturas Rozenas worked as a political reporter in his home country.

Arturas Rozenas wrote his dissertation titled *Elections, Information and Political Survival in Autocracies* on the topic of elections in non-democratic and semi-democratic states. His research has been supported by the National Science Foundation Dissertation Improvement Grant, by the Program for Advanced Research in the Social Sciences (Duke University), Walter Molano Fellowship in Comparative Government and Taylor Cole fellowship (both from Duke University). He also holds the British Chevening Award (from the British Commonwealth Office and the Open Society Foundation). His research has been published in *Political Analysis* (Rozenas, 2012) and *The Journal of Theoretical Politics* (Rozenas, 2011).