Essays on political economy and development

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Declaration

I, Rubén Aarón Poblete Cazenave confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Rubén Aarón Poblete Cazenave
11th July 2019
Abstract

This thesis studies two different topics in political economy and development. The first is related to how incumbents use their privileged position to avoid legal sanctions (chapter two) and being held accountable at the polls (chapter three). The second topic refers to the determinants of civil conflict and its intensity (chapter four).

Chapter two analyzes candidates to legislative assemblies in India, focusing on those with pending criminal cases. I study the impact of winning the election on the probability that these cases are disposed without conviction. The results show no significant differences in legal outcomes for candidates barely winning the election versus candidates barely losing. However, the results also uncover opposite effects of winning the election, depending of candidates’ political alignment with the state ruling party. Elected candidates from the incoming party in government are more likely to get their pending cases disposed without conviction during the legislature. In contrast, the criminal cases of elected candidates not aligned with the new ruling party take longer to be resolved.

Chapter three uses data from Brazilian mayoral elections to study how incumbents react to information affecting their reputation. Results show that candidates adapt their effort in campaigning. A detrimental (beneficial) shock results in incumbents increasing (decreasing) the amount of resources spent on campaigning. The results show that incumbents’ response on campaign expenditure partially compensates the negative (positive) effect produced by the information on electoral outcomes. Incumbents’ ability to react might explain why more information does not always imply more electoral accountability.

The last chapter introduces a two-stage contest model with reference-dependent preferences to study the determinants of conflict and its intensity. The model shows that reference points play a crucial role in the decision of waging war, and in the level of intensity of the conflict. The model delivers predictions in line with the evidence, and explains empirical regularities that previous models cannot account for. The model encompasses two of the most common empirical patterns found in the conflict literature. Conflicts are more likely to occur after negative income shocks due to the current situation being perceived as a loss compared to agents’ reference points. Additionally, income reduces the odds of conflict if agents are more \textit{risk-averse} for gains than \textit{risk-seeker} for losses.
Impact Statement

This thesis addresses one of the biggest threats to modern democracies, the politicization of the legal system. Using evidence from India, the first part of this thesis analyzes the extent to which the judicial system can be influenced by high-powered actors. Specifically, it explores whether politicians accused of criminal offenses can use their political power to avoid legal sanctions and circumvent the legal process. To the best of my knowledge, this study is the first to present evidence of politically-motivated discrimination in the judicial system.

While the judiciary is an independent body, other actors involved in the criminal justice system, such as the police and the Department of Prosecution, might be more vulnerable to political pressures. This work underscores the importance of identifying the actors at highest risk of manipulation and putting the right safeguards in place to prevent the abuse of power by those holding office.

Beyond advancing the academic literature on judiciary independence and political accountability, this work opens up the discussion about how to reconstruct existing legal frameworks and deliver effective strategies to ensure the presence of an independent and impartial judiciary. Whilst focusing on India, the evidence provided is relevant to other modern democracies.

The second part of this thesis addresses the long-standing question of why voters support corrupt politicians. This even when credible information reporting irregularities in the use of public resources is available. The analysis focuses on Brazil, a country where this issue is ubiquitous. The study provides evidence showing that politicians can compensate their misbehaviour while in office by increasing their campaign expenditures and offering benefits to the public. This shows that providing credible and timely information is not enough to tackle corruption in contexts where clientelistic practices abound. In order to effectively address endemic corruption, other types of policy interventions, beyond providing information about politicians’ behaviors, must be considered. Complementary interventions focusing on reducing clientelistic behaviours and increasing citizens’ awareness can prove more effective in the long-term.

The last part explores the drivers of civil conflicts and what determines their intensity. A game theoretic model introducing state-of-the-art behavioural assumptions regarding agents’ preferences is developed. This model allows explaining some of the most recognized empirical patterns highlighted in the civil conflict literature. Namely, that conflict is
more prevalent when income is low, and also that conflict is likely to arise after negative income shocks. This study stresses the relevance of incorporating reference-dependent preferences in the analysis. The inclusion of more realistic assumptions about agents’ risk-taking behaviour provides a set of predictions that are consistent with the empirical evidence. Particularly, this suggests that policies designed to affect people’s perceptions of the status quo could be effective in preventing conflict. Similar behavioral interventions have been implemented, yielding promising results.
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Chapter 1

Introduction

The capacity to keep politicians accountable is a crucial tenet in any democracy. The consequences of political misconduct and abuse of power are sizable. It affects economic growth, increases income inequality, creates distrust on institutions, and impairs policies and governance, among others (Mauro, 1995; Besley and Case, 1995; Rose-Ackerman, 1999; Persson and Tabellini, 2003; Fisman and Golden, 2017). Indeed, the World Bank identified corruption as one of the biggest challenges for development.

The effectiveness of any policy promoting political accountability hinges on the capacity of identifying the perpetrators and on being able to punish their misbehavior.

Chapters two and three of this thesis address these issues. They place focus on the capacity of incumbents to avoid punishment, even when evidence against their misconduct exists.

Chapter two examines whether political power can be misused to influence the legal system. It analyzes the role of the judiciary in enforcing the law and ensuring long-term political accountability. Since Locke (1689) and Montesquieu (1748) the separation of powers is highlighted as crucial for upholding the principles of liberal democracies, preventing malfeasance and avoiding the usurpation of power (Persson et al., 1997). In this endeavor, the presence of an independent and impartial judiciary is paramount (La Porta et al., 2004; Glaeser and Goldin, 2007)

I study the biggest democracy in the world, India. I focus on candidates to legislative assemblies in India to study whether winning a seat in the legislature allows politicians to influence legal outcomes on their pending criminal accusations. India presents a
unique setting that allows answering this question. First, when running for elections, politicians have to disclose their pending criminal accusations. Second, members of the legislative assemblies can be prosecuted during their period in office. I analyze what happened to these pending criminal accusations five years after the election, when the period of the legislature finished. I compare the probability that a pending criminal case is being disposed without conviction for candidates barely winning the elections and those barely losing the election. The results uncover opposite effects of winning office on legal outcomes, depending on the political alignment with the state ruling party. Winners from the state ruling party are more likely to get their pending criminal cases disposed of without conviction during their period in office. In contrast, winners from other parties are less likely to get their pending criminal cases disposed of without conviction during the same time-frame.

The effects are driven by politicians’ use of extortion. Indeed, politicians who use these tactics are able to favorably manipulate legal outcomes, if aligned with the ruling party. In turn, politicians who are less likely to use extortion, are also less likely to get their criminal cases disposed of without conviction during the legislature.

Political manipulation exists in states with low judicial strength, and for non-serious criminal cases. Additionally, politicians aligned with the ruling party at the Union level do not get special treatment on their criminal cases.

To the best of my knowledge, chapter two is the first study providing causal evidence of the effects of political power on enforcement and administration of justice.

Chapter three addresses the role of information on electoral accountability. In particular, it studies the capacity of incumbents to respond strategically to detrimental or beneficial information shocks impacting their reputation. Furthermore, it analyzes how these strategic reactions impact on electoral outcomes. Indeed, elections are one of the main instruments through which voters can hold politicians accountable (Besley, 2006; Smart and Sturm, 2013) and greater information about politicians’ behavior influences voting decisions (Ferraz and Finan, 2008; Bobonis et al., 2016; Chong et al., 2015).

There is substantial literature analyzing the effect of information provision on electoral accountability (see chapter three for a discussion). Yet, no consensus exists. The evidence varies substantially across different contexts. Recently, a group of researchers from several institutions around the world have joined efforts to generate cumulative evidence from comparable studies in various countries (Dunning et al., 2018). They do
not find evidence that bad (or good) news about incumbents decrease (increase) their
electoral support.

Chapter three contributes to this literature by analyzing incumbents’ strategic response
to information shocks. Additionally, I analyze how the information and incumbents’
responses impact on electoral outcomes. The setting employed is mayoral elections in
Brazil.

Political campaigns are an effective tool for politicians to influence the electorate (Gross-
man and Helpman, 2001). Higher expenditure on campaigning is often linked to higher
voting shares. Campaigning requires significant effort, both monetary and non-monetary.
In this study, I utilize candidates’ expenditure in campaigning as a proxy for this effort.

Information about incumbents’ behaviors might positively or negatively affect their rep-
utation. This chapter focuses on information about corruption and mismanagement of
public funds as reported by external audits (Ferraz and Finan, 2008). I compare incum-
bents’ campaign expenditures for those receiving reputation shocks before the election
against those affected after the elections. I also distinguish between shocks that damage
or improve incumbents’ reputation.

Facing beneficial reputation shocks result in incumbents’ decreasing their campaign
expenditure. In contrast, those incumbents subject to detrimental reputation shocks
increase their campaign expenditure.

Strategically increasing campaign expenditure, allows the incumbent to compensate for
the negative effects detrimental information shocks might have on voters’ behavior. In
turn, the decrease in expenditures following a beneficial shock leads to a crowding out
in campaigning efforts. This could harm incumbents’ future electoral prospects. The
results show that incumbents with damaged reputations are reelected more often when
they react by increasing their campaign expenditure per person. Analogously, those who
have seen their reputation enhanced, are more likely to be reelected. This, contingent
on not decreasing their campaign expenditures drastically.

I show that incumbents with high previous electoral support are responsive to reputation
shocks, either beneficial or detrimental. Those without high previous political support
do not respond to information shocks.

Conflict onset and intensity
Civil conflict is pervasive, and its social and economic consequences are devastating
This issue is particularly serious for developing countries. Collier and Hoeffler (2007) estimate that 73 percent of those in the poorest billion of the world’s population are either involved in or recovering from civil war.

Chapter four introduces a contest model to study the determinants of conflict and its intensity. The model departs from standard contest models in two ways. First, it separates the decision of fighting from the decision of arming if conflict is waged. In most of contest models there is no decision of fighting. Peace is often defined by the situation where no one invests in arming - which does not happen in equilibrium. This separation is crucial to analyze the processes underlying the occurrence of conflict and its severity conditional on conflict breaking out. The second departure is regarding agents’ preferences. Most conflict models assume risk neutral expected utility agents. However, the vast body of empirical evidence shows violations of the axioms of this theory (Camerer et al., 2011). I introduce reference-dependent preferences a l à Kőszegi and Rabin (2006) in a contest model.

By including these two departures the model delivers predictions in line with empirical regularities, some of which were not explained by previous models. The chapter shows that reference points are crucial for understanding agents’ participation in violent conflict and its intensity. Particularly, agents’ perception of the status quo is crucial in the decision of engaging in conflict. If the status quo is perceived as a loss, the odds of conflict are higher. This offers another explanation of why conflict is more likely to occur after negative income shocks. This can be attributed to the fact that agents’ situation after the income shock is perceived as a loss. Additionally, the model provides a theoretical explanation to one of the most robust empirical facts in conflict literature: that income reduces the odds of civil conflict. There is a direct mechanism linking income to conflict through agents’ preferences. I show that reference-dependent preferences can explain this empirical regularity if people are more risk-averse for gains than risk-seeker for losses.

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1By civil conflict I follow James Fearon’s definition, ‘a violent conflict within a country fought by organized groups that aim to take power at the center or in a region, or to change government policies.’
Chapter 2

Crime and Punishment: Do politicians in power receive special treatment in courts? Evidence from India

2.1 Introduction

An independent and impartial judiciary is one of the cornerstones of any democracy (Locke, 1689; Montesquieu, 1748). This is crucial to avoid usurpation and tyranny by those holding power (Persson et al., 1997; La Porta et al., 2004). Whilst most democracies establish an independent judiciary as part of their constitutions, in practice, politicians in office may substantially influence the legal system to promote their interests. Even though this concern is more common in developing countries, developed countries are not exempt from this issue.¹

Do politicians in power receive special treatment in courts when facing criminal accusations? If so, does this depend on the political alignment with the ruling party?

Answering these questions is relevant, not only because a politicized judicial system violates a fundamental human right - equality before the law - but also because it

¹Data from the World Economic Forum for 2018 shows similar perception of judicial independence for economies with diverse level of development such as Brazil, India, Indonesia, Italy and Spain. The question asked how independent is the judicial system from influences of the government, individuals, or companies?
compromises other aspects of society and the economy. A persuadable judiciary facilitates high-level corruption (Rose-Ackerman, 1999) and decreases investment and growth (Glaeser et al., 2003; Voigt et al., 2015). It also erodes citizens’ trust on institutions, increases social inequalities and encourages justice by ‘own hand’ (International, 2015). Finally, it creates incentives that attract dishonest people into politics rising serious concerns over the quality of the political apparatus and its capacity to provide public goods to the population.2

Studying political discrimination in the legal system is difficult for several reasons. First, the main challenge is determining whether differences in legal outcomes reflect discrimination towards politicians in power, or whether these are driven by unobserved heterogeneity correlated to politicians holding office. Systematic differences exist between politicians in office and ordinary citizens, both in terms of socio-economic and personal characteristics. For instance, political elites might have access to high-powered attorneys and, therefore, a greater chance of a strong defense, as well as monetary resources to pay for fines or arrange settlements. Second, we rarely observe elected politicians being prosecuted in court. They have access to a range of resources which can be used to avoid litigation. Third, even for those cases that do reach court, their type and severity might differ significantly from cases of those without political power. For instance, powerful politicians may not be subject to criminal prosecution for minor offenses, whereas everyday citizens would. Or on the other hand, given that they are public figures, they might be more exposed to politically motivated accusations, where some of them might not be real. In sum, having a convincing counterfactual for politicians holding office is difficult. 

To the best of my knowledge this paper is the first to provide causal evidence of the impact of holding office on criminal proceedings. To estimate the effect of political power on legal outcomes, I focus on India, the largest democracy in the world. Due to a change in the Law of Information in Elections which came into effect in 2003, all candidates running for a state Legislative Assembly are obliged to disclose their pending criminal cases and convictions before elections. Nearly 20 percent of the candidates running for Legislative Assemblies report having at least one pending criminal case.3 I

2For consequences of electing politicians with pending criminal cases see Chemin (2012), and Prakash et al. (2015).

3It is worth noting that India is one of the few countries requiring their candidates to provide information on pending criminal cases and convictions, and make it publicly available. Therefore, it is difficult possible to put this number into a comparative perspective. See Djankov et al. (2010) for a discussion.
analyze whether members of Legislative Assemblies in India receive an *unfair advantage* in courts when facing criminal accusations. I analyze this in terms of speediness and result of the trials.

I construct a unique panel of criminal cases for candidates running for Indian Legislative Assemblies from 2004 to 2017. The database is composed by candidates that have at least one pending criminal case and are not holding office at the moment of the election. This database plus a research design based on Lee (2008)’s close elections allows to separate the effects of winning a seat in the Legislature on court proceedings (sentencing and speed of the cases) from other confounding factors. The use of close elections as an exogenous source of variation in the allocation of power means that candidates who barely lost the election are a good counterfactual for those who barely won the election.

Tracking candidates’ criminal cases in the legal system is very complex due to institutional constraints and the lack of easily accessible data. However, if candidates rerun in the following election it is possible to identify whether their criminal cases from the previous election are still pending or whether they were not convicted.

I compare the probability of a pending criminal case being disposed of without conviction for politicians who barely won an election against those who barely lost, within the duration of the legislature. Since the decision of rerunning is endogenous, I also estimate a Heckman selection model (Heckman, 1979) exploiting exogenous variation due to a re-delimitation process of the electoral constituencies in 2008.

The results show that, *on average*, candidates who barely won a seat in the state legislature do not receive favorable treatment in courts compared to candidates who barely lost the previous election. However, the article uncovers heterogeneous and opposite effects of winning depending on whether the candidate belongs to the state ruling party or not. Winners from the state ruling party are more likely to get their pending criminal cases disposed of without a conviction during their period in the legislature. In contrast, winners from opposition parties are less likely to get their pending criminal cases disposed of without conviction within the same time-frame.

However, not all type of criminal cases suffer from political manipulation. Serious criminal cases are not affected by political pressures. Additionally, the results show political discrimination in legal outcomes only for states with low judicial strength and weak institutions. Finally, I do not find evidence that members from the state legislatures aligned with the Union government get special treatment on their criminal cases.
Chapter 2. Crime and punishment

The results can be rationalized by the (mis)use of certain attributions vested on the executive to manipulate law-and-order officials. As in most countries, several actors involved in the legal process depend directly from the current government. This makes them more susceptible to political pressures. Politicians from the governing party can affect career paths of legal officials through the use of appointments, removals or foregone career opportunities, among others.\footnote{There is evidence for the United States showing political influence on prosecutors’ behavior (Gordon, 2009, Alt and Lassen, 2012, Nyhan and Rehavi, 2017).}

One practice commonly used by Indian politicians to control bureaucrats is the use of transfers to other locations (Wade, 1982; Iyer and Mani, 2012). This does not only affect the condition of service, but also their chances of getting a more prestigious position in the future.\footnote{All these types of political threats can be very effective in shaping behavior, even for honest legal officials (see Dal Bó and Di Tella, 2003; Dal Bó et al., 2006).}

I find evidence that politicians who are more likely to use extortion are able to favorably manipulate legal outcomes if aligned with the ruling party. In turn, those who are less likely to use extortion, are also less likely to get their criminal cases disposed of without conviction during the legislature if they are not aligned with the ruling party.

The use of narrow win margins in elections for identification relies on the fact that there can be no manipulation of the election results. I test for evidence of this by using a McCrary test. I do not observe evidence of bunching in the distribution of the win margins. Also, no discontinuity is observed on observable variables at the cut-off. An additional concern regarding identification is the selection into re-contesting. The data shows similar probabilities of re-running for candidates with and without any pending criminal cases. I find that the sample of politicians re-running and those that do not, are balanced across a range of dimensions. Further, I estimate a Heckman selection model using the re-delimitation of electoral constituencies in 2008 as an exogenous shock affecting the decision of rerunning but not the legal system. The results do not change.

This article contributes to different strands of the literature. In the first place, it complements the already vast literature on judicial discrimination. Most of this literature has focused on the differential characteristics of those being accused, analyzing the effect of race, gender or religion on sentencing behavior (see for instance, Rehavi and Starr, 2014; Arnold et al., 2018; Abrams et al., 2012; Cohen and Yang, 2018; Alesina and La Ferrara, 2014). There are two distinct differences between my article and this literature. First, in most articles the defendant characteristic that is analyzed is fixed. In contrast, the characteristic studied in this paper, the political status of the accused...
(i.e. whether the politician is holding office or not) can vary during the course of the legal proceeding. I exploit this time-variation to study whether criminal proceedings are affected by a change in political power. Second, and more importantly, in this paper, those accused can directly influence court proceedings and final outcomes through their political power. I contribute to this literature by providing causal evidence on discrimination based on the defendant’s political status. I show that the level of political power and political affiliation of the accused does affect the enforcement and administration of law.

Second, this article adds to the literature analyzing political influence on the legal system. Gordon (2009) finds partisan bias in U.S. prosecution department where weaker sentences are granted for opponents than for co-partisans. He argues that prosecutors only prosecute the most serious cases against their co-partisans. Alt and Lassen (2012) show that prosecutors invest more resources when prosecuting the opposition. Most of this literature employs data on corruption cases and, as explained above, the type of corruption cases that are actually prosecuted is endogenous. Recently, articles have focused on exogenous sources of variation to overcome this issue. Along this line, Nyhan and Rehavi (2017) rely on the electoral date to show that prosecutors file cases of corruption against the other party just before elections. For the Indian context, Aney et al. (2017) show that Supreme Court judges pander to the Indian Union Government when they are close to retiring.

The present article analyzes criminal cases occurring several months before elections and for politicians not holding office, reducing the likelihood that these are affected by any position of power. Additionally, the database used in this article includes criminal cases that are not directly related to political parties, such as corruption, but other types of criminal cases affecting individual candidates. The diversity of the criminal cases, spanning from rioting, criminal intimidation to murder, among others, allows studying differential effects of political influence across types of crimes and severity of crimes. In this sense, this article shows that political power can have far-reaching effects in the criminal justice system by affecting legal proceedings for crimes not related to the political spectrum.

Third, this paper relates to a longstanding literature on accountability of politicians. Particularly, there is recent literature examining the role of the judiciary on improving accountability and reducing corruption (Avis et al., 2018; Zamboni et al., 2018). This article contributes to this literature by highlighting that, in contexts where the executive
can affect individuals and institutions involved in the legal system, judicial accountability will not be as effective in prosecuting corrupt politicians, especially those linked to the ruling party. This poses serious constraints to the capacity of the judiciary to control corruption, whenever institutions involved in the legal process are susceptible to political pressure.

Finally, this article adds to the literature on candidates selection and, particularly, to the criminalization of politics, which is prevalent in India and South Asia (see Vaishnav, 2017). If politicians can influence the legal system then citizens with pending criminal cases might have additional incentives to get into politics to drop their cases upon reaching office.

The article is organized as follows. Section 2.2 depicts the institutional setting and conceptual framework. In section 2.3, I describe the data sources, the identification strategy, and how I construct the outcome variable. The results are shown in section 2.4. I discuss the main mechanisms driving the results in section 2.5. Section 2.6 performs heterogeneity analysis. Finally, in section 2.7, I provide some concluding remarks and ideas for future research.

2.2 Institutional setting and conceptual framework

2.2.1 State government

India is a federation with a parliamentary system. There is three-tiered government: the Union or Central, the state, and the municipal and Panchayats. This study focuses on the second tier government. The federal union is composed by 29 states and seven union territories. Every state has a legislature composed by the Governor and either one or two houses. Among these, only the lower house, known as Legislative Assembly (LA) or Vidhan Sabha, elects their members democratically. Therefore, to analyze the impact of political power on legal proceedings, I focus on candidates for the LAs.

Every state and two union territories (National Capital Territory of Delhi and Puducherry) have a LA. Elections occur every five years, where each constituency elects one member
of the legislative assembly (MLA).\footnote{The state of Jammu and Kashmir has elections every six years. Additionally, in certain cases the period of the assembly can be less than five years if the Governor dissolves the assembly by recommendation of the Chief Minister or whenever the majority of the LA does not support the government.} Elections are conducted by the Election Commission of India, a nonpartisan organization. This institution has established a reputation for conducting free and fair elections (Iyer and Reddy, 2013). Candidates are elected using a plurality (first-past-the-post) rule, and incumbents face no term limits.

Table 2.1 shows the number of constituencies/seats for each LA from 2003 onward. The number of seats is determined by the size of the population. This varies substantially from nearly 400 seats in Uttar Pradesh to 30 seats in Puducherry. The political party who gets the majority of the seats gets the chance to conform the state government and become the ruling party.\footnote{If no party obtains the majority, then a coalition of parties can be created to form a government.} The state government is headed by the Chief Minister and the cabinet of Ministers, in which the de facto executive power lies upon.

### 2.2.2 Disclosure of pending criminal cases

Since November 2003, due to a reform in the Right of Information, candidates for LAs are obliged to present a sworn affidavit disclosing their pending criminal cases. They are required to disclose whether they have ever been charged with committing a crime and the type of crime according to the Indian Penal Code (IPC), criminal convictions, and also the value of their financial assets and liabilities. These documents are publicly available. Figure 2.7 in appendix 2.A.1 presents an example of the first page of an affidavit. It contains information about the candidate’s name, election being contested, age and pending criminal cases, among others. It also describes the number of the court case, and which sections of the IPC are related with each criminal offense.

The general perception is that these criminal charges are truthful and they are not politically motivated, despite being self reported (Vaishnav, 2017). If the information is not accurate the law establishes penalties which could be financial, incarceration, and disqualification from public office.\footnote{See Section 125A of the The Representation of the People Act, 1951.} Additionally, candidates running for office are subject to public scrutiny by the general public and, particularly, from candidates’ opponents. Finally, on average, candidates with pending criminal cases do not face worse electoral
### Table 2.1: Legislative Assemblies and elections from 2003 to 2017.

<table>
<thead>
<tr>
<th>States/Union Territories</th>
<th>Population (in millions)</th>
<th>Constituencies (Seats)</th>
<th>Elections</th>
<th>Elections with disclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>84.7</td>
<td>294</td>
<td>2004, 2009, 2014</td>
<td>3</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>1.4</td>
<td>60</td>
<td>2004, 2009, 2014</td>
<td>3</td>
</tr>
<tr>
<td>Bihar</td>
<td>103.8</td>
<td>243</td>
<td>2005(^a), 2010, 2015</td>
<td>3</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>25.5</td>
<td>90</td>
<td>2003, 2008, 2013</td>
<td>3</td>
</tr>
<tr>
<td>Goa</td>
<td>1.5</td>
<td>40</td>
<td>2007, 2012, 2013</td>
<td>3</td>
</tr>
<tr>
<td>Gujarat</td>
<td>60.4</td>
<td>182</td>
<td>2007, 2012, 2013</td>
<td>3</td>
</tr>
<tr>
<td>Haryana</td>
<td>25.4</td>
<td>90</td>
<td>2005, 2009, 2014</td>
<td>3</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>12.5</td>
<td>87</td>
<td>2008, 2014</td>
<td>2</td>
</tr>
<tr>
<td>Kerala</td>
<td>33.4</td>
<td>140</td>
<td>2006, 2011, 2016</td>
<td>3</td>
</tr>
<tr>
<td>Manipur</td>
<td>2.7</td>
<td>60</td>
<td>2007, 2012, 2017</td>
<td>3</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>2.9</td>
<td>60</td>
<td>2003(^b), 2008, 2013</td>
<td>2</td>
</tr>
<tr>
<td>Mizoram</td>
<td>1.1</td>
<td>40</td>
<td>2003, 2008, 2013</td>
<td>3</td>
</tr>
<tr>
<td>Nagaland</td>
<td>2</td>
<td>60</td>
<td>2003(^b), 2008, 2013</td>
<td>2</td>
</tr>
<tr>
<td>Odisha</td>
<td>42</td>
<td>147</td>
<td>2004, 2009, 2014</td>
<td>3</td>
</tr>
<tr>
<td>Puducherry</td>
<td>1.2</td>
<td>30</td>
<td>2006, 2011, 2016</td>
<td>3</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>68.6</td>
<td>200</td>
<td>2003, 2008, 2013</td>
<td>3</td>
</tr>
<tr>
<td>Sikkim</td>
<td>0.6</td>
<td>32</td>
<td>2004, 2009, 2014</td>
<td>3</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>72.1</td>
<td>234</td>
<td>2006, 2011, 2016</td>
<td>3</td>
</tr>
<tr>
<td>Tripura</td>
<td>3.7</td>
<td>60</td>
<td>2003(^b), 2008, 2013</td>
<td>2</td>
</tr>
<tr>
<td>West Bengal</td>
<td>91.3</td>
<td>294</td>
<td>2006, 2011, 2016</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total** | **1,210.2** | **4,120** | **87** |

Notes. Union Territories are written in italics. Population is based on information of 2011 census. Andhra Pradesh includes Telangana.

\(^a\) Elections were held twice in 2005 for Bihar (February & October) due to Hung assembly dissolved.

\(^b\) These states had elections before the reform on information was put in practice (November 2003 onwards).

But there is evidence that, after controlling for other differences, voters are less likely to support candidates with criminal cases if information is provided (Banerjee et al., 2014).

Finally, the type of criminal cases that candidates must disclose have already passed

\(^9\) In the 2014 national election, candidates with pending criminal cases were three times more likely to be elected than candidates without pending criminal cases. A similar pattern occurs for LAs.
several investigations, and a judge considered the evidence as sufficient to continue with a judicial process.

### 2.2.3 Legal system in India

As in most countries, the criminal justice system is composed of four institutions: the law enforcement (e.g. police), prosecutors, courts and prisons. Given the nature of this study and that cases are already at court stage, the focus is on legal institutions at state level, that is, the judiciary and the prosecution department.

Indian judicial institutions are similar to other countries, particularly those that were under the influence of British colonial rule. India follows a Common Law System, where lower courts must follow the decisions of the higher court. Article 50 of the constitution of India obliges the state to separate the judiciary from the executive in the public services of the state.\(^\text{11}\)

Judicial institutions are the same across states and courts. Courts are in charge of interpreting and applying the law along with the constitution, and to provide impartial adjudications of disputes between the parties involved. The main institution at state level is the High Court, which is mainly an appellate court. High Court judges are appointed by the President of India after consultation with the Chief Justice of India, Chief Justice of High Court and also the state governor. Below the High courts there are subordinate courts at the district levels (called Session courts for criminal cases) and also subordinate local courts. Judges of subordinate courts are appointed by the Governor in consultation with the Chief Justice of the corresponding High Court. Transfers of judges in subordinate courts are issued by the corresponding High Court. Judges have tenured positions where the age of retirement is established by law and depends on which court they are assigned.

Criminal offenses are considered acts against the state. In this matter, public prosecutors are the ones that represent the interests of the state before the courts. The Department of

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\(^{10}\)First, the police performs an investigation on the allegedly offense and if prima facie evidence exists then a charge-sheet is filed to the court. Then another independent investigation by the public prosecutors occurs. At the end of this investigation if there is sufficient corroborating evidence to support a case against the accused, the charge-sheet is filed to the court by the public prosecutor.

\(^{11}\)Glaeser and Shleifer (2002) on a discussion on Common Law Systems and Civil Law Systems. They argue that law enforcement is relatively more depoliticized in common law system than civil law systems, given that juries and judges are independent.
Prosecution is part of the state government. Particularly, is under the remit of the Home Office. Public prosecutors from sessions courts and subordinate courts are appointed by the state government. Prosecutors do not have tenured appointments.

The Indian legal system is characterized by a huge backlog of pending cases and low conviction rates. Data from the Crime in India 2016 Report shows that on average it takes more than 4 years to complete trials by subordinate courts under the Indian Penal Codes crimes. Indeed, as of 2016, 87 percent of the cases in a year are postponed for the following year. Additionally, the average conviction rate for the whole country was 47 percent in 2016.\(^\text{12}\)

An important characteristic in India, and for this study in particular, is that members of legislative assemblies can be prosecuted for criminal cases during their period in the legislature. Additionally, as opposed to other countries, criminal cases are not prescribed in India if they are not solved within a given time frame.

### 2.2.4 Conceptual framework: How does political power affect legal outcomes?

In this section, I discuss why and how elected politicians might get differential treatment in the legal system, and the extent to which the ability to get it could depend on their political alignment with the state ruling party.

From individuals’ point of view, there are several benefits of influencing ongoing criminal cases. Pending criminal cases are costly for the accused individuals. There are monetary costs in terms of legal costs incurred in the legal process as paying attorneys and paperwork. Also, there are opportunity costs related to the time spent during litigation, and potentially not being able to work if the accused is in jail during the legal process. Moreover, the litigation process could last many years and can be psychologically exhausting. Finally, there are several social cost in terms of reputation and social stigma, which could be long lasting regardless the final result. Therefore, if cases can be resolved quickly, these costs can be avoided. More importantly, if the final outcome of

\(^{12}\)This figure is above 85 percent for countries like United States, United Kingdom, France or Japan.
the litigation can be manipulated, then a favorable judgment implies avoiding facing legal punishments be them in the form of fines or incarceration. This ability to affect legal outcomes guarantees politicians can operate under impunity (Rose-Ackerman, 1999).\(^{13}\)

Now I discuss the mechanisms on how accused individuals with political power can affect legal outcomes.

There are several ways to influence legal actors’ behavior and affect judicial processes. These methods can be grouped into three types: bribery, political interference, and others non-political threats. In the former type, bribes can be offered to law-and-order and administrative officials (such as judges, prosecutors or court staff, for instance) to derail court proceedings, misplacing evidence or obtaining favorable sentences. In the second type, politicians use their privileged position and access to other (non-monetary) resources to affect legal outcomes. These could be in the form of political favors or political threats. Finally, other types of ‘non-conventional threats’ can be used to manipulate behavior. These could be in the form of threat of physical violence against a particular legal official (or family), for instance. However, this is not a common pattern in the Indian context.\(^{14}\)

In theory, bribes and violent threats can be made by any citizen.\(^{15}\) However, political interference is only accessible to powerful politicians (or people connected to them). This political power can give politicians more leverage to use bribes or coercion over legal officials.

In the specific case of this paper, individual MLAs do not have direct political power over legal actors in order to influence their behavior and affect court proceedings. Instead, their main way to influence legal outcomes is through their connections with the government.

In India, as in most countries, there are certain powers invested in the executive that can be (mis)used to influence legal officials. Particularly, those officials depending on

\(^{13}\)Note that delaying the litigation as much as possible could be optimal if the chances of being found guilty are considerably high.

\(^{14}\)The effectiveness of threats as motivator to affect behavior (even from honest politicians or bureaucrats) has been studied in the literature (Dal Bó and Di Tella, 2003; Dal Bó et al., 2006). Also, there is a vast theoretical literature analyzing how pressure groups can influence politicians and bureaucrats to adapt their behavior. See Grossman and Helpman (2001) for a general analysis of persuasion in politics.

\(^{15}\)Anecdotal evidence suggests that in India bribes are used regularly to accelerate the legal process. It is acknowledged that court officials introduce artificial delays to increase income coming from bribes from people seeking justice (Rose-Ackerman, 1999).
the government. Thus, elected politicians from the governing party have at their disposal a wider range of resources to influence legal actors - and bureaucrats in general - compared to other elected politicians. These might include appointments and removals or foregone career opportunities (Ramseyer and Rasmusen, 2001 for Japan; Nyhan and Rehavi, 2017 for United States), the possibility to offer judges governmental jobs after retirement (Aney et al., 2017 for India), arrange salaries and conditions of service, among others. A widely common practice used by Indian politicians to shape bureaucrats’ behavior is to transfers bureaucrats to job posts in other locations (Wade, 1982; Iyer and Mani, 2012). This might be of particular use for politicians with pending criminal accusations (Chemin, 2012). Note that political influence do not have to be explicit to affect legal officials’ behavior. It is enough that they believe there might be consequences if they refuse to help a politician. Moreover, it might be the case that legal actors are affecting legal proceedings without any political influence. This would be the case if there are political ideologies (party loyalty) involved in their actions.

2.3 Data and empirical strategy

2.3.1 Data

I use two main data sources. Electoral information comes from the Election Commission of India (ECI). This data contains information for each constituency including: number of voters registered, number of voters who voted, contesting candidates specifying the candidate’s name, gender, age, political party, and the total valid votes received.

Information on candidates’ criminal cases comes from the Association for Democratic Reforms (ADR) and National Election Watch. They process the information coming from the affidavits of each candidate. Figure 2.7 in appendix 2.A.1 shows an example of an affidavits. Figure 2.8, in turn, shows how the information contained in this affidavit is shown in their website.¹⁶

I created a Python code to scrape the data directly from the website. From this source, I obtained nearly 92,700 candidates from 2004 to 2017. Of these candidates about 16,500 candidates disclosed having pending criminal cases before elections. That is, 18

¹⁶http://myneta.info/
percent of the candidates contesting for the Legislative Assemblies in India have at least one pending criminal case.

Figure 2.1 shows the share of candidates with at least one pending criminal case for each legislative assembly. As can be seen there is substantial variation across states. The state with the highest share of candidates with pending criminal cases is Bihar with 30 percent. Followed by Jharkhand (which used to be part of Bihar before 2000), Kerala, and Maharashtra. There is a group of four small states in the North East of India which have a considerably lower share of ‘tainted’ candidates: Manipur, Meghalaya, Mizoram, and Nagaland. However, there are small sized legislature with high share of candidates with pending criminal cases such as Goa, Himachal Pradesh and Puducherry. The average share of candidates with pending criminal cases for the whole country is 18 percent. This is denoted by the vertical red line.

**Figure 2.1:** Share of candidates with pending criminal cases by states

![Graph showing the share of candidates with pending criminal cases by states](image)

Note: This figure shows the share of candidates for legislative assemblies with at least one pending criminal case before the election. For each legislative assemblies, the data corresponds to the last election before 2018. Andhra Pradesh includes Telangana. The red line is the average share of candidates with pending criminal cases for the whole country, which 18 percent.
One of the main challenges in working with electoral data in India is the lack of identifiers for candidates, and Indian name spelling.\textsuperscript{17} These impose difficulties in (i) identifying the same candidate across elections, and (ii) matching candidates (from the ECI data) to their pending criminal accusations (from the ADR data). To identify candidates across databases and in different elections, I follow an iterative matching process based on candidates’ names and other characteristics. For more detail see appendix 2.A.2.

2.3.2 Empirical strategy

To estimate the causal effect of political power on differential treatment in the legal process, the ideal experiment would randomly assign political power across people facing similar criminal cases, and then compare court sentences and procedures among those with political power and those without.

In practice this is not doable. First, the allocation of political power cannot be manipulated randomly within society, and people holding powerful positions have different characteristics from those who don’t. Secondly, detailed information of criminal cases across the population would be required, as well as variation in the level of political power amongst those who have been accused - which most of the time is rarely observed.\textsuperscript{18} Additionally, to study political discrimination in the legal system, we would require criminal cases not directly related with being in a politically powerful position. This is necessary for two main reasons: First, criminal cases might be politically motivated. This is likely to be true for incumbent politicians, who are more exposed than non-incumbents.\textsuperscript{19} Second, the type and severity of the criminal cases might differ significantly for those with and without political power.\textsuperscript{20}

India presents a unique setting which allows to overcome these issues. First, there is information about pending criminal accusations \textit{before} elections. Second, politicians in\textsuperscript{17}For instance, the following names correspond to the same candidate: Ateeq Ahmed; Atique Ahmad; Atiq Ahmad; Atique Ahamad. Moreover, in certain states, it is customary for people to change the order of their names, and also the use nicknames for electoral purposes is officially accepted.

\textsuperscript{18}Arguably, most of the time, powerful people are not involved in legal issues in the first place, potentially due to their privileged position.

\textsuperscript{19}Suppose some politically motivated accusations are fake. Then if they reach the courts, the final outcome should be not guilty, conditional on the legal system being impartial and independent. Additionally, it is likely that the legal process is faster if there is no evidence supporting the allegations.

\textsuperscript{20}It might be that, for people holding power, only their most severe crimes are prosecuted, since they might be too serious to be ignored. In contrast, for people without political power all type of criminal cases are equally likely to be prosecuted.
office can be prosecuted during their period in the legislature. Third, the allocation of power can be solved by focusing on close electoral races (Lee, 2008). Lastly, by focusing on non-incumbent candidates with pending cases, the chances that these accusations are related with having political power are lower.21

Therefore, if by the end of a legislature we observe what occurred to candidates’ criminal cases that were pending before the election for that legislature, we can estimate a causal effect of political power on legal proceedings by comparing the legal outcomes for winners and runners-up contesting in close elections.

Figure 2.2 represents this empirical strategy. Before election $t$ candidates disclosed their pending criminal cases. Based on this information, I separate candidates according to whether they have at least one pending criminal case or not.22 Additionally, I use information from previous elections to determine whether some of these candidates were holding office or not at the moment of the elections. 66 percent of the candidates with pending cases were not incumbents at the moment of the election. The sample of interest is composed by candidates who are non-incumbents and have at least one pending criminal case before elections.

**Figure 2.2: Empirical strategy**

Notes: This figure shows the empirical strategy employed to estimate how obtaining political power (i.e. winning office) affects ongoing legal proceedings. The blue sets show the sample of interest for the analysis. An election is considered as close whenever the win margin is no more than 5 percentage points.

21 If I include candidates in office and only their criminal cases that occurred prior to holding office, these cases are those that could not be settled during their period in office, and hence, might be of a different type. Therefore, I exclude them completely from the analysis.

22 As mentioned before, there are 16,507 candidates disclosing pending criminal accusations.
The focus on close elections provides an exogenous source of variation in the allocation of power. In this sense, a group who barely lost an election provides a good counterfactual for a group who barely won an election. The running variable is defined by the win margin (or margin of victory) between the winner and the runner-up. For the winner this will be positive, since it is the difference in the voting share of the winner with respect to the runner-up. In the case of the runners-up it will be negative, since it is the voting share of the runner-up minus the winners. This approach implies a discontinuity in the level of political power at the cutoff (zero) produced by winning an election and becoming a MLA.

Figure 2.3 shows the win margin and voting share for winners and runners-up with pending criminal cases. Given the electoral system the variation in vote share for winners and runners-up is substantial. The average vote share for the group is 39 percent of the votes. The orange dots represent winners and runners-up with pending cases contesting in elections where the win margin was no more than five percentage points. This threshold is used to define a close elections. The number of non-incumbents candidates with pending criminal cases contesting in close election is nearly 850.

2.3.2.1 Outcome variable: Criminal case disposed of without conviction

Ideally, I would compare court proceedings and sentences for criminal cases of candidates barely winning versus those barely losing. However, tracking criminal cases in India based on the information from affidavits is complex. This is due to institutional constraints, inconsistent digitization of legal records, and not easily accessible data. Additionally, as mentioned, using names as individual identifiers is difficult. This limits the ability to match a criminal case in the legal system to a particular politician. Despite this, it is possible to track criminal cases if candidates rerun for election. Let $cc_{i,t}$ be a pending criminal case for candidate $i$ at election $t$. Given the information that must be disclosed in the affidavits, two possibilities exist. If $cc_{i,t}$ is not stated at election

\[23\] Due to the challenges in matching pending criminal cases before elections with their status at the end of the legislature (see discussion in section 2.3.2.1), I focus only on criminal cases for candidates contesting in close electoral races. This sample is the relevant to find a local average treatment effect given the nature of the identification strategy. To define close elections, I use 5 percentage points as the threshold given its common use in the literature.

\[24\] A number of sentences are available [http://services.ecourts.gov.in/ecourtindia_v6/](http://services.ecourts.gov.in/ecourtindia_v6/), but linking them to a particular accused is difficult even when specific information about the court, year, criminal case number and defendant exist.
Figure 2.3: Margin of victory and vote share of winners and runners-up with pending criminal cases

Note: This figure shows the win margin and the candidate vote share. For winners the win margin is defined as the difference in vote share between the candidate and the runner-up. For runners-up is the difference in vote share for the candidate and the winner. The sample is composed by winners and runners-up with at least one pending criminal case. The orange dots denotes candidates that contest in close elections (i.e. the margin of victory was no more than 5 percentage points).

$t + 1$’s affidavits, then the case was disposed and candidate $i$ was not convicted. Alternatively, if $cc_{i,t}$ appears at election $t + 1$’s affidavits, then either the case was disposed and the candidate was convicted, or the case is still pending.

To determine whether $cc_{i,t}$ is still pending or not at $t + 1$, I use the following procedure. Given a candidate $i$, I analyze the Indian Penal Codes (IPCs) associated with each criminal case $cc_{i,t}$. Then, I examine all candidate $i$’s pending criminal cases at election $t + 1$. On one hand, if there is one criminal case at $t + 1$ with the same IPCs as $cc_{i,t}$, then these two cases are the same. In this situation, I analyze whether the case is reported as a conviction or is still on trial. On the other hand, if there is no criminal case at $t + 1$ matching $cc_{i,t}$’s IPCs, then $cc_{i,t}$ was disposed without conviction.\(^{25}\) Whenever there is additional information related $cc_{i,t}$, such as a case number, I use this to improve the matching. Appendix 2.A.1 shows an example of this procedure.

\(^{25}\)If candidate $i$ has no criminal cases at $t + 1$, then all cases were disposed without conviction.
Hence, to define whether a case is disposed of without conviction candidates are required to rerun in the next election. This means that the last election for each state (see table 2.1) is only employed to construct the outcome variable, but does not form part of the sample for the empirical analysis. Therefore, candidates contesting in elections from 2004 to 2013 are included in the sample.

**Random electoral outcomes**

The crucial assumption for identification is that, even if agents can influence the vote, there is nonetheless a nontrivial random-chance component to the ultimate voting share difference between the winners and the runners-up (Lee, 2008).

To check how random these close elections are, I analyze whether there is systematic manipulation around the cutoff. Figure 2.4 panel (a) shows the density of the win margin, and panel (b) the McCrary test. These figures include all candidates with at least one pending criminal case. To the left of the cutoff (i.e. win margin equal to zero) are the runners-up, while those to the right are winners. From the first panel there are no signs of bunching around the cutoff for the running variable. In panel (b) there are no signs of a discontinuity of the density of the win margin. This suggests there is no evidence of electoral manipulation for close elections. This is confirmed by the McCrary test which rejects the null of discontinuity at the cutoff.

**Figure 2.4: Discontinuity of margin of victory**

![Histogram of the winning margin.](image1)

![McCrary test.](image2)

**Notes.** This figure shows in panel (a) the histogram of the winning margin for winners and runners-up with pending criminal cases. In panel (b) it shows the McCrary (2008) test for discontinuity in the density at the cutoff. The sample is composed by non-incumbent winners and runners-up with pending criminal cases to all legislative assemblies in India from 2004-2013.

To analyze whether candidates barely losing are a good comparison group for candidates barely winning, I check whether observable characteristics at the moment of the elections are balanced across winners and runners-up in the neighborhood of the cutoff.
Candidates barely losing are a good comparison group for candidates barely winning if both have the same distribution of characteristics at the moment of the elections. Figure 2.5 shows the distribution of several covariates with respect to the win margin. From the figure there is no significant differences in any of the covariates. Baseline characteristics of the candidates are similarly distributed just above and just below the cut off. From the first panel, it can be noted that close electoral races are more likely to occur in constituencies with large electorates. The same occurs for constituencies with younger candidates. The third panel on the left shows that candidates belonging to the state ruling party do not have higher chances of winning a close election. Over 95 percent of the candidates are male. Finally, the last panel shows that the number of pending criminal cases (denoted by ‘crimes’) are statistically not different for winners and runners up at the cutoff.

Finally, note that using a sample of candidates rerunning could bias the estimates if the decision of rerunning is related to the legal process. This issue is addressed in 2.4.

### 2.3.3 Descriptive statistics

The final sample is composed by 512 rerunning candidates contesting in close elections and with pending criminal cases. From these, 288 are winners and 224 are runners-up. In terms of criminal cases, there are 1,339 pending cases associated with these candidates. 754 for winners and 585 for runners-up.

Table 2.2 shows the distribution of candidates by number of pending criminal cases. The table separates candidates by electoral outcome. Nearly half of the candidates in the sample have one pending criminal case before election. 91 percent of the candidates have no more than five pending criminal cases. The distribution of winners and runners-up is similar across number of pending criminal cases (see columns 2 and 3).

Tables 2.3 and 2.4 provide information on the types of criminal cases candidates are facing. Table 2.3 shows the five most common categories of criminal offenses. The classification is based on the Indian Penal Code. 55 percent of candidates’ criminal cases have at least one criminal charge affecting the human body. Followed by crimes against public tranquility, and crimes against property. Table 2.4 shows the most common criminal charges received by the candidates in the sample. The table shows criminal offenses under the Indian Penal Code. The most common criminal offense is punishing for rioting (147 of the IPC). This charge is present in almost a third of the criminal cases.
Note: This figure shows whether several covariates are balanced above and below the cutoff. The sample is composed by non-incumbent winners and runners-up with pending criminal cases to all legislative assemblies in India from 2004-2013. Each dot is the unconditional mean in bins of 8 percent by the winning margin. The solid line is the predicted values of a local linear smoother estimated using raw data on each side of the threshold at zero. Outer gray lines indicate 95 percent confidence intervals.

Regarding other candidates’ characteristics, table 2.5 shows summary statistics separated by treatment status. This table shows how balanced observable characteristics are for winners and runners-up. The information is at criminal case level, since it is the unit of analysis. The table shows the average characteristics for runners-up, the difference between winners and runners-up, and the p-values for these differences for a large set of characteristics. The table shows this information for all candidates in the sample, and for candidates rerunning in the next election.

Chapter 2. Crime and punishment

Figure 2.5: Balanced covariates at the cutoff for candidates with pending criminal cases
TABLE 2.2: Number of pending criminal cases by candidates’ electoral outcome

<table>
<thead>
<tr>
<th>Criminal cases</th>
<th>Winners</th>
<th>Runners-up</th>
<th>Total</th>
<th>% (Cum.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>134</td>
<td>112</td>
<td>246</td>
<td>48 (48)</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>57</td>
<td>122</td>
<td>24 (72)</td>
</tr>
<tr>
<td>3-5</td>
<td>61</td>
<td>36</td>
<td>97</td>
<td>19 (91)</td>
</tr>
<tr>
<td>≥ 6</td>
<td>28</td>
<td>19</td>
<td>47</td>
<td>9 (100)</td>
</tr>
<tr>
<td>Total</td>
<td>288</td>
<td>224</td>
<td>512</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes. This table shows the distribution of criminal cases by winners and runners-up. Information is at candidate’s level. The sample contains candidates with pending criminal cases not holding office when contesting the close election (less than 5 percentage point win margin), and re-running in the following election.

TABLE 2.3: Most common type of offenses

<table>
<thead>
<tr>
<th>Nº</th>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Affecting the Human Body</td>
<td>55</td>
</tr>
<tr>
<td>2</td>
<td>Against the Public Tranquility</td>
<td>43</td>
</tr>
<tr>
<td>3</td>
<td>Against Property</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>Criminal Intimidation, insult &amp; annoyance</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>Contempt of lawful authority of public servants</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes. This table shows the most common categories of criminal offenses. The classification is based on the Indian Penal Code.

There are no systematic differences for baseline characteristics between winners and runners-up in both of these samples. For almost all variables the differences in the means for winners and runners-up are statistically not significant, except by education where winners are more educated than runners-up, and a higher share of winners belong to constituencies with reserved seats (scheduled castes and scheduled tribes). Additionally, (although not shown) there are no systematic differences in the type of crimes for winners and runners-up.26

The outcome variable indicating whether a criminal case was disposed of without conviction is denoted as ‘disposed’. The average probability that a pending criminal case is disposed of without conviction in a period of almost five years is approximately 60 percent.

Figure 2.6 shows the spatial variation of the final sample of candidates rerunning associated with the last three columns of table 2.5. Constituencies in green are those where

26There are only differences for defamation crime and murder at 10 percent.
Table 2.4: Most common Indian Penal Codes (IPCs) violated

<table>
<thead>
<tr>
<th>No</th>
<th>IPC</th>
<th>Offense</th>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>147</td>
<td>Punishment for Rioting.</td>
<td>Public Tranquility</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>149</td>
<td>Unlawful assembly.</td>
<td>Public Tranquility</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>506</td>
<td>Criminal intimidation.</td>
<td>Intimidation</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>323</td>
<td>Voluntarily causing hurt.</td>
<td>Human Body</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>148</td>
<td>Rioting armed with deadly weapon.</td>
<td>Public Tranquility</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>341</td>
<td>Wrongfully restraining any person.</td>
<td>Human Body</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>353</td>
<td>Assault or use of criminal force to deter a public servant from discharge of his duty.</td>
<td>Human Body</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>504</td>
<td>Intentional insult with intent to provoke breach of the peace.</td>
<td>Intimidation</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>143</td>
<td>Being member of an unlawful assembly.</td>
<td>Public Tranquility</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>427</td>
<td>Mischief causing damage to the amount of fifty rupees.</td>
<td>Property</td>
<td>14</td>
</tr>
</tbody>
</table>

Notes. This table shows the most common criminal charges faced by the candidates. Only criminal offenses under the Indian Penal Code are included.

a non-incumbent candidate with at least one pending criminal case barely lost the election, while constituencies in red are those where a non-incumbent candidate with at least one pending criminal case barely won the election. Constituencies’ borders are denoted by a black line, where smaller constituencies are in areas where the density of population is higher. As can be seen from the figure, constituencies in the sample are spread throughout the country with most belonging to the north east of India, in the states of Uttar Pradesh and Bihar, and also in the west state of Maharashtra.

2.3.4 Econometric specification

To estimate the effect of political power on the judicial process, I compare the change in status of criminal cases for candidates who barely won the previous elections and candidates that barely lost the previous elections during the same time-period. I estimate the following reduced-form model:

\[
\text{Disposed}_{cis} = \alpha + \beta \cdot \text{winner}_{is} + X'_{is} \gamma + Z'_{cis} \phi + \omega_c + e_{cis},
\]

(2.1)
## Table 2.5: Balance test for winners and runners-up contesting in close elections

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Runners-up</th>
<th>Winners - Runners-up</th>
<th>p-value</th>
<th>Runners-up</th>
<th>Winners - Runners-up</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Candidate’s characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crimes</td>
<td>7.354</td>
<td>-1.622</td>
<td><strong>0.280</strong></td>
<td></td>
<td>7.909</td>
<td>-1.858</td>
<td><strong>0.397</strong></td>
</tr>
<tr>
<td>Vote share</td>
<td>0.334</td>
<td>0.023</td>
<td><strong>0.006</strong></td>
<td></td>
<td>0.332</td>
<td>0.026</td>
<td><strong>0.018</strong></td>
</tr>
<tr>
<td>Education</td>
<td>3.422</td>
<td>0.205</td>
<td><strong>0.051</strong></td>
<td></td>
<td>3.456</td>
<td>0.271</td>
<td><strong>0.080</strong></td>
</tr>
<tr>
<td>Age</td>
<td>45.577</td>
<td>-0.005</td>
<td>0.997</td>
<td></td>
<td>44.116</td>
<td>-0.177</td>
<td>0.893</td>
</tr>
<tr>
<td>Net asset (in ln)</td>
<td>15.190</td>
<td>0.228</td>
<td><strong>0.399</strong></td>
<td></td>
<td>14.866</td>
<td>0.561</td>
<td>0.161</td>
</tr>
<tr>
<td>Female</td>
<td>0.011</td>
<td>0.013</td>
<td>0.119</td>
<td></td>
<td>0.022</td>
<td>0.003</td>
<td>0.830</td>
</tr>
<tr>
<td>New Ruling Party member</td>
<td>0.249</td>
<td>0.123</td>
<td>0.020</td>
<td></td>
<td>0.231</td>
<td>0.126</td>
<td>0.059</td>
</tr>
<tr>
<td><strong>Case characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposed</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.597</td>
<td>-0.002</td>
<td>0.954</td>
<td></td>
</tr>
<tr>
<td>Serious crimes</td>
<td>0.596</td>
<td>-0.033</td>
<td><strong>0.388</strong></td>
<td></td>
<td>0.590</td>
<td>-0.034</td>
<td><strong>0.484</strong></td>
</tr>
<tr>
<td>Number IPCs</td>
<td>4.081</td>
<td>-0.207</td>
<td><strong>0.254</strong></td>
<td></td>
<td>3.730</td>
<td>-0.054</td>
<td><strong>0.827</strong></td>
</tr>
<tr>
<td>Legal status</td>
<td>1.017</td>
<td>-0.005</td>
<td>0.472</td>
<td></td>
<td>1.007</td>
<td>0.000</td>
<td>0.963</td>
</tr>
<tr>
<td><strong>Constituency’s characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electorate (in ln)</td>
<td>5.376</td>
<td>-0.004</td>
<td>0.910</td>
<td>5.373</td>
<td>-0.010</td>
<td>0.816</td>
<td></td>
</tr>
<tr>
<td>Turnout</td>
<td>62.992</td>
<td>0.941</td>
<td>0.525</td>
<td>61.674</td>
<td>1.992</td>
<td>0.334</td>
<td></td>
</tr>
<tr>
<td>SC/ST</td>
<td>0.097</td>
<td>0.006</td>
<td>0.841</td>
<td>0.051</td>
<td>0.053</td>
<td>0.044</td>
<td></td>
</tr>
<tr>
<td>Number of Candidates</td>
<td>12.140</td>
<td>1.181</td>
<td>0.071</td>
<td>12.838</td>
<td>0.174</td>
<td>0.826</td>
<td></td>
</tr>
<tr>
<td><strong>State characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conviction rate</td>
<td>0.334</td>
<td>0.031</td>
<td>0.162</td>
<td>0.345</td>
<td>0.014</td>
<td>0.632</td>
<td></td>
</tr>
<tr>
<td>Resolved cases</td>
<td>0.158</td>
<td>0.003</td>
<td>0.845</td>
<td>0.146</td>
<td>0.016</td>
<td>0.357</td>
<td></td>
</tr>
<tr>
<td>BIMARU</td>
<td>0.464</td>
<td>-0.037</td>
<td>0.493</td>
<td>0.559</td>
<td>-0.148</td>
<td>0.027</td>
<td></td>
</tr>
</tbody>
</table>

Notes. This table shows balance tests for winners and runners-up for two samples. The full sample includes non-incumbent candidates with pending criminal cases contesting in elections where the win margin was no more than 5 percentage points. The sample of rerunning candidates are those winners and runners-up from the full sample who re-contest in the following election. ‘Crimes’ is the number of pending criminal accusations of a candidate. ‘New ruling party member’ is a dummy which is equal to one if the candidate belongs to the party of the new Chief Minister. ‘Serious case’ is a dummy equal to one when the criminal case contains a criminal charges that is serious (see section 2.6.2 for more details). ‘Number IPCs’ is the number of Indian Penal Codes violated in the criminal case. ‘Legal status’ is a dummy which is equal to one if the criminal case if charges have been framed by the corresponding court, otherwise is zero. ‘SC/ST’ is a dummy equal to one if the seat in the legislature for that constituency is reserved for scheduled castes (SC) or scheduled tribes (ST). ‘BIMARU’ is a dummy equal to one for the following states: Bihar, Madhya Pradesh, Rajasthan, Uttarakhand and Uttar Pradesh. This variable is commonly used to denote states with low quality of institutions. The rest of the variables are self-explanatory.

The full sample contains information for 2,321 pending criminal cases, where 1,099 are for winners and 1,222 for runners-up. The number of criminal cases for candidates rerunning is 1,339, 754 cases for winners and 585 cases for runners-up. Information is at the criminal case level. Errors are clustered at the constituency level.
where $\text{Disposed}_{cis}$ is a binary variable equal to one if a criminal case $c$ was pending before election $t$ and was disposed of without conviction before election $t+1$ for candidate $i$ from state $s$, otherwise it is equal to zero (see section 2.3.2.1). The variable $\text{winner}_{is}$ is a dummy equal to one if the candidate barely won the election (i.e. by no more than 5 percent winning margin), and zero if the candidate barely lost the election. $X'_{is}$ and $Z'_{cis}$ are candidates’ and case characteristics, respectively. $\omega_C$ represents criminal case-category fixed effects, and $e_{cis}$ are the residuals, which are clustered at constituency level. The parameter of interest is $\beta$. This provides an estimate of the (local) average treatment effect of winning an election on the probability that a pending criminal case is disposed of without a conviction.

As explained in section 2.2.4, MLAs from the state ruling party might have more political power than MLAs from other parties. Hence, the effects of winning a seat in the state parliament can be different depending on the candidate’s political alignment with the ruling party. To test for these heterogeneous effects, I estimate the following
specification including interaction terms for whether the candidate is a member of the ruling party or not.

\[
\text{Disposed}_{cis} = \alpha + \beta_1 \cdot \text{winner}_{is} + \beta_2 \cdot \text{ruling party}_{is} + \beta_3 \cdot \text{winner}_{is} \cdot \text{ruling party}_{is} + X'_{is} \gamma + Z'_{cis} \phi + \omega_k + e_{cis},
\]

where \( \text{ruling party}_{is} \) is a dummy variable equal to one if candidate \( i \) belongs to the new ruling party at state \( s \), that is, the party of the new Chief Minister elected after election \( t \) (in section 2.4.2 I use other definitions based on ruling coalition).

There are two parameters of interest \( \beta_1 \) and \( \beta_3 \). The parameter \( \beta_1 \) captures the effect of winning office on legal outcomes for politicians not belonging to the ruling party. A priori the sign of this parameter is not obvious. It would be negative if MLAs not from the ruling party are victims of political persecution. On the other hand, if it is positive then MLAs not from the ruling party can influence legal proceedings in their favor. (Although, it is expected that their ability to affect judicial outcomes would be lower than from MLAs from the ruling party.) The other parameter of interest \( \beta_3 \), estimates the causal impact of winning the election for members of the new ruling party with respect to MLAs of other parties. This interaction allows disentangling differences in the political influence on judicial outcomes for winners related to the executive power against those who are not. If MLAs connected to the executive have more influence on legal proceedings this parameter should be positive and significant. In other words, \( \beta_3 \) captures the differential effects for MLAs aligned with the state government compared to the rest of the MLAs.

2.4 Results

This section first analyzes the effects of winning office on pending criminal cases, irrespective of candidates’ political party. Then I study the heterogeneous effects resulting from partisan alignment to the state ruling party.
Chapter 2. Crime and punishment

2.4.1 Effect of winning on pending criminal cases

Columns (1) to (5) in table 2.6 show the OLS estimates of equation 2.1. Each column shows a different specification depending on the set of controls included. All specifications include dummy variables accounting for the number of years between elections, that is, the duration of the legislature, and also crime-category fixed effects.

The first column shows that winning a seat in the state legislature is negatively but not significantly associated with higher chances of a pending criminal case being disposed of without conviction. In column (2), I include state controls to account for variation across states. The magnitude of the coefficient increase (in absolute terms), yet it is still not significant. In the third specification, I add crime-specific controls such as the number of Indian Penal Codes associated with the criminal offense, and in which stage of the legal process the case is. The number of IPCs is highly significant (results not shown in the table). More IPCs increment the time needed to resolve the case. Additionally, it is easier to dispose a criminal case whenever charges have not been framed by the relevant court. In columns (4) and (5), a large set of variables are included. For candidates’ characteristics variables such as net assets, gender, age, education, voting share, number of pending criminal cases, are included. Column five, also controls for constituency characteristics as the size of the electorate, the level of turnout, the number of candidates contesting the previous election, and a dummy denoting whether the constituency is reserved for scheduled castes and tribes. The inclusion of these variables does not considerably affect the size of the main estimate nor its significance.

In sum the coefficient of interest is negative for all specifications but is not statistically significant at any conventional level. Regardless the controls used, the linear probability model shows that - on average - becoming an MLA does not imply a higher probability of a pending criminal case being disposed of without conviction. Hence, winning a seat in a State Assembly does not make a difference on courts’ proceedings for candidates with pending criminal cases.\(^{27}\)

\(^{27}\)Since I am comparing winners and runners-up the estimate represents a premium for winning election (a positive shock on political power) on a candidate’s ability to influence the judiciary. However, runners-up also have political power. In this sense, if the control group were composed by average citizens who are comparable with winners, instead of runners-up, the estimate would possibly be positive and larger given the lack of political power of an average citizen.
### Table 2.6: Effect of political power on the likelihood of a pending criminal case being disposed of without conviction

<table>
<thead>
<tr>
<th>Dependent variable: Dummy = 1 if criminal case is disposed of without conviction before the end of the legislature</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winner</td>
<td>-0.012 (0.041)</td>
<td>-0.039 (0.039)</td>
<td>-0.038 (0.038)</td>
<td>-0.040 (0.040)</td>
<td>-0.035 (0.038)</td>
<td>-0.069 (0.042)</td>
<td>-0.104*** (0.040)</td>
<td>-0.098** (0.039)</td>
<td>-0.103** (0.040)</td>
<td>-0.090** (0.039)</td>
</tr>
<tr>
<td>Ruling Party</td>
<td>-0.002 (0.049)</td>
<td>-0.002 (0.047)</td>
<td>-0.002 (0.046)</td>
<td>-0.017 (0.048)</td>
<td>-0.006 (0.044)</td>
<td>-0.127 (0.077)</td>
<td>-0.146** (0.068)</td>
<td>-0.134** (0.068)</td>
<td>-0.155** (0.068)</td>
<td>-0.127* (0.066)</td>
</tr>
<tr>
<td>Winner x Ruling Party</td>
<td>0.201** (0.092)</td>
<td>0.228*** (0.084)</td>
<td>0.211** (0.082)</td>
<td>0.219*** (0.082)</td>
<td>0.194** (0.081)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Candidates’ controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Constituencies’ controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>State controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Observations</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
<td>1339</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.014</td>
<td>0.038</td>
<td>0.056</td>
<td>0.067</td>
<td>0.062</td>
<td>0.021</td>
<td>0.048</td>
<td>0.064</td>
<td>0.066</td>
<td>0.069</td>
</tr>
</tbody>
</table>

**Notes.** This table estimates the impact of holding office on the likelihood of a pending criminal case being disposed of without conviction at the end of the legislature. This table estimates the impact of holding office, and belonging to the ruling party on the likelihood of a pending criminal case being disposed of without conviction at the end of the legislature. The sample is composed by non-incumbent winners and runners-up contesting in close elections (i.e. where the winning margin was no more than 5 percentage points). Winner is a dummy equal to one when candidate barely wins the election. Ruling party is a dummy for candidates belonging to the party of the Chief Minister. All columns control for the number of years between elections and also for crimes category fixed effects: murder crime, sexual crime, property crime, state crime and defamation crime. Case controls include the number of Indian Penal Codes (IPCs), a dummy for seriousness of the criminal case, and previous status of the case: court has taken cognizance or had framed charges. Candidates’ controls include gender (one for female), ln(net assets), age, education, voting share at election $t$, ln(pending criminal cases at the election). Constituencies’ controls are ln(electorate), turnout, total candidates, and a dummy for reserved constituencies for scheduled castes and tribes. State controls include a dummy for BIMARU states and conviction rates. Robust standard errors clustered at the constituency level in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$. 
2.4.2 Effect of winning and alignment with the ruling party on pending criminal cases

The last five columns of table 2.6 show the estimates of equation 2.2. As can be seen there are heterogeneous effects depending on politicians’ political alignment with the state ruling party. In particular, for candidates from parties not in government, the probability of a pending criminal case being disposed of without conviction is reduced by 9 percentage points for winners compared to runners-up. This represents a decrease in 15 percent of the unconditional probability for candidates from a party different than the ruling party. On the other hand, winners from the ruling party have 10 percentage points higher probability of their pending criminal cases being disposed of without conviction compared to runners-up. This represents a 17 percent increase of the unconditional probability for candidates from the ruling party to get their criminal cases disposed.

These results imply that individual MLAs do not have the ability to affect legal outcomes by themselves - at least for cases that are already in motion. In contrast, what seems to matter is whether the MLA is affiliated to the party in government. This implies that political parties, and particularly, the ruling party is the main driver behind these effects.

First, MLAs involved with the party at the executive power are the ones that can get favorable legal treatment (in terms of speediness of trials and sentencing outcomes). Second, MLAs from parties not in government are less likely to get a fair trial in terms of their speediness. Their cases take much longer to be resolved. This might be due to strategic political reasons. If these MLAs are perceived as political threats to the current ruling party, then there are incentives to place them at a disadvantage.

2.4.2.1 Ruling coalition

Whenever a party fails to obtain the majority of the seats in the legislature, a coalition of parties can be proposed to conform the new government. Table 2.15 in appendix 2.A.3 shows the state-elections when a coalition was required to obtain the majority.

Two variables for ruling coalition are defined. First, I define a dummy variable which is equal to one if the candidate belongs to any of the parties conforming the coalition in power. Otherwise, it is zero. The second variable is a continuous measure based on parties’ relative contribution to the total seats obtained by the ruling coalition. Hence,
this measure is zero for any party not in government. If only one party forms the government, then this variable is equal to one.

Table 2.7 shows the results of estimating equation 2.2 using the two measures of political power accounting for ruling coalitions. The results using the interaction with the ruling coalition are in line with the previous results based on the ruling party. The size of the estimates (in absolute value) when using ruling coalition instead of ruling party, are larger for every specification. This implies that losers belonging to the ruling coalition are worse off than candidates belonging to the main party within the coalition.
Table 2.7: Effect of political power on likelihood of a pending criminal case being disposed of without conviction by different definition of ruling coalition

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy = 1 if criminal case is disposed of without conviction before the end of the legislature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coalition dummy</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Winner</td>
<td>-0.082*</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
</tr>
<tr>
<td>Ruling Coalition</td>
<td>-0.146**</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
</tr>
<tr>
<td>Winner × Ruling Coalition</td>
<td>0.196**</td>
</tr>
<tr>
<td></td>
<td>(0.085)</td>
</tr>
</tbody>
</table>

|                  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Case controls     | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Candidates’ controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Constituencies’ controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| State controls    | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations      | 1339 | 1339 | 1339 | 1339 | 1339 | 1339 | 1339 | 1339 | 1339 | 1339 |
| Adjusted R²       | 0.028 | 0.050 | 0.069 | 0.067 | 0.073 | 0.027 | 0.050 | 0.069 | 0.066 | 0.072 |

Notes. This table estimates the impact of holding office and belonging to the ruling coalition/party on the likelihood of a pending criminal case is disposed at the end of the legislative period, using two ways to define a ruling coalition. In columns (1)-(5): Coalition dummy is equal to one if the candidate is a member of the ruling party or ruling coalition whenever a coalition exists. In columns (6)-(10): Coalition seat share is defined as the proportion of seats in the legislature that each party contributes within the ruling coalition. The sample is composed by non-incumbent winners and runners-up contesting in close elections (i.e. where the winning margin was no more than 5 percentage points). Winner is a dummy for winning the previous election. All columns control for the number of years between elections and also for crimes category fixed effects: murder crime, sexual crime, property crime, state crime and defamation crime. Case controls include the number of IPCs, a dummy for seriousness of the criminal case, and previous status of the case: court has taken cognizance or had framed charges. Candidates’ controls include female, ln(net assets), age, education, voting share at election t, ln(pending criminal cases at t). Constituencies’ controls are ln(electorate), turnout, total candidates, and a dummy for reserved constituencies for scheduled castes and tribes. State controls include a dummy for BIMARU states and conviction rates. Robust standard errors clustered at the constituency level in parentheses *** p<0.01, ** p<0.05, * p<0.1.
2.4.3 Decision of rerunning and re-delimitation of electoral constituencies

One relevant concern is that winning might not only affect the probability that a pending criminal case is disposed, but also candidates’ decision of rerunning. Hence, even when in close elections the allocation of power is as good as random, non-random attrition could affect the comparability of re-contesting winners and runners-up. This could possibly bias the estimates.

To study whether the decision of rerunning is linked to legal outcomes, I compare the probability of rerunning for winners with and without pending criminal cases. I do the same for runners-up. Additionally, I analyze whether candidates rerunning and not rerunning have different characteristics. I do this for winners and runners-up separately. Finally, I use the re-delimitation of the electoral constituencies in 2008 to estimate a Heckman selection model.

2.4.3.1 Probability of rerunning and candidates’ characteristics

As in most democracies, the final rank obtained by a candidate in the election affects whether she reruns or not (Anagol and Fujiwara, 2016). In particular, winners rerun more often than other candidates. Table 2.8 shows the probability of rerunning for candidates contesting close electoral races. The table separates candidates by electoral outcomes and whether they have pending accusations or not. Winners with pending accusations rerun 71 percent of the time, while this number is 55 percent for runners-up with pending accusations. Thus, candidates not treated are more likely to attrit than those treated. However, conditional on the previous electoral outcome, candidates without any pending criminal case have similar probabilities of rerunning. Winners rerun 70 percent of the time, whereas for runners-up is 54 percent.

This suggests that, conditional on the previous electoral outcome, the main factors affecting the decision of rerunning are similar for candidates with and without criminal cases. Thus, whether candidates rerun or not seems to be mostly driven by idiosyncrasies not related to their criminal status. The differential probability of rerunning
between winner and runners-up might be a structural feature of any democratic system, even when the margin of victory was no more than 5 percentage points.\textsuperscript{28}

\textbf{Table 2.8: Probability of rerunning by electoral outcome and type of candidates}

<table>
<thead>
<tr>
<th>Result</th>
<th>All sample</th>
<th>With criminal cases</th>
<th>Without criminal cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Obs.</td>
<td>Prob (%)</td>
<td>Obs.</td>
</tr>
<tr>
<td>Winner</td>
<td>1,211</td>
<td>71</td>
<td>416</td>
</tr>
<tr>
<td>Runners-up</td>
<td>1,236</td>
<td>55</td>
<td>434</td>
</tr>
</tbody>
</table>

\textit{Notes.} This table shows the unconditional probability of rerunning depending on the result of the previous election and whether the candidate had pending criminal cases before election or not. Data is at the candidate level. The sample contains only winners and runners-up who were non-incumbents and contested in close elections (i.e. the winning margin was no more than 5 percent).

Table 2.9 shows how balanced observable characteristics are for candidates rerunning and those not rerunning, conditional on the previous electoral result. There are no systematic differences between candidates rerunning versus those not rerunning. Although there are a few differences. Candidates rerunning are younger. Given the previous electoral outcomes, candidates not rerunning and those running have similar number of criminal cases. However, those rerunning have less IPCs per criminal case. This is true for winners and runners-up. Note however, that sources affecting the decision of rerunning do not bias the estimates as long as these affect winners and losers symmetrically. According to table 2.9 this is the case.

However, despite this, there might exist some characteristics associated with politicians re-running that differ for winners and runners-up, which might affect the probability that a pending criminal case is disposed of without conviction.

To further explore the issue of attrition I estimate a Heckman selection model (Heckman, 1979) by exploiting exogenous variation due to the re-delimitation of the electoral constituencies in 2008.

\textsuperscript{28}Even more, Anagol and Fujiwara (2016) show that candidates finishing second are more likely to rerun and win than those finishing third. This is surprising since neither gets to hold office or enjoy institutional advantage.
### Table 2.9: Balance tests for candidates rerunning and those not rerunning by treatment status

<table>
<thead>
<tr>
<th>Candidate's characteristics</th>
<th></th>
<th></th>
<th></th>
<th>Runners-up</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimes</td>
<td>4.750</td>
<td>1.334</td>
<td>0.373</td>
<td>7.134</td>
<td>0.435</td>
<td>0.860</td>
</tr>
<tr>
<td>Vote share</td>
<td>0.352</td>
<td>0.006</td>
<td>0.634</td>
<td>0.338</td>
<td>-0.009</td>
<td>0.397</td>
</tr>
<tr>
<td>Education</td>
<td>5.955</td>
<td>0.570</td>
<td>0.002</td>
<td>6.024</td>
<td>0.147</td>
<td>0.541</td>
</tr>
<tr>
<td>Age</td>
<td>50.598</td>
<td>-6.829</td>
<td>0.004</td>
<td>46.947</td>
<td>-2.711</td>
<td>0.082</td>
</tr>
<tr>
<td>Net asset (in ln)</td>
<td>15.475</td>
<td>-0.078</td>
<td>0.787</td>
<td>15.494</td>
<td>-0.601</td>
<td>0.190</td>
</tr>
<tr>
<td>Female</td>
<td>0.034</td>
<td>-0.014</td>
<td>0.464</td>
<td>0.006</td>
<td>0.011</td>
<td>0.252</td>
</tr>
<tr>
<td>New Ruling Party member</td>
<td>0.428</td>
<td>-0.076</td>
<td>0.383</td>
<td>0.300</td>
<td>-0.102</td>
<td>0.112</td>
</tr>
</tbody>
</table>

| Cases characteristics       | | | | | | |
| Serious crimes              | 0.598             | -0.048            | 0.436             | 0.608             | -0.024            | 0.668             |
| Number IPCs                 | 4.519             | -0.876            | 0.001             | 4.440             | -0.710            | 0.005             |
| Legal status                | 1.027             | -0.020            | 0.224             | 1.028             | -0.020            | 0.163             |

| Constituency's characteristics | | | | | | |
| Electorate (in ln)           | 5.397             | -0.033            | 0.531             | 5.390             | -0.027            | 0.591             |
| Turnout                      | 64.519            | -0.795            | 0.704             | 63.814            | -1.626            | 0.409             |
| Number of Candidates         | 14.284            | -1.309            | 0.375             | 11.503            | 1.261             | 0.072             |
| SC/ST                        | 0.091             | 0.016             | 0.643             | 0.142             | -0.088            | 0.043             |

| State characteristics        | | | | | | |
| Conviction rate              | 0.384             | -0.027            | 0.416             | 0.329             | 0.010             | 0.771             |
| Resolved cases               | 0.160             | 0.001             | 0.970             | 0.168             | -0.019            | 0.357             |
| BIMARU                       | 0.462             | -0.048            | 0.583             | 0.379             | 0.167             | 0.045             |

Notes. This table shows balance tests for candidates rerunning and not rerunning by previous electoral outcome. ‘Crimes’ is the number of pending criminal accusations of a candidate. ‘New ruling party member’ is a dummy which is equal to one if the candidate belongs to the party of the new Chief Minister. ‘Serious case’ is a dummy equal to one when the criminal case contains a criminal charges that is serious (see section 2.6.2 for more details). ‘Number IPCs’ is the number of Indian Penal Codes violated in the criminal case. ‘Legal status’ is a dummy which is equal to one if the criminal case if charges have been framed by the corresponding court, otherwise is zero. ‘SC/ST’ is a dummy equal to one if the seat in the legislature for that constituency is reserved for scheduled castes (SC) or scheduled tribes (ST). ‘BIMARU’ is a dummy equal to one for the following states: Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh. This variable is commonly used to denote states with low quality of institutions. The rest of the variables are self-explanatory.

Information at the criminal case level. Errors are clustered at the constituency level. *** p<0.01, ** p<0.05, * p<0.1. Number of observations is 1,099 for winners. Of those 754 rerun. For runners-up the observations are 1,222 of which 585 rerun.
2.4.3.2 Re-delimitation of the constituencies

In 2008, India faced the biggest re-delimitation of their electoral constituencies since 1976. The purpose of this delimitation was that the size of the population within constituencies at each state would be as similar as possible. The number of constituencies in the legislature did not change. But the number of constituencies between districts did. Constituencies were re-assigned across districts based on their population. This process did not suffer from political manipulation (Iyer and Reddy, 2013).

This re-delimitation process might have affected the decision of rerunning. However, it should not affect the probability that a pending criminal case is disposed of without conviction.29 The re-delimitation might have impacted the likelihood of winning the next election, potentially the cost of campaigning, or the benefits for being elected given the new size of the constituency (Iyer and Reddy, 2013; Nath, 2015).

I use constituency’s electorate in the election prior to 2008 to calculate deviations with respect to the district’s average. This is used as a predictor of the extent of redistricting (Iyer and Reddy, 2013).30

After the implementation of this process, some constituencies disappeared, while others were created. Based on this, I create a dummy variable (‘Disappear’) denoting whether the constituency exists after the 2008 delimitation or not. To do so I track constituencies by their pre-2008 name.31 If the constituency disappeared the chances of running for re-election are lower.

Finally, some constituencies became reserved for members of specific communities, while others that were reserved change their status to open seat. This also affects the incentives to rerun. On one hand, constituencies that are reserved cannot have general caste candidates. This implies that previous incumbents cannot re-contest. On the other hand, while changing the status from reserved to unreserved does not forbid previous candidates to (re)contest, it decreases their chances of rerunning. Given that the seat

29Note that constituencies in India only serve an electoral purpose. They do not necessarily match any particular administrative region per se. Moreover, administrative boundaries are drawn based on land area, not population. See Nath (2015).

30Fisman et al. (2017) use a similar measure to analyze the effect of delimitation on politicians’ probability of rerunning.

31In 70 percent of the cases, the name of the constituencies remained the same, and in most cases the majority of the ‘old’ constituency belong to a single ‘new’ constituency (Nath, 2014).
is now open, the competition is higher, and therefore the chances of being re-elected smaller.\textsuperscript{32} I create two dummies to account for these phenomena.

Lastly, but not related to the re-delimitation process, I create a dummy equal called ‘General Elections’ which is one for state-elections that are in the same year as general elections. This might affect the chances of candidates rerunning for the state elections.

Table 2.10 shows the estimates for a Heckman selection model based on equations 2.1 and 2.2 and accounting for the decision of rerunning. The set of instruments are the ones explained above. The key identification assumption is that all these instruments are not correlated with candidates’ characteristics or the legal outcomes for candidates’ criminal cases. Jointly, all instruments are strong predictors of whether a candidate reruns or not (p-value of joint significance $< 0.01$).

The Inverse Mills Ratio is estimated from the first stage regression (probability of rerunning) and is included in the main regression to correct for the selection. This parameter is not significant for column (1) and (3) suggesting that this model does not capture significant differences in unobservable characteristics among candidates rerunning or not. Additionally, after correcting the main equations with the Inverse Mills Ratio, the estimates in this table are very similar to those in tables 2.6. Although the estimates of equation 2.2 are reduced in magnitude, the signs are still in the same direction, and the effects significant.

\section*{2.5 Mechanisms}

The results from the previous section show that the enforcement and administration of justice are compromised when those accused have political power. Particularly, the role of the state ruling party in the differential effects of winning office sheds light on the underlying mechanisms taking place and the actors involved.

The fact that there are positive returns of winning office for politicians from the ruling party (or ruling coalition) while for others these are negative implies two things. First, political actors are actively influencing legal outcomes. Second, the results are more likely to be in line with political pressure over law-and-order officials with career concerns.

\textsuperscript{32}Candidates from SC or ST rarely compete in unreserved constituencies, and in less than 2 percent of the unreserved constituencies a candidate from these groups won the election. See Nath (2015).
Chapter 2. Crime and punishment

<table>
<thead>
<tr>
<th>Table 2.10: Selection model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
</tr>
<tr>
<td>Winner</td>
</tr>
<tr>
<td>Ruling Party</td>
</tr>
<tr>
<td>Winner × Ruling Party</td>
</tr>
<tr>
<td>Inverse Mills ratio</td>
</tr>
<tr>
<td>Open Seat</td>
</tr>
<tr>
<td>Reserved Seat</td>
</tr>
<tr>
<td>Disappear</td>
</tr>
<tr>
<td>General Elections</td>
</tr>
<tr>
<td>Population deviation</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

Notes. This table estimates a selection model to account for candidates that do not rerun. Columns (1) and (3) show the impact of holding office and belonging to the ruling party on the likelihood of a pending criminal case is disposed at the end of the legislative period. The Inverse Mills ratio is estimated from the first stage regression (probability of rerunning: columns (2) and (4)) and is included in the main regression to correct for the selection due to candidates not rerunning. The sample is composed by non-incumbent winners and runners-up contesting in close elections (i.e. where the winning margin was no more than 5 percentage points). Winner is a dummy for winning the previous election. All columns control for the following. (i) the number of years between elections and also for crimes category fixed effects: murder crime, sexual crime, property crime, state crime and defamation crime; (ii) Case controls include the number of IPCs, a dummy for seriousness of the criminal case, and previous status of the case: court has taken cognizance or had framed charges; (iii) Candidates’ controls include female, ln(net assets), age, education, voting share at election t, ln(pending criminal cases at t);(iv) Constituencies’ controls are ln(electorate), turnout, total candidates, and a dummy for reserved constituencies for scheduled castes and tribes; and (v) State controls include a dummy for BIMARU states and conviction rates. Standard errors computed using the cluster-correlated Huber-White estimator are reported in parentheses, with clustering at constituency level.*** p<0.01, ** p<0.05, * p<0.1.
There is substantial anecdotal evidence suggesting that legal officials do have career concerns and that they can be affected by the governing party. This is true even in the case of judges, which are better insulated from political pressures. There is evidence that in practice there is substantial political interference in the appointment of judges (Katju, 2018). Moreover, even for judges of the Supreme Court in India, there is evidence that, when they are close to retiring, they pander to Ruling Party at Union level (Aney et al., 2017). This situation might be even worse for other legal officials depending on the government. This would be the case for the Prosecution Department and the police, which may be more susceptible to political interference. Particularly, the use of punitive transfers has been highlighted as one of the most powerful weapons for politicians (Iyer and Mani, 2012; Wade, 1982).

To analyze whether political threats are used to affect legal outcomes, I compare candidates who are more likely to use these tactics with those who are less likely to do so. To classify candidates by their likelihood of using threats, I use information on criminal cases. Using the IPCs, I look for evidence of extortion, intimidation, or threats. If there is at least one criminal case containing an IPC related with the mentioned characteristics, then the candidate is classified as more likely to use threats. Otherwise, the candidate is classified as less likely to use threats.

Table 2.11 shows the results of estimating the effect of political power on legal outcomes by candidates’ likelihood of using political threats. Odd columns control for the number of years between elections and crime category fixed effects. Even columns add a wide range of controls. Columns (1) and (2) show the results for candidates who are less likely to use political interference upon reaching office. Interestingly, criminal cases of winners not from the ruling party takes longer to be disposed of compared to runners-up not from the ruling party. The results are fairly stable after accounting for other

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33 There are some notorious examples of political interference in judicial system in India. The first (1981) and second (1993) Judges’ Transfer Case allow local politicians to fire and transfer judges without the consent of the judiciary. See for instance, Dua (1983) and Chemin (2009) for historical accounts of the first and second Judges’ Cases (1981, 1993).

34 Vappala Balachandran, a former top police officer from Maharashtra said: ‘The one weapon the politician has is the threat of transfer (of police officers) and which they routinely exercise. So the investigation is slow, improper and weak,’ Balachandran said. See https://www.reuters.com/article/uk-india-rape-data/despite-changes-after-2012-horror-indias-rape-victims-denied-speedy-justice-idUKKBN1HP2IM [accessed in 25/01/2019].

35 I focus on IPCs containing the words: extortion, threats, and intimidation. Additionally, I include IPCs reflecting misconducts against a public servant, such as ‘Voluntarily causing hurt to deter public servant from his duty’. These charges reflect the willingness to manipulate or disturb other public servant’s behavior. The IPCs are the following 152, 189, 190, 195A, 228, 332, 333, 353, 383-389, 503, 506, and 507.
controls in column (2). Winning a seat in the legislature and not belonging to the state government reduces the probability of a pending criminal case being disposed without conviction by 14.9 percentage points. Additionally, winners from the ruling party are not more likely to get their cases disposed of without conviction if political threats are not used.

Columns (3) and (4) show the results for candidates more likely to use political threats. These results show that using political threats increase the chances that winners from the ruling party get their cases disposed of without conviction. Therefore, winning office and belonging to the ruling party has high payoffs for candidates who are more likely to use threats. Their pending cases are 15.8 percentage points more likely to be disposed of without conviction. Also, cases of winners outside the ruling party do not take longer to be resolved, whenever political threats are used.

Overall table 2.11 suggests that the use of threats helps mediate the effect of political power on legal proceedings. This not only benefits winners from the ruling party, but also helps winners from outside the ruling party avoid political persecution.

Finally, it is worth noting the potential influence of another external actor: the media. There is substantial evidence that the media can directly affect judicial outcomes (Lim et al., 2015, Philippe and Ouss, 2018). Particularly, winning and becoming part of the ruling party could attract higher media exposure, and this might affect legal outcomes. However, there are several reasons why this might not be the case in the Indian context. First, the control that the state government in India can exert on media outlets is limited compared to other countries. One of the most important media outlets previously analyzed in the literature is newspapers (see Besley and Burgess, 2002, Anagol and Fujiwara, 2016). In India, most of the newspapers are owned by individuals, societies and associations. Data from the Annual Report of the Registrar of Newspapers for India for 2016-17 shows that central and state governments ownership represents less than 1 percent of all titles. Second, international evidence shows that appointed judges are not responsive to media coverage (Lim et al., 2015). In India judges are appointed, and therefore less vulnerable to public opinion.

This suggest that the direct channel through which media affects judicial outcomes is not a first order concern in the Indian context.

36Lim et al. (2015) shows that elected (nonpartisan) judges in United States react to media whereas appointed judges do not.
2.6 Heterogeneity analysis

To analyze the extent to which politicians can affect the legal system and the role of legal actors, I analyze which type of criminal cases can be manipulated. Which states are more likely to be victims of political manipulation? Are there any differential effects for MLAs aligned with the ruling party at the Union government?
2.6.1 Quality of judicial institutions

To study the contexts under which political manipulation is more likely, I exploit variations at the state level. This section focuses on judicial strength in subordinate courts. Judicial strength is defined as the number of judges per court over the size of the population. Using information from Transparency International’s report on Corruption in India for 2005, I separate judicial strength into three levels: high, medium and low.\footnote{According to the definition Delhi, Gujarat, Himachal Pradesh and Karnataka are among the high strength states. Rajasthan, Bihar, Jharkhand, Kerala, Tamil Nadu, Punjab, Haryana, Odisha, Madhya Pradesh and Chhattisgarh are among the medium strength states. Andhra Pradesh, Assam, Maharashtra, Uttar Pradesh, Uttarakhand, and West Bengal are among the low strength states.}

States with low strength, also have high vacancy rates. This situation might increase the time it takes to prosecute defendants. Therefore, in courts with low judicial strength, cases might take longer to be disposed of. However, another effect might occur when there is low judicial capacity. Legal actors may find ways to resolve cases more efficiently given the limited availability of judges (Yang, 2016). These capacity constraints might facilitate political manipulation, making it easier for legal officials to drop politicians’ criminal cases.

Additionally, I separate states by BIMARU states and non-BIMARU states. BIMARU states have been highlighted as states with weak institutions and generally more corrupt. Therefore, it is likely that in highly corrupt states politicians are more able to influence the legal system. The BIMARU states are Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh.

Table 2.12 shows the estimates of the impact of winning office on legal outcomes for states with different quality of institutions. Columns (1) to (3) separate states by the level of judicial strength, and columns (4) to (5) by whether the state is classified as BIMARU. Column (1) presents the results for states with high judicial strength. Given the low number of observations for high strength states, standard errors are quite large. The effect of winning is positive and the magnitude is large, although not significant from zero. For the case of states with medium strength, there are no significant differences between winners and runners-up, regardless of whether they belong to the state ruling party or not. In contrast, for the case of low judicial strength (column (3)) there are significant differences. Elected candidates from the new ruling party are 24 percentage points more likely to get their criminal cases disposed of without conviction compared to winners from other parties. This suggests that courts with lower institutional capacity...
are more prone to suffer from political pressures. In this sense, it might be easier for the legal actor to favor politicians or ‘turn the blind eye’ whenever courts are over burdened with cases.

When using the other measure of institutional quality, similar results emerge. In non-BIMARU states there is no evidence of systematic political manipulation in the legal system. However, when analyzing BIMARU states, evidence of political discrimination is found, specially for winners of the new ruling party. States with weak institutional capacity are more likely to suffer from political pressures.

**TABLE 2.12: Effect of holding power on likelihood of a pending criminal case being disposed without conviction by type of institutions**

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy = 1 if case is disposed of without conviction before the end of the legislature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Strength</td>
</tr>
<tr>
<td>Winner</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>0.203</td>
</tr>
<tr>
<td></td>
<td>(0.146)</td>
</tr>
<tr>
<td>Ruling Party</td>
<td>-0.109</td>
</tr>
<tr>
<td></td>
<td>(0.151)</td>
</tr>
<tr>
<td>Winner x Ruling Party</td>
<td>0.079</td>
</tr>
<tr>
<td></td>
<td>(0.176)</td>
</tr>
<tr>
<td>Observations</td>
<td>74</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.490</td>
</tr>
</tbody>
</table>

Notes. This table estimates the impact of winning office and belonging to the ruling party on the likelihood that pending criminal case is disposed without conviction, for states with different institutional capacities. Robust standard errors clustered at the constituency level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All columns control for State fixed effects, and crimes category fixed effects. Candidates’ controls: female, ln(net assets), dummy equal to one if same party in both elections, age, education, voting share at election \(t\), total pending criminal cases at \(t\). Constituencies’ controls: total candidates, and dummy for scheduled cases and tribes (SC and ST). All regressions control for case characteristics: number of IPCs, a dummy for seriousness of the cases, and initial status of the case: Cognizance taken or charges were framed. Additionally, I include a time variable to control for the number of years between elections.

### 2.6.2 Seriousness of the criminal offense

This section analyzes the effect of the severity of the criminal accusation in mediating political manipulation. To do so, I first analyzes how incentives to manipulate legal outcomes change with the severity of the criminal case.

From politicians’ point of view there are several benefits of interfering with legal proceedings (see section 2.2.4). This is particularly true when facing serious criminal accusations. Given that the consequences of being convicted are higher for serious charges than for less serious cases, the payoffs of manipulating the outcome are higher.
Chapter 2. Crime and punishment

From legal officials’ point of view, the costs for manipulating serious cases are higher compared to less serious criminal cases. This costs could be in the form of legal reputation costs and/or moral costs. For instance, suppose legal officials want to improve their career prospects. There is a trade-off between these investments. Officials can invest in either legal reputation and/or political reputation. This implies that officials might be willing to benefit a politician (and increase their political reputation) up to a certain point. Beyond this threshold the costs of manipulating the system become too high.38

In this sense, if politicians are the only ones interfering with the legal process, we would expect to see similar effects for all types of criminal cases. However, if manipulation only occurs for non-serious criminal cases, this might suggest that other agents are involved in the process.

To define a criminal case as serious, I follow the definition of ADR. A serious criminal case is a case satisfying one of the following conditions: (i) the maximum punishment is of 5 years or more, (ii) they are non-bailable, (iii) electoral offenses, (iv) offenses related to loss to exchequer, (v) offenses that are assault, murder, kidnap, rape related, (vi) offenses that are mentioned in Representation of the People Act (Section 8), (vii) under Prevention of Corruption Act, and (viii) crimes against women.39

Table 2.13 shows the effect of holding office on legal outcomes by the severity of the criminal case. Columns (1) and (2) analyze non-serious criminal cases, whereas columns (3) and (4) are for serious cases. Odd columns control only for the number of years between elections and crime-category fixed effects. Even columns control for a large set of controls.

The magnitude of the estimates (in absolute value) increases for non-serious criminal cases with respect to those when the whole sample is used. On the other hand, although the signs are in the same direction, there are no significant differences for serious criminal offenses for any politicians, irrespective of the political party or current political status. These results imply that politicians can only influence legal proceedings and outcomes for criminal cases that are not serious.

38 See Dal Bó and Di Tella, 2003 for a model with similar intuition. See also Nyhan and Rehavi, 2017.
39 Note that in general serious criminal cases take longer to be disposed of than non-serious cases. However, the number of serious cases disposed of without conviction between legislatures is still relatively high. For candidates in the sample, 56 percent of the serious cases are disposed without conviction between elections. This number is 62 for non-serious cases.
The fact that serious cases cannot be manipulated, could suggest that legal actors are preventing this from happening. It could also reflect strategic behavior of political parties given the potential negative exposure they can face if the media reports evidence of manipulation of these cases. These could affect future electoral prospects or put pressure on the current government. However, I do not find evidence of this channel (results not shown).\(^{40}\)

### Table 2.13: Effect of political power on likelihood of a pending criminal case being disposed of without conviction by type of crime

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy = 1 if criminal case is disposed of without conviction before the end of the legislature</th>
<th>Non-serious criminal cases</th>
<th>Serious criminal cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Winner</td>
<td>-0.112*</td>
<td>(0.064)</td>
<td>-0.028</td>
</tr>
<tr>
<td>Ruling Party</td>
<td>-0.246*</td>
<td>(0.136)</td>
<td>0.007</td>
</tr>
<tr>
<td>Winner × Ruling Party</td>
<td>0.292*</td>
<td>(0.159)</td>
<td>0.044</td>
</tr>
</tbody>
</table>

| Other controls      | ✓                                                                                               | ✓                         | ✓                      |
| Observations        | 515                                                                                             | 515                       | 692                    | 692                     |
| Adjusted \(R^2\)    | 0.047                                                                                           | 0.132                     | 0.017                  | 0.047                   |

*Notes.* This table estimates the impact of holding office and belonging to the ruling party on the likelihood of a pending criminal case is disposed at the end of the legislative period by seriousness of the crimes. To define a crime as serious I follow the definition used by the Association of democratic reform. These includes crimes where the punishment is 5 years or more, they are non-bailable, crimes against women, among other criteria. These include crimes such as assault, murder, kidnap, rape, for instance. For more detail see definition in appendix. The sample in columns (1)-(2) includes only non-serious crimes, while the sample in columns (3)-(4) include serious crimes. The sample is composed by non-incumbent winners and runners-up contesting in close elections (i.e. where the winning margin was no more than 5 percentage points). Winner is a dummy for winning the previous election. All columns control for the number of years between elections and also for crimes category fixed effects: murder crime, sexual crime, property crime, state crime and defamation crime. Case controls include the number of IPCs, a dummy for seriousness of the criminal case, and previous status of the case: court has taken cognizance or had framed charges. Candidates’ controls include female, ln(net assets), age, education, voting share at election \(t\), ln(pending criminal cases at \(t\)). Constituencies’ controls are ln(electorate), turnout, total candidates, and a dummy for reserved constituencies for scheduled castes and tribes. State controls include a dummy for BIMARU states and conviction rates. Robust standard errors clustered at the constituency level in parentheses *** \(p<0.01\), ** \(p<0.05\), * \(p<0.1\).

\(^{40}\)Additionally, this can be explained by the fact that political parties want to help candidates only with non-serious cases, but not candidates with serious criminal accusations. However, this explanation raises concerns on the motivation of political parties in supporting the candidacy of people with serious criminal cases in the first place.
2.6.3 Political alignment with ruling party at the Union level

It is interesting to analyze whether MLAs aligned with the ruling party at the Union level receive differential treatment on their cases.\(^{41}\) On one hand, the ruling parties at Union and state level might have different attributions that can be used to exert political pressure depending on the legal actors involved. Hence, MLAs aligned with the Prime Minister’s party might have access to different resources to manipulate the legal system compared to MLAs aligned with the Chief Minister’s party. On the other hand, they might face political persecution at the state level given their connections with the Union government.

Given its status as an independent body, the judiciary is less susceptible to political pressures than other legal institutions, such as the Department of Prosecution (see section 2.2.3). One important attribution of prosecutors is that they have the authority to withdraw criminal cases (Section 321 of the Criminal Code 1973). Anecdotal evidence supports the fact that prosecutors receive instructions from the government when deciding which cases to withdraw (Lal Sharma, 1997).\(^{42}\)

These elements suggest that the state ruling party might have more political influence than the ruling party at the Union government. Moreover, prosecutors seem to be more vulnerable to political pressures—specially from the state ruling party, compared with judges.\(^{43}\)

During most of the period of analysis the ruling party at the Union level was the Indian National Congress (INC) commanded by Manmohan Singh, who held power for nearly 10 years until May 2014 when the Bharatiya Janata Party (BJP) led by Narendra Modi succeeded him. In the first two columns of table 2.14 I show the estimations for the period under the control of the INC from 2004 to 2014. I analyze whether members of the INC receive particular benefits with respect to other politicians due to the influence of the Union government. In columns (3) and (4) I include the whole period from 2004 until 2017. Since the outcome variable measures whether a pending criminal case is

\(^{41}\)In India, the central government is most commonly referred as the Union.

\(^{42}\)Batra et al. (2005) describe one salient example of this practice when an ex Chief Minister of Bihar, Jagannath Mishra, and some of his associates, were prosecuted for manipulation of funds of a cooperative bank. The prosecution was launched when Mr. Mishra was not in power, but soon after he was elected Chief Minister, a decision was taken by the state government that the prosecution against him and his associates should be dropped.

\(^{43}\)Evidence from other countries also shows that the prosecution department is subject to political pressures. For instance, Nyhan and Rehavi (2017) show that in the United States, the ruling party influences prosecutors to file cases of corruption against the opposition just before elections.
disposed of without conviction during a certain time frame - typically five years - then
some litigations potentially overlap between the two central governments. For instance,
if a case was pending in 2013 the case was ongoing during the period of the INC but also
it is very likely that it was ongoing when the BJP rose to power. Therefore for any case
disclosed from 2010 onward the dummy variable INC or BJP member is equal to one for
candidates from INC/BJP. Prior to that year this variable is equal to one for candidates
from INC. As seen from the table, cases from winners aligned with the Prime Minister’s
party are not more or less likely to be disposed of without conviction. If anything, the
results from columns (3) and (4) show negative effects for winners belonging to either
the INC or BJP at the respective periods in the Union government. However, these
effects are not statistically significant from zero.

2.7 Concluding remarks

This article analyzes whether the enforcement and administration of justice are com-
promised when individuals accused of criminal offenses have political power. I analyze
whether candidates with a pending criminal case who suddenly acquire a position of
power (by obtaining a seat in the state legislature) can affect the legal course of their
criminal cases and their outcomes. The findings of this article show that winning a
seat in the state legislature does not result in special treatment during the legal process.
However, there are opposite effects depending on candidates’ political alignment with
the state ruling party. The results highlight that powers vested on the executive might be
misused to manipulate legal officials with career concerns. In particular, appointments,
promotions, and transfers are relevant for political interference.

Understanding which institutions and actors involved in the criminal justice system are
affected and more susceptible to political pressure is crucial to improve the level of in-
dependence in the legal system. Given that the cases analyzed in this paper are already
at the court level, two institutions are of first order relevance: the judiciary and the De-
partment of Prosecution. Since the latter depends directly from the government, it is
more susceptible to political manipulation. However, in order to deepen this analysis,
more detailed and disaggregated data on the different actors and stages of the criminal
process would be required. For instance, information on prosecutors, witnesses, hear-
ings, the police, judges and judgments would be needed to identify the weakest links
in the legal chain and pin down how legal outcomes change over time. Specifically, it
### Table 2.14: Effect of political power on likelihood of a pending criminal case being disposed of without conviction by alignment with ruling party at the Union level

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Dummy = 1 if criminal case is disposed of without conviction before the end of the legislature</th>
<th>Indian Congress Party 2004-2014</th>
<th>Indian Congress Party &amp; Bharatiya Janata Party 2004-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Winner</td>
<td>0.027</td>
<td>0.021</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>(0.056)</td>
<td>(0.053)</td>
<td>(0.048)</td>
</tr>
<tr>
<td>INC member</td>
<td>0.087</td>
<td>0.085</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.080)</td>
<td>(0.081)</td>
<td></td>
</tr>
<tr>
<td>Winner × INC member</td>
<td>-0.007</td>
<td>-0.059</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.105)</td>
<td>(0.103)</td>
<td></td>
</tr>
<tr>
<td>INC/BJP member</td>
<td></td>
<td>0.098</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>(0.065)</td>
<td>(0.064)</td>
<td></td>
</tr>
<tr>
<td>Winner × INC/BJP member</td>
<td>-0.129</td>
<td>-0.111</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.089)</td>
<td>(0.080)</td>
<td></td>
</tr>
<tr>
<td>Case controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Candidates’ controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Constituencies’ controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>State controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Observations</td>
<td>902</td>
<td>902</td>
<td>1339</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.013</td>
<td>0.058</td>
<td>0.020</td>
</tr>
</tbody>
</table>

Notes. This table estimates the impact of holding office and belonging to the Union ruling party on the likelihood of a pending criminal case is disposed of at the end of the legislature. The sample is composed by non-incumbent winners and runners-up contesting in close elections (i.e. where the winning margin was no more than 5 percentage points). Winner is a dummy for winning the previous election. INC is a dummy variable equal to one if the candidate is align with the Indian National Congress. INC/BJP is also a dummy variable equal to one for candidates of INC, and for candidates from BJP for year 2010 onward. All columns control for the number of years between elections and also for crimes category fixed effects: murder crime, sexual crime, property crime, state crime and defamation crime. Case controls include the number of IPCs, a dummy for seriousness of the criminal case, and previous status of the case: court has taken cognizance or had framed charges. Candidates’ controls include female, ln(net assets), age, education, voting share at election t, ln(pending criminal cases at t). Constituencies’ controls are ln(electorate), turnout, total candidates, and a dummy for reserved constituencies for scheduled castes and tribes. State controls include a dummy for BIMARU states and conviction rates. Robust standard errors clustered at the constituency level in parentheses.

---

*** p<0.01, ** p<0.05, * p<0.1.
would be interesting to analyze the reason why politicians’ criminal cases are disposed. Are winners of the ruling party more likely to see their cases disposed of because they are acquitted or because the case was dismissed by the court? If dismissed, what are the underlying reasons and actors involved?

Finally, it is worth noting that this article identifies the effects of an increase in political power determined by winning an election on legal proceedings and outcomes. This, however, might represent a lower bound for the effect of having political power and the extent to which it can affect the whole legal system. This is due to two reasons. First, I use as a counterfactual for politicians holding office, politicians who ended up second in a close electoral race. Runners-up might still hold some political influence on court proceedings and, most likely, not less than the average citizen. Therefore, if able to construct a convincing counterfactual using citizens not involved in politics then the effects would probably be higher. Second, this article focuses on the effects of political power on court proceedings and outcomes, once a criminal case has reached courts. Yet, in practice, politicians holding office can abuse their powers to affect the legal system even at earlier stages. Further research on these issues would help expand understandings of the different mechanisms taking place and the extent to which political power can affect the legal system.

44Think about a politician speeding and being stopped by the police. S/he can avoid getting fined by threatening the officer with potential retaliation and potential negative consequences. It is enough for the officer to consider the threat as credible for their behavior change.
Chapter 2. Crime and punishment

2.A Appendices to Chapter 2

2.A.1 Affidavits and matching criminal cases across elections

Figure 2.7: Example of Affidavits- Form 26

Figure 2.9 shows an example of the matching procedure employed to define the outcome variable. The first criminal case reported in election 2009 does not match any of the pending criminal cases reported in election 2014 based on the IPC, therefore the case was disposed of without conviction. On the other hand, the second pending criminal case at 2009 does match with the first pending criminal case at 2014 based on the...
Additionally, the crime number is reported (e.g. No 41/03). Whenever information exists, this is also used to improve the matching procedure. I manually check the matching procedure for all of the criminal cases that were pending at $t$ and whether they were stated at $t + 1$.

I discard cases without IPC, unless there is additional information to perform the matching. For example, the third criminal case in election 2009 in Figure 2.9 relates to the second case in 2014.

It is important to mention that only a few criminal cases have different IPCs from one election to another, conditional on having information on crime number. This information was also confirmed during with meeting with practitioners.45

45 Many thanks to Surya Prakash from DAKSH.
2.A.2 Identifying candidates across databases and elections

To identify candidates between the electoral data (Election Commission of India) and the affidavits data (Association for Democratic Reform and National Election Watch) I perform the following iterative matching process. This process is based on candidates’ names and other characteristics.

To prepare the data for the merging, I create an identifier for each observation in each database. This allows to keep track of each particular observation to avoid duplication of the information during the merging process.

First, I merged the two databases using candidates’ characteristics such as name, age, education, constituency, political party. Then I separate the matched observations from the unmatched observations from each database. I generate three data sets. One containing the matched observations, and two other data sets containing the unmatched
observations, one for the electoral data, and the other for the criminal data from the affidavits. Second, using the two unmatched databases from the previous step (unmatched electoral data, and unmatched criminal data), I merge them using a less strict criteria. Specifically, I subtract one variable from the merging criteria to perform the matching. Then, I separate the observations in three different databases again. The matched observations and two unmatched observations. I append the matched observations in this second round to those observations that were previously matched in the first step. Third, with the unmatched observations I repeat step two using a less strict criteria (i.e. taking one variable from the criteria for the merging).

Fourth, I conduct the same procedure using a fuzzy matching algorithm to account for the fact that names can be written differently across elections. The fuzzy match generates a metric of distance or similarity between the two names based on the Levenshtein method. This prevents matching candidates with similar names who are not the same, as well as matching candidates with different name spelling across elections. Finally, I manually checked all candidates in my final database.

For tracking candidates across elections within the electoral data, I follow a similar procedure to the one just described. The main difference is that I account for variables that might change over time, such as age, education, political party, among others. For instance, for the case of age. If the election is 5 years ahead, in order to have a match then the candidate should have more than 4 years but less than 7. This to account for the different month between the date were elections occurs and the months were the candidate was born.

2.A.3 Other tables

2.A.4 Selection model

To be more concrete on the potential bias due to non-random attrition let the model be as follows:

$$d_{cis}^{*} = \alpha + \beta \cdot w_{is} + X'_{is} \gamma + Z'_{cs} \phi + \varepsilon_{cis}$$ (2.3)

$$r_{is}^{*} = a + b \cdot w_{is} + X'_{is} \psi + Z'_{cs} \sigma + d_{cis} + u_{cis}$$ (2.4)

$$d_{cis} = 1[r_{is}^{*} \geq 0] \cdot d_{cis}^{*}$$ (2.5)
Table 2.15: Ruling party/coalition by Legislative Assembly since 2003

<table>
<thead>
<tr>
<th>State</th>
<th>Election t</th>
<th>Election t+1</th>
<th>Election t+2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>INC</td>
<td>TDP</td>
<td>INC</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>INC</td>
<td>INC</td>
<td>INC</td>
</tr>
<tr>
<td>Assam</td>
<td>INC [BPF]</td>
<td>INC [BPF]</td>
<td>BJP [BPF, AGP]</td>
</tr>
<tr>
<td>Bihar</td>
<td>JD(U) [BJP]</td>
<td>JD(U) [BJP]</td>
<td>JD(U) [BJP]</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>BJP</td>
<td>BJP</td>
<td></td>
</tr>
<tr>
<td>NCT Delhi</td>
<td>INC</td>
<td>AAP [INC]</td>
<td>AAP</td>
</tr>
<tr>
<td>Goa</td>
<td>INC</td>
<td>BJP</td>
<td>INC</td>
</tr>
<tr>
<td>Gujarat</td>
<td>BJP</td>
<td>BJP</td>
<td>BJP</td>
</tr>
<tr>
<td>Haryana</td>
<td>INC</td>
<td>INC</td>
<td>BJP</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>BJP</td>
<td>INC</td>
<td>BJP</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>BJP [JMM]</td>
<td>JMM [BJP]</td>
<td>BJP</td>
</tr>
<tr>
<td>Karnataka</td>
<td>BJP</td>
<td>INC</td>
<td></td>
</tr>
<tr>
<td>Kerala</td>
<td>CPI(M) [CPI]</td>
<td>INC [ML]</td>
<td>CPI(M) [CPI]</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>BJP</td>
<td>BJP</td>
<td></td>
</tr>
<tr>
<td>Maharashtra</td>
<td>INC [NCP]</td>
<td>INC [NCP]</td>
<td>BJP [SHS]</td>
</tr>
<tr>
<td>Manipur</td>
<td>INC</td>
<td>INC</td>
<td>BJP [NPP, NPF]</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>INC</td>
<td>INC</td>
<td></td>
</tr>
<tr>
<td>Mizoram</td>
<td>INC</td>
<td>INC</td>
<td></td>
</tr>
<tr>
<td>Nagaland</td>
<td>NPF</td>
<td>NPF</td>
<td></td>
</tr>
<tr>
<td>Odisha</td>
<td>BJD [BJP]</td>
<td>BJD</td>
<td>BJD</td>
</tr>
<tr>
<td>Puducherry</td>
<td>INC</td>
<td>AINRC</td>
<td>INC</td>
</tr>
<tr>
<td>Punjab</td>
<td>SAD [BJP]</td>
<td>SAD [BJP]</td>
<td>INC</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>INC</td>
<td>BJP</td>
<td></td>
</tr>
<tr>
<td>Sikkim</td>
<td>SDF</td>
<td>SDF</td>
<td>SDF</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>DMK [INC, PMK]</td>
<td>AIADMK</td>
<td>AIADMK</td>
</tr>
<tr>
<td>Telangana</td>
<td>INC</td>
<td>TRS</td>
<td></td>
</tr>
<tr>
<td>Tripura</td>
<td>CPI(M)</td>
<td>CPI(M)</td>
<td></td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>BSP</td>
<td>SP</td>
<td>BJP</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>BJP</td>
<td>INC</td>
<td>BJP</td>
</tr>
<tr>
<td>West Bengal</td>
<td>CPI (M)</td>
<td>AITC</td>
<td>AITC</td>
</tr>
</tbody>
</table>

Notes. This table shows the acronym of each ruling party for each legislative assembly from 2003 to 2017. Ruling party is defined by the party of the Chief Minister. Squared parentheses denotes other parties in the coalition forming the government. Election t denotes the first election for each state where there is information about pending criminal cases (see table 2.1). For example: For Uttar Pradesh t is 2007, t+1, 2012 and t+2, 2017. The most popular national political parties are the Indian National Congress (INC) and the Bharatiya Janata Party (BJP). Union Territories are written in italics.

where \( d_{cis}^{*} \) is a binary variable equal to one if the criminal case \( c \) from candidate \( i \) of state \( s \) is disposed of without conviction before election \( t+1 \). \( r_{is}^{*} \) is an latent variable representing the propensity to rerun, where if \( r_{is}^{*} \geq 0 \) the candidate decides to rerun otherwise she does not rerun. \( b \) represents the causal effect of winning on rerunning.
propensity, and \( \beta \) is the treatment effect of interest.\(^{46}\) \( \text{[1]} \) \( \) is an indicator function. The outcome variable is only observed when the candidates decided to rerun. The main independent variable is \( w_{is} \) which is equal to one if the candidate won the previous election, and zero if the candidate finished second.\(^{47}\)

To avoid excessive notation and focusing on the main issue, I omit sub-indexes and the rest of the covariates (all probability and expectations are conditional on the covariates).

The average treatment effect of winning is given by:

\[
\beta = E(d^*|w = 1) - E(d^*|w = 0)
\]

\[
= (1 - \rho_1) \cdot E(d^*|w = 1, r^* \geq 0) + \rho_1 \cdot E(d^*|w = 1, r^* < 0) - (1 - \rho_0) \cdot E(d^*|w = 0, r^* \geq 0) - \rho_0 \cdot E(d^*|w = 0, r^* < 0)
\]

where \( \rho_w = \Pr(r^* < 0|w) \), and therefore \( \Pr(r^* \geq 0|w) = 1 - \rho_w \) for \( w \in \{0, 1\} \). From data we know that the attrition is higher for runners-up than for winners: \( \rho_1 < \rho_0 \).

\[
\beta = E(d^*|w = 1, r^* \geq 0) - E(d^*|w = 0, r^* \geq 0) + \rho_1 \cdot [E(d^*|w = 1, r^* < 0) - E(d^*|w = 1, r^* \geq 0)]
\]

\[
= \rho_0 \cdot [E(d^*|w = 0, r^* < 0) - E(d^*|w = 0, r^* \geq 0)]
\]

Therefore, the parameter I would recover with the population of candidates rerunning (observable) is:

\[
\hat{\beta} = \beta_{true} + \rho_1 \cdot [E(d^*|w = 1, r^* \geq 0) - E(d^*|w = 1, r^* < 0)]
\]

\[^{46}\]Note that here I stated a constant treatment effect. However, the previous sections showed heterogeneous treatment effects of winning depending on the candidates’ political affiliation with respect to the ruling party. For simplicity of exposition I omit this but the analysis is straightforward.

\[
d_{cis} = \alpha + \beta_1 \cdot w_{is} + \beta_2 \cdot p_{is} + \beta_3 \cdot w_{is} \cdot p_{is} + X'_{is} \gamma + Z'_{cis} \phi + \epsilon_{cis},
\]

where \( p_{is} \) is equal to one if the candidate belongs to the ruling party. Additionally, the decision of rerunning or not is not affected by candidates’ partisanship with respect to the current ruling political party.

\[^{47}\]Note that the first equation is at criminal case level, while the selection equation is at candidate’s level.
\[-\rho_0 \cdot [E(d^*|w = 0, r^* \geq 0) - E(d^*|w = 0, r^* < 0)]\]

Replacing equations 2.4 and 2.5.48

\[
\hat{\beta} = \beta_{true} + \rho_1 \cdot [E(\varepsilon|w = 1, u \geq -a - b) - E(\varepsilon|w = 1, u < -a - b)] - \rho_0 \cdot [E(\varepsilon|w = 0, u \geq -a) - E(\varepsilon|w = 0, u < -a)]
\]

B: Selection due to attrition of winners

D: Selection due to attrition of runners-up

\[
\hat{\beta} = \beta_{true} + \rho_1 \cdot B - \rho_0 \cdot D
\]

The estimate \( \hat{\beta} \) is composed by the true average effect of winning a seat in the state legislature assembly on the probability of a pending criminal case being disposed of without conviction (\( \beta \)) plus a selection term due to differential re-running rates between winners and runners-up. These two additional terms are given by the fact that I cannot observe what happen to candidates’ criminal cases if they do not rerun.

Hence, whether \( \hat{\beta} \) is upward or downward biased depends on the sign and magnitude of \( \beta_{true} \), and of \( \rho_1 \cdot B - \rho_0 \cdot D \).

As the equation above shows this selection into the sample could bias the estimates if the attrition is related to the outcomes of interest, or variation in these outcomes. For instance, if there exists any unobservable characteristic affecting the decision of rerunning in the next election \( t + 1 \), and also affects the judicial process of a candidate’s criminal case. This will be the case if, for example, candidates with higher chances of being declared guilty are less likely to rerun in the next election for winners than from runners-up.

If any correlation exits between the residuals of the equation estimating the effects of winning on the probability of a criminal case being disposed of without conviction, and the equation determining whether the candidate re-contest or not, the estimates of section 2.4 would be biased. For instance, suppose a candidate with a pending criminal case is convicted between elections \( t \) and \( t + 1 \). If convicted people are forbidden to run for office, this candidate will not rerun, and therefore I do not observe the outcome variable (whether the case was disposed of without conviction or not) for this candidate.

48Note that if there is no attrition then \( \rho_w = 0 \ \forall \ w. \)
If we assume that most candidates that did not rerun was because they were convicted, the parameter capturing the value of winning office would be downward biased. However, as noted before, conviction rates in India are quite low, and this rate is lower for politicians. Data from 2018 shows that the rate of convictions for current and past MPs and MLAs is 6 percent.
Chapter 3

Holding politicians accountable: Reputation shocks, and incumbents’ reaction

3.1 Introduction

Institutions that make politicians accountable to voters improve policies, governance and promote economic growth (Besley and Case, 1995; Mauro, 1995; Persson and Tabellini, 2003). In this regard, elections are the main instrument through which voters can exert political accountability (Smart and Sturm, 2013). Yet, politicians getting reelected despite being involved in corruption allegations is not uncommon - even in well-established democracies.\(^1\)

Accessible and credible information is deemed important for voters to hold politicians to account (Persson and Tabellini, 2000; Besley and Prat, 2006). However, the evidence of the effect of information on electoral accountability is mixed (see for instance Banerjee et al. (2011), and Banerjee et al. (2014) for India; Chong et al. (2015), Larreguy et al. (2015), Arias et al. (2018a) for Mexico; Ferraz and Finan (2008) and De Figueiredo et al. (2012) for Brazil; Humphreys and Weinstein (2012) for Uganda, among others).\(^2\)

\(^1\)Several articles find low electoral punishment for corruption. See for instance, Eggers (2014) for United Kingdom, Costas-Pérez et al. (2012) for Spain, Chang et al. (2010) for Italy, Peters and Welch (1980) see United States.

\(^2\)Recently, Dunning et al. (2018) in their ‘Metaketa I’ conclude that there is ‘no evidence of impact of the common informational intervention across all studies in the aggregate, and little evidence of substantial impact in any of the individual studies.’
Most of the focus of this literature is on how voters react to information. Instead, this study acknowledges that incumbents have an opportunity to react to information shocks prior to the elections.

There is substantial evidence showing that incumbents adapt their policies when information is available to the electorate (Besley and Burgess, 2002; Snyder and Strömberg, 2010). Most of the previous studies have analyzed the impact of the availability of information, but not the effects of beneficial or detrimental information content impacting incumbents’ on their behavior. Incumbents might react differently depending on whether information improves or damages their reputation.

Information shocks affecting incumbents’ reputation might motivate a strategic response. This chapter analyzes incumbents’ responses depending on whether information shocks damage or enhance their reputation. To provide evidence of this I study the case of mayors in Brazil.

One of the most visible ways for politicians to influence the electorate is through political campaigns. In most democracies, candidates that invest more in campaigning are the ones who receive more votes. In the case of Brazil, the role of campaign expenditures on electoral outcomes has been recognized (see for instance Samuels, 2001). Political campaigns are expensive and require significant effort from candidates, from gathering sufficient funds to rallying for votes. In this study, I utilize candidates’ expenditure in campaigning as a proxy for effort.

To measure reputation shocks I focus on information about corruption and mismanagement of public funds as reported by external audits. These audits analyze municipalities’ use of federal transfers and generate a report disclosing any irregularities. Given that mayors are the main political figure at the municipal level and have substantial autonomy in the allocation of public services, this information would directly affect their reputation.\(^3\)

To estimate the causal effect of reputation shocks on electoral campaign expenditures, I exploit the random timing of the audits with respect to elections on campaign expenditures. I compare the level of campaign spending of incumbents receiving reputation shocks...
shocks before the election against those from incumbents that were affected after the elections.\textsuperscript{4}

The results show that both ‘honest’ and ‘corrupt’ incumbents react to reputation shocks. In particular, the paper shows a substitution effect between the reputation shocks and the effort exerted by the incumbent measured as campaign expenditures. Incumbents receiving a beneficial reputation shock decrease their campaign expenditure by 27 percent. That is, the monetary value of a beneficial reputation shock is between 19,850 to 22,500 Brazilian Reals (at prices of 2000).\textsuperscript{5} This is equivalent to over 30 times the average wage in Brazil in the year 2000. On the other hand, incumbents facing detrimental reputation shocks increase their campaign expenditure by 12 to 14 percent. Therefore, incumbents spend on average between 9,500 to 12,600 Brazilian Real more to compensate the detrimental reputation shocks produced by corruption findings.

I analyze whether other measures commonly used to draw electoral support are affected by the incumbents’ reputation shock. I study the use of patronage through the manipulation of public sector employment (Enikolopov, 2014; Robinson and Verdier, 2013), and manipulation of a conditional cash transfer program (Manacorda et al., 2011, De La O, 2013, Labonne, 2013; Brollo et al., 2015; Frey, 2016). I find similar behavior for the conditional cash transfer program in terms of the share of beneficiary families within the municipality over population but not for the value of the benefits received per family. This is attributed to mayors being able to administrate the registry of citizens in the program, but not being able to affect the benefits provided. These benefits are directly administered by the federal government. In the case of public employment, I do not observe any significant differences of the effect of information, regardless of whether the employment is permanent or transitory.

Additionally, I show that political support is relevant in making incumbents more responsive to reputation shocks. Particularly, incumbents whose previous margin of victory were high are responsive to detrimental as well as beneficial reputation shocks. Those without high previous political support do not respond to the information shocks.

Of particular interest is to understand the effect of the incumbents’ reaction and reputation shocks on electoral outcomes. Specifically, I show that detrimental reputation shocks decrease the chances of being reelected. However, incumbents with damaged

\textsuperscript{4}This empirical strategy was previously used in Ferraz and Finan (2008).

\textsuperscript{5}At the year 2000, the value of the Brazilian Real was approximately to USD 0.55.
reputations are reelected more often when they react by increasing their campaign expenditure per person. Analogously, information improving incumbents’ reputation do have a positive electoral impact provided that candidates does not decrease their campaign expenditures by a significant magnitude. Otherwise, they are reelected less often despite their improved reputation.

The results can be rationalized as follows. Given that performing well during an electoral campaign (and while in office) requires substantial effort, then any information improving incumbents’ reputation would give her some room to decrease the amount of effort exerted to attain the same electoral approval. On the other hand, if information damages incumbents’ reputation, they can react and compensate citizens by exerting higher effort. In particular, given their position in office, incumbents have a higher capacity to attract resources compared to other candidates and can re-allocate resources to specific sectors of the electorate. Hence, if profitable, they can incur in additional costs to attract and reallocate resources to gain citizens’ approval. In this reasoning it is crucial that at least a share of voters can be influenced to support the incumbent in exchange of political favors. There is substantial evidence in different contexts that this is the case (Finan and Schechter, 2012; Nannicini et al., 2013), and particularly in the Brazilian context (Bobonis et al., 2017).

This study relates to different strands of the literature. First, the literature on information and electoral accountability. There is an extensive literature is this regard see for instance Dunning et al. (2018) and references therein. Recently, a few studies have examined how information affects different political actors beyond voters. Bobonis et al. (2016) show that politicians are strategic and adjust they behavior when they foresee the likelihood of being audited. Grossman and Michelitch (2018) shows that politicians in Uganda shirk whenever voters are unaware of their performance. For the Philippines, Cruz et al. (2018) find that increasing voters awareness on the availability and scope of public programs induces incumbents to buy vote. In this study I analyze detrimental as well as beneficial reputation shocks. I show that politicians adapt their behavior to reputation shocks by adapting their campaign expenditure. This change in spending is crucial in mediating the effects of detrimental and beneficial reputation shocks on electoral outcomes. Therefore, even when voters are perfectly aware of the incumbents’ misbehavior, they might not ‘throw the rascals out’. Politicians can compensate voters for their misbehavior.

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6In the setting of campaign expenditures voters are referred to be impressionable (Grossman and Helpman, 1996).
Second, the literature on information and distributive politics (Golden and Min, 2013). This literature highlights the crucial role of information and the presence of media on incumbents’ responsiveness (Besley and Burgess, 2002; Strömberg, 2004; Snyder and Strömberg, 2010; Cole et al., 2012). This study contributes to this literature by showing that incumbents respond not only to the availability of information but they do it differently depending on how the information affects their reputation. Particularly, I show that beneficial information enhancing incumbent’s reputation can crowd out the effort exerted to win elections.

Finally, this study contributes to the literature on campaign expenditure (Levitt, 1994; Gerber, 1998; Stratmann, 2017). It shows that information on candidates’ reputation impact their campaign spending, and that greater spending in campaign can, in certain circumstances, compensate bad reputation shocks due to corruption allegations. Additionally, beneficial reputation shocks do not completely substitute the role of campaigning.

This chapter is organized as follows. In section 3.2, I describe the institutional settings and the data. After describing the empirical strategy in section 3.3, I present the main findings in section 3.4. Then I proceed to perform heterogeneity analysis on the results in section 3.5. In section 3.6, I analyze the effects of incumbents’ reaction on the probability of being reelected. Finally, I conclude in section 3.7.

3.2 Institutional setting and data

This section describes the institutional setting and the data employed to conduct the empirical analysis.

3.2.1 Municipal elections and campaign expenditures

Brazil is a republican federation with a presidential system. There are three levels of government: The federal government, 26 states and 5,565 municipalities. The focus of this study is on the lowest level of government. Each municipality is led by the mayor (Prefeito) and a city council (Câmara de Vereadores), which represent the executive and legislative powers, respectively. Each municipality has considerable power and autonomy in the allocation of public resources. They receive transfers from the federal and
state government which are spent on education, health, social assistance, infrastructure, among others. The mayor has a crucial role in defining how the budget will be spent.

Elections for choosing mayors are held every 4 years, on the first Sunday of October (all municipalities on the same date). Mayoral elections are decided by simple plurality rule, except for municipalities where the electorate surpasses 200,000 people, where there is a run-off if no candidate obtains majority in the first round. Incumbent mayors cannot hold office for more than two consecutive terms. Voting is electronic and compulsory for people between the ages of 18 and 70.

*Campaign expenditures.* For the period studied here, mayoral electoral campaigns were based on public and private financing. Public resources come from the Party Fund (Fundo Partidário).\(^7\) Private funding comes from own resources as well as firm and people’s donation. Private individuals can only donate up to 10 percent of their gross annual income to a candidate’s campaign. Similarly, firms are not allowed to contribute more than 2 percent of their gross annual revenues.\(^8\) The Law of Elections holds parties and candidates responsible for their campaign expenses, and for reporting their financial accounts. Candidates must declare their resources, otherwise their registration is canceled.

Data on electoral variables, mayoral characteristics, campaign expenditures and finances are obtained from the *Tribunal Superior Eleitoral* (TSE).\(^9\) This data contains information on candidates for each municipality, party affiliation, gender, education, age, marital status, and the total votes obtained by each candidate. Based on this information it is possible to know whether the mayor is eligible for reelection, and whether she reruns or not. Regarding the campaign expenditure data, this information is only available from 2004.\(^10\) I separate funding sources into personal resources, donations from private individuals, donations from firms, and others sources, which includes the Party

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\(^7\) Parties receive public funding in proportion to the number of seats in the lower house.

\(^8\) Lei n. 9.504/1997 (Lei das Eleições)

\(^9\) This situation changed in 2015. Now companies cannot donate to political campaigns but individuals still can. 2016 municipal elections were the first elections without firms’ donation, but this period is outside the scope of this study.


\(^11\) For some candidates there is no information in the online database regarding their campaign expenditures for the elections 2004 and 2008. This is nearly 9 percent for incumbents rerunning. I analyze whether there are significant differences between incumbents reporting campaign expenditures with those who did not. I do not report this table here. However, I do not observe any significant differences in municipal variables nor in mayor’s characteristics, with the exception of age and education. Mayors that do not reports are slightly older (48.6 versus 45.2) and less educated (5.9 versus 6.3) than those who reported.
Chapter 3. Reputation shocks and incumbents’ reaction

Fund. This allows examining whether revealing the mayors’ type before elections has any effect on campaign spending and the way incumbents fund their campaigns. Campaign expenditures are in Brazilian currency units (Real) at 2000 prices (IPCA - FGV deflator).

Higher expenditures in campaigning relate to better electoral outcomes (Grossman and Helpman, 2001). And particularly incumbents have a higher capacity to attract funds than other candidates. To have a sense of these two characteristics in the Brazilian context, figure 3.2a shows data for municipalities where there are at least three candidates, and the mayor is re-contesting the elections. Panel (a) shows the distribution of the shares over the total campaign expenditures spent by the winner of the election, the runner-up and the third highest ranked candidate. As can be seen from the graph, candidates that spend more on campaigning are more likely to rank higher in the election. On average, for municipalities with three or more candidates, out of the total campaign expenditures within the municipality, 48 percent corresponds to the winner. Additionally, from figure 3.2b incumbents rerunning attract more funds for campaigning compared to the main challengers (i.e. those either winning the election or ending up second). Current mayors spend 265 Brazilian Reals per hundred people, compared to the 186 spent by the main challenger. Figure 3.2b also shows where these resources come from. Rerunning mayors obtain 20 Reals more from people’s donation for every hundred citizens, and also spend more from their own resources. The largest difference is on the case of firms’ donations, where rerunning mayors receive on average 28 Reals more per hundred of people. The difference coming from other sources is not as large as the others.

3.2.2 Reputation shocks: Municipal audit program.

Information shocks affecting incumbents’ reputation can take various forms. In this study I focus on information related to corruption while in office. This information comes from audit reports.

In April 2003, the Brazilian government started a fiscalization program in charge of Controladoria Geral da União (CGU) aimed at auditing the use of federal funds transferred to municipalities. Only municipalities with less than 450,000 inhabitants were part of the audit program.12 Municipalities were randomly selected through a lottery

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12 This excludes nearly 8 percent of the municipalities.
process. For each lottery, 60 municipalities were selected. If selected, a group of external auditors visited the municipality and reviewed the municipal accounts, physically contrasting the existence of public goods against reported municipal expenditure. Following the visit, a report compiling the findings is produced. Prior to releasing the report, mayors are given the opportunity to comment and provide further evidence. A final report is then generated and released to the media and general public. This process has been recognized as transparent and accurate.

To measure information affecting mayors’ reputation I focus on the level of corruption found in these reports. The corruption measure I use comes from Brollo (2011) and Brollo et al. (2013). This measure covers severe illegal procurement practices, fraud, over-invoicing, among others (for more detail see appendix 3.A.1). The data covers lotteries 2 to 29. For these lotteries there is a total of 2,065 observations for terms 2001-2004 and 2005-2008. However 60 percent of these mayors were eligible for reelection.

Table 3.9 shows the corruption measures employed in this study. In columns 2 and 3 the variable ‘Corruption’ is a dummy variable equal to one when the audit found evidence of irregularities in the use of fiscal funds, otherwise is zero. For the mayor term 2001-2004, 70 percent of the mayors received a report stating irregularities. In the last columns ‘Share corruption’ denotes the ratio between the total amount of funds involved in irregularities over the total amount audited in the municipality. On average 4.43 percent of the audited resources were found to be involved in violations for the period 2001-2004. For the period 2005-2008, the proportion of incumbents involved in irregularities increased considerably, by 18 percentage point, and the average amount of resources involved in irregular transactions increased to almost 6 percent.

### 3.2.3 Other data

Municipal characteristics are obtained from the Instituto Brasileiro de Geografia e Estatística (IBGE), the 2000 Brazilian Census and a municipal-level survey Perfil dos Municipios Brasileiros 2005. I include the GDP per capita, population (in logs), Gini

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13The first draw of the lottery was a pilot. In the second lottery 26 municipalities were selected, one from each state - except from Brazilia. From lottery 3 until lottery 9 included, 50 municipalities were selected. Finally, increasing up to 60 from lottery 10 onward.

14For more details on the audit program see Ferraz and Finan (2008), Ferraz and Finan (2011), Brollo et al. (2013), Zamboni and Litschig (2013).

15The data was directly downloaded from the author’s website. https://sites.google.com/site/fernandabrollo/home/data [accessed on February 2016].
TABLE 3.1: Reputation shock: Evidence of corruption from audits by electoral term.

<table>
<thead>
<tr>
<th>Term</th>
<th>Obs.</th>
<th>Mean (%)</th>
<th>Obs.</th>
<th>Mean</th>
<th>p25</th>
<th>p50</th>
<th>p75</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2004</td>
<td>808</td>
<td>70</td>
<td>776</td>
<td>4.43</td>
<td>0</td>
<td>0.09</td>
<td>4.41</td>
<td>84.3</td>
</tr>
<tr>
<td>2005-2008</td>
<td>557</td>
<td>88</td>
<td>511</td>
<td>5.79</td>
<td>0</td>
<td>2.03</td>
<td>7.13</td>
<td>90.5</td>
</tr>
</tbody>
</table>

Notes. This table shows two measures of corruption. Corruption is a dummy denoting whether the audit report showed evidence of irregularities in the use of federal funds. Share corruption is the ratio between the total amount of funds involved in the violations over the total amount audited in the municipality. Data from lotteries 2-29 are included and only for mayors in the first mandate. Share corruption is not available for lottery 19. See Brollo (2011) and Brollo et al. (2013) for more details.

 coefficient for income, share of urban population, illiteracy rates, and level of education of the municipality measured by the share of population over 18 years with complete schooling. To control for media availability I define whether there is a radio station (am) or not in the municipality.

**Other political instruments**

Incumbents can employ different tactics to attract voters’ support. I refer to these as ‘political instruments.’ These can range from clientelistic tactics in the form of patronage (offering of public-sector employment) or direct vote-buying (through the distribution of money, tangible goods or gifts); or through the use of pork-barrel spending while holding office. In Brazil, these tactics are ubiquitous (Ames et al., 2008). The method used and its effectiveness in gathering voters’ support could vary across contexts. Here I focus on ‘political instruments’ that are found to be effective in motivating electoral support. I analyze public employment, and cash transfers. There is evidence of the use of public employment for political purposes (Enikolopov, 2014). It has been shown to be effective in obtaining political support as it can be easily targeted to certain individuals and, in specific cases withdrawn if the mayor is not reelected (Robinson and Verdier, 2013). Additionally, cash transfers programs have been found to be effective in drawing electoral support (Manacorda et al., 2011, De La O, 2013, Labonne, 2013). I assess the relevance of these two into the Brazilian municipal context.

**Public employment.** This information is obtained from Perfil dos Municipios Brasileiros. I separate public employment between permanent and non-permanent, where the latter
includes commissioned, intern, and employees without a permanent link.\(^\text{16}\) Commissioned employees are easy to use as patronage since they are directly appointed by the mayor and do not need to satisfy any specific requirement, whereas permanent employees are required to pass an exam to get hired and cannot be easily dismissed if a new mayor is appointed (Brollo and Troiano, 2016). It is crucial to note that according to Electoral Legislation, incumbents cannot affect public employment three months before the elections (Klein and Sakurai, 2015). This implies that the capacity of incumbents to use patronage as a way to gather political support is limited when scandals damaging their reputation are in the year of the elections.\(^\text{17}\)

\textit{Conditional cash transfers.} Brazil has one of the largest conditional cash transfers program in the world reaching nearly 14 million people. This program - called Bolsa Família (BF) - is administered by the Social Development Ministry, which sets the eligibility criteria, and pays beneficiaries directly. However, municipalities are responsible for enrolling potential beneficiaries into a national database, as well as maintaining and updating it (Cadastro Unico). The mayor’s personal involvement in selecting beneficiaries allows her to claim credit for the benefits distributed, even when benefits are funded and transferred by the federal government. There is evidence that BF has been used for electoral purposes (see Zucco, 2013; Brollo et al., 2015; Frey, 2016). Data on the BF program is obtained from the IBGE. It includes the number of beneficiary families, and the total value of benefits both by end of the calendar year. This data is from 2004 onward.

### 3.3 Empirical strategy

The main objective of this study is to test whether incumbents’ reputation induce them to adapt their behavior, and if the reaction depends on whether the information is beneficial or detrimental. As a measure of reputation shocks I focus on information revealing irregularities in the use of funds during their period in office.

\(^{16}\)The survey runs for the following years 2001, 2002, 2004 for mayoral term 2001-2004, and 2005, 2006, and 2008 for mayoral term 2005-2008. Depending on the year of the survey, the number of public employees can be divided between: estatutários, estagiário, commissionados, sin vínculo permanente, CLT (which comes from Consolidação das Leis Trabalhistas), and others.

\(^{17}\)Although it is possible for incumbents to promise public jobs conditional on being reelected.
Chapter 3. Reputation shocks and incumbents’ reaction

To estimate the causal effect of reputation shocks on campaign expenditures I compare mayors’ level of campaign spending in municipalities that were audited and the information was released before elections versus those were the audit reports was released after elections.

Let $Y_{ist}(1)$ be the potential outcome variable for an incumbent-municipality $i$ from state $s$ at term $t$ if the incumbent faced a reputation shock before the election, whereas $Y_{ist}(0)$ is the potential outcome variable for the same incumbent if the reputation shock occurred after the election. The observed outcome is $Y_{ist} = r_{ist} \cdot Y_{ist}(1) + (1 - r_{ist}) \cdot Y_{ist}(0)$, where $r_{ist} = 1$ denotes that the reputation shock occurred before the election. I estimate the (average) causal effect of treatment on the outcome variable, $E_{ist}(Y_{ist}(1) - Y_{ist}(0))$.

Additionally, given that mayors’ behavior might be different depending on whether the information improves or damages their reputation, I analyze whether heterogeneous effects exist depending on the signal. Denote as $c_{ist}$ the variable accounting for whether the reputation shock is detrimental ($c_{ist} = 1$) or beneficial ($c_{ist} = 0$). Hence, to estimate the effect of different reputation shocks on campaign expenditures I estimate the following model:

$$
Y_{ist} = \alpha + \beta_0 r_{ist} + \beta_1 c_{ist} + \beta_2 r_{ist} \cdot c_{ist} + Z_{ist}' \phi + \omega_s + \lambda_t + \epsilon_{ist},
$$

where $Z_{ist}'$ represents municipal and mayor characteristics, $\omega_s$ and $\lambda_t$ are state and term fixed effects, respectively, and $\epsilon_{ist}$ is the error term clustered at municipal level. Given the randomness of the timing on the audit lotteries with respect to the date of the elections, then $\beta_0 + \beta_2 c_{ist}$ indicates the average effects of the treatment depending on the type of the shock $c_{ist}$. If this is term is negative for beneficial reputation shocks, then incumbents decrease their campaign expenditures whenever their reputation is improved. On the other hand, if the term is positive for detrimental reputation shocks, then incumbents increase their campaign expenditures whenever information damages their reputation. This would suggest a substitution effect between reputation shocks and the effort exerted in winning an election or in maintaining a good reputation.

Classifying whether an information shock is beneficial or detrimental is difficult since it depends on citizens’ prior beliefs on the quality of the incumbent. A beneficial shock is
one were the audits did not find any evidence of irregularities. However, it is harder to determine whether a signal is detrimental or beneficial for outcomes in between. If the audits found evidence of irregularities, but it was less than what everybody expected, then this would improve incumbents’ reputation. In order to account for the complex relationship between information and prior beliefs I use four measures to define whether the shocks improve or deteriorate incumbents’ reputation. The first measure is a dummy variable which is equal to one if the auditors found evidence of irregularities in the use of public funds, otherwise this is set to be equal to zero. The second is a continuous measure showing the proportion of the investigated resources that were part of irregular transactions. A third measure is a dummy variable equal to one if the share of resources in irregular transactions is above the median of the distribution, otherwise it is zero. The last measure is similar to the third one but the sample is separated into quartiles. The estimation is by Ordinary Least Squares (OLS).

3.3.1 Sample and summary statistics

To estimate the effect of information shocks affecting incumbents’ reputation on incumbents’ behavior, I use data corresponding to mayoral terms January 2001- December 2004 and January 2005- December 2008. Given that the main focus is on campaign expenditures, the sample is based on municipalities that were audited during this period and where the current mayor was eligible for reelection and actually reran. There are 1,365 mayors satisfying both of these requirements during the period. Out of these, 971 mayors rerun in the next election. Campaign expenditures data is available for 91 percent of these candidates.

Table 3.2 shows the summary statistics for a set of variables. The sample is split depending on whether the reputation shock occurred before or after the election. Mayor and municipal characteristics are well balanced across the treated and control groups with the exception of non-consecutive mayors that ran for office. Additionally, for identification purposes, it is relevant to stress that I do not find any evidence that reputation shocks affect the decision of re-contesting (see table 3.13 in appendix). This is

18 A beneficial (detrimental) shock can be defined more easily for extreme outcomes (i.e. no evidence of corruption or considerably high level of corruption), given that there are no other outcomes that can be better (worst).
19 Table 3.12 in Appendix shows how balanced are the sample for the 1,365 observations.
Chapter 3. Reputation shocks and incumbents’ reaction

Table 3.2: Summary statistics by treatment status - Elections 2004 and 2008

<table>
<thead>
<tr>
<th></th>
<th>Reputation shock after election</th>
<th>Reputation shock before election</th>
<th>Difference</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>A: Reputation shocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>461</td>
<td>80.7</td>
<td>422</td>
<td>77.7</td>
</tr>
<tr>
<td>Share corruption</td>
<td>445</td>
<td>4.96</td>
<td>391</td>
<td>5.40</td>
</tr>
<tr>
<td>B: Mayor characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>461</td>
<td>93.1</td>
<td>422</td>
<td>92.7</td>
</tr>
<tr>
<td>Married</td>
<td>461</td>
<td>79.0</td>
<td>422</td>
<td>80.3</td>
</tr>
<tr>
<td>Age</td>
<td>461</td>
<td>44.97</td>
<td>422</td>
<td>45.64</td>
</tr>
<tr>
<td>Education</td>
<td>461</td>
<td>6.29</td>
<td>422</td>
<td>6.40</td>
</tr>
<tr>
<td>Previous mayor</td>
<td>461</td>
<td>1.3</td>
<td>422</td>
<td>5.2</td>
</tr>
<tr>
<td>Previous win margin</td>
<td>453</td>
<td>13.6</td>
<td>417</td>
<td>13.9</td>
</tr>
<tr>
<td>C: Municipal characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln GDP per capita</td>
<td>461</td>
<td>5.60</td>
<td>422</td>
<td>5.62</td>
</tr>
<tr>
<td>Population</td>
<td>461</td>
<td>29031.93</td>
<td>422</td>
<td>25199.41</td>
</tr>
<tr>
<td>AM Radio station</td>
<td>461</td>
<td>23.64</td>
<td>422</td>
<td>24.17</td>
</tr>
<tr>
<td>Gini index</td>
<td>461</td>
<td>55.44</td>
<td>422</td>
<td>55.06</td>
</tr>
<tr>
<td>Illiteracy rate</td>
<td>461</td>
<td>25.08</td>
<td>422</td>
<td>25.11</td>
</tr>
<tr>
<td>Share urban population</td>
<td>460</td>
<td>59.41</td>
<td>422</td>
<td>58.77</td>
</tr>
<tr>
<td>D: Political instruments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campaign expenditures pc</td>
<td>461</td>
<td>2.74</td>
<td>422</td>
<td>3.01</td>
</tr>
<tr>
<td>Share Permanent employment</td>
<td>459</td>
<td>3.06</td>
<td>422</td>
<td>3.11</td>
</tr>
<tr>
<td>Share Transitory employment</td>
<td>459</td>
<td>0.96</td>
<td>422</td>
<td>1.14</td>
</tr>
<tr>
<td>Beneficiary families BF /population</td>
<td>457</td>
<td>6.62</td>
<td>421</td>
<td>7.53</td>
</tr>
<tr>
<td>Benefits per family BF</td>
<td>457</td>
<td>31.36</td>
<td>421</td>
<td>29.65</td>
</tr>
</tbody>
</table>

Notes. This table reports the comparison of the mean for mayor, political, and socioeconomic characteristics of municipalities for which the reports from the audit were disclosed before and after the corresponding election 2004 and 2008. The sample includes only audited municipalities in lotteries 2-29 where mayors were mayors re-contest for election. pc denotes per capita. Errors are clustered at municipal level. The number of observations for share corruption is reduced given that there is no information for this measure in lottery 19. BF stands for Bolsa Familia.

***, **, *, significant at the 1, 5, and 10 percent level, respectively.

true regardless of whether the shock improved or damaged incumbents’ reputation. Of the eligible incumbents, 71 percent re-contested in the following election.20

Table 3.11 and figure 3.3 in Appendix 3.A.1 shows the geographical variation in the sample for each region and state and the proportion of municipalities with irregularities for each state. The figure shows that in North-East of Brazil a higher share of mayors from municipalities that were audited received a bad report which potentially negatively affect their electoral prospects.

20This is in line with the evidence found in Ferraz and Finan (2008) for the 2004 mayoral election.
3.4 Results

3.4.1 Reputation shocks on campaign expenditures

Table 3.3 presents the results of the specification in model 3.1 for the per capita campaign expenditures as the dependent variable. The different columns correspond to a combination of one of the four measures capturing whether reputation shocks are detrimental or beneficial for the incumbent, and the use of different controls. The variable ‘Before’ is a dummy variable denoting whether the reputation shock affected the incumbent before the elections. All specifications control for state fixed effects and also a mayoral term dummy.

Columns (1) to (3) use the dummy variable of ‘corruption’ denoting the presence of irregularities in the use of public funds. The first column shows no indication that only being exposed to a reputation shock before the election had any effect on the amount spent in campaigning. This is expected given the potential opposite effect on campaign expenditure depending on whether the reputation shock is beneficial or detrimental. In column (2) and (3) I include interactions between the timing of the release of the audit reports with respect to the election and the corruption measure. In this case we observe differential effects on incumbents’ behavior depending on the shock. Being exposed to a beneficial reputation shock induces incumbents to decrease their campaign expenditure. Note that if no information is available, corrupt incumbents (i.e. those with irregular public funds spending) spend on average 0.7 Brazilian Reals less than incumbents without any irregularities. When including mayor and municipal controls the effect decreases and it is not statistically significant at the conventional level. The effect of detrimental reputation shocks on campaign expenditures is not significantly different from zero. Columns (4) and (5) are similar to columns (2) and (3) respectively but they classify a detrimental reputation shock by using the share of the audited resources that were involved in irregular transactions. Incumbents decrease their campaign spending whenever a beneficial reputation shock occurs before election. On the other hand, if the reputation shock is detrimental and occurs before the elections, incumbents increase their campaign expenditure.

For columns (6) and (7) a detrimental reputation shock is whenever the share of funds
involved in irregularities is higher than the median share. The same patterns hold. According to these estimates, incumbents improving their reputation decrease their campaign expenditure per person by 0.73 to 0.83 Brazilian Reals (at prices of 2000). In contrast, incumbents facing detrimental reputation shocks increase their per capita campaign expenditure by between 0.463 and 0.351 Brazilian Reals according to column (6) and (7), respectively. These effects are sizable. Based on the estimates of column (7) incumbents improving their reputation spend 26.6 percent less compared to the average per capita campaign expenditure of candidates in the control group. On the other hand, incumbents facing detrimental reputation shocks spend 13 percent more in campaigning. Using this information is also possible to estimate the monetary value that candidates place on beneficial and detrimental reputation shocks. A beneficial reputation shock is worth between 19,850 to 22,500 Brazilian Reals (at prices of 2000), whereas a detrimental reputation shocks costs a candidate about 9,500 to 12,600 Brazilian Reals.

Finally, columns (8) and (9) use three dummies to distinguish different levels of reputation shocks depending on the share of resources audited that were involved in irregularities. These variables better reflect the effect of reputation shocks and citizens’ beliefs by isolating incumbents with evidence of corruption. The results are in line with the previous specifications. The more detrimental the reputation shock is, the higher the campaigning expenditures are. Incumbents receiving a beneficial reputation shock decrease their per capita campaign expenditure by 1.03 Brazilian Reals, and incumbents facing a detrimental reputation shock (i.e. upper quartile) increase the per capita expenditure by 0.41 Brazilian Reals. These estimates imply a monetary value of a beneficial reputation shock of 28,000 Brazilian Reals, and 11,150 Brazilian Reals for detrimental reputation shocks. Also note that incumbents involved in irregularities spend less resources in campaigning if this information is not revealed before elections. This is true regardless the level of corruption identified in the audits. This suggests that corrupt incumbents are not using the federal funds for financing their electoral campaigns.

3.4.2 Reputation shocks on conditional cash transfers and public employment.

In this section I analyze whether incumbents react to reputation shocks by manipulating a conditional cash transfer program and public employment. Regarding the conditional cash transfer program (Bolsa Familia program) I analyze the number of beneficiary
### Table 3.3: Effect of reputation shocks on incumbents’ campaign expenditure (per capita)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Corruption</th>
<th>Share corruption</th>
<th>Median</th>
<th>Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Before</td>
<td>-0.123</td>
<td>-0.851*</td>
<td>-0.711</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.218)</td>
<td>(0.471)</td>
<td>(0.457)</td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>-0.239</td>
<td>-0.703*</td>
<td>-0.674</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.291)</td>
<td>(0.424)</td>
<td>(0.423)</td>
<td></td>
</tr>
<tr>
<td>Before × corruption</td>
<td>0.919*</td>
<td>0.709</td>
<td>(0.508)</td>
<td>(0.505)</td>
</tr>
<tr>
<td>Share corruption</td>
<td>-0.039***</td>
<td>-0.039***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × share corruption</td>
<td>0.069**</td>
<td>0.064**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above median corruption</td>
<td>-0.736**</td>
<td>-0.638*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.360)</td>
<td>(0.342)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>1.297***</td>
<td>1.084**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.457)</td>
<td>(0.439)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td>-1.281**</td>
<td>-1.133**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.587)</td>
<td>(0.548)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>-0.921*</td>
<td>-0.788*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.473)</td>
<td>(0.449)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>-1.204**</td>
<td>-1.072**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.492)</td>
<td>(0.458)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td>1.241</td>
<td>1.283</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.800)</td>
<td>(0.805)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
<td>1.474**</td>
<td>1.336**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.591)</td>
<td>(0.555)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
<td>1.723***</td>
<td>1.450**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.618)</td>
<td>(0.599)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes.
This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on campaign expenditure per capita. ‘Before’ denotes whether the release of the information occurred before elections or not. ‘Corruption’ is a dummy denoting whether the report showed evidence of corruption. ‘Share corruption’ is the ratio between the total amount of funds involved in the violation over the total amount audited for the municipality. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the Gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was elected as mayor in a non-consecutive period and the margin of victory in the previous election. Campaign expenditures per capita are expressed in Reals at 2000 prices. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Brollo (2011) and Brollo et al. (2013) for more details. Mayoral terms 2001–2004 and 2005–2008. Robust standard errors clustered at the municipality level in parentheses. ***, **, *, significant at the 1, 5, and 10 percent level, respectively.

families within the municipality as a proportion of the population, and also the average value received by the beneficiary families within the municipality. In terms of public employment, I separate permanent from transitory employment.

Table 3.4 shows the result of estimating model 3.1 using the two variables associated to the Bolsa Familia program as the dependent variable. In the first four columns the dependent variable is the number of beneficiary families as a percentage of the municipal population. In the last four columns the dependent variable is the annual value of the benefits received by the beneficiary family within the municipality. The table shows similar patterns as before for the proportion of families receiving the benefits, but not
Chapter 3. Reputation shocks and incumbents’ reaction

for the total value of the benefits. This goes in line with the fact that mayors are not involved in the allocation of resources for the program. This is administered by the federal government. However, mayors are involved in the registration of individuals receiving the benefits. Particularly, the effect of receiving a detrimental reputation shock implies an increase in the number of people registered in the program. Whereas the eligibility for the program cannot be adapted, there is substantial anecdotal evidence suggesting that mayors tend to register political supporters into the program. It is interesting to note that in municipalities where the mayor improved her reputation, the share of people receiving the benefits within the municipality decreased. This could potentially suggest that mayors stop performing properly while in office or another alternative is related to the clientelistic relationship between mayors and citizens. It is documented that mayors are subject to pressures from people. In this sense, incumbents receiving beneficial reputation shocks might be not subject to meet these expectations or might not succumb to pressures to maintain their position in office.

In the case of public employment, the results are shown on table 3.5. The results are separated by whether the employees have a permanent (columns (1) to (4)) or transitory position (columns (5) to (8)). Given that incumbents cannot easily hire or fire public employees in the last year of their mandate, I analyze whether shocks that occurred before the last year of the mayoral term had any effect on public employment. The table shows that reputation shocks do not affect public employment at the municipal level, regardless of whether the information improved or damaged the incumbent’s reputation. This is the case for both types of employment, permanent or transitory. If anything, incumbents facing beneficial reputation shocks the year before the electoral year have a higher number of permanent and transitory employees, while those with detrimental reputation shocks have a lower share. Although the standard errors are large.

Overall, the evidence from table 3.3, 3.4 and 3.5 seems to point to which type of political instruments are most likely to be used by mayors to react to reputation shocks in order to drawn electoral support. It seems that the most effective political instruments is through

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22Johannessen (2016) shows that voters act in ways that push local politicians to prioritize visible projects and selective benefits, rather than less visible public goods that are more consistent with citizens’ preferences.

23Additionally, I estimate a similar specifications using as treatment that information was released before elections. The results (not shown here) do not show any significant differences for the effect of informational shocks.
### Table 3.4: Effect of reputation shocks on Bolsa Familia

<table>
<thead>
<tr>
<th></th>
<th>Beneficiary families (% population)</th>
<th>Value of benefits per family</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>Quartile</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.270)</td>
<td>(0.235)</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>0.286</td>
<td>0.211</td>
</tr>
<tr>
<td></td>
<td>(0.253)</td>
<td>(0.223)</td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>0.710**</td>
<td>0.606**</td>
</tr>
<tr>
<td></td>
<td>(0.350)</td>
<td>(0.305)</td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td>0.215</td>
<td>0.291</td>
</tr>
<tr>
<td></td>
<td>(0.401)</td>
<td>(0.352)</td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>0.281</td>
<td>0.428</td>
</tr>
<tr>
<td></td>
<td>(0.316)</td>
<td>(0.292)</td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>0.413</td>
<td>0.141</td>
</tr>
<tr>
<td></td>
<td>(0.329)</td>
<td>(0.291)</td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td>-0.481</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.591)</td>
<td>(0.471)</td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
<td>0.364</td>
<td>0.258</td>
</tr>
<tr>
<td></td>
<td>(0.435)</td>
<td>(0.378)</td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
<td>0.795*</td>
<td>0.895**</td>
</tr>
<tr>
<td></td>
<td>(0.450)</td>
<td>(0.396)</td>
</tr>
</tbody>
</table>

**Mayor and municipal controls**

- ✓ State fixed effects
- ✓ Observations: 831
- ✓ Adjusted $R^2$: 0.695

**Notes.** This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on Bolsa Familia beneficiary families as percentage of the municipality population (Columns (1) to (4)) and on the average value of the benefits per family (columns (5) to (8)). Before denotes whether the release of the audit reports occurred before elections or not. Corruption is a dummy denoting whether the report showed evidence of corruption. Share corruption is the ratio between the total amount of funds involved in the broad violation over the total amount audited for the municipality. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Brollo (2011) and Brollo et al. (2013) for more details. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was a elected as mayor in a non-consecutive period and the margin of victory in the previous election. Errors are clustered at municipal level. ***, **, *, significant at the 1, 5, and 10 percent level, respectively.

Campaign expenditure given its high electoral impact and that can be relatively easily adjusted. In turn, the reach of the use of patronage is limited, meanwhile BF has more coverage the room for manipulation is constrained by the federal government.

### 3.5 Heterogeneity analysis

In this section I explore the circumstances that make it more likely that incumbents will react to reputation shocks. I analyze whether there are differential reactions to reputation shocks, for candidates with various levels of electoral support. I also analyze whether there are differences in the composition of the funds that make campaign expenditure possible. Additionally, given the particular role of the media in propagating
### Table 3.5: Effect of reputation shocks on Public employment (% population)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Permanent employees</th>
<th></th>
<th></th>
<th></th>
<th>Transitory employees</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (1)</td>
<td>Quartile (2)</td>
<td>Quartile (3)</td>
<td>Quartile (4)</td>
<td>Median (5)</td>
<td>Quartile (6)</td>
<td>Quartile (7)</td>
<td>Quartile (8)</td>
</tr>
<tr>
<td>Year before</td>
<td>0.162</td>
<td>0.173</td>
<td>0.039</td>
<td>0.092</td>
<td>-0.029</td>
<td>0.021</td>
<td>-0.012</td>
<td>0.045</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>0.052</td>
<td>0.121</td>
<td>0.048</td>
<td>0.050</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year before × Above median corruption</td>
<td>-0.110</td>
<td>-0.254</td>
<td>-0.098</td>
<td>-0.147</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td></td>
<td>-0.395**</td>
<td>-0.048</td>
<td>-0.025</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>-0.167</td>
<td>0.049</td>
<td>0.100</td>
<td>0.157</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>0.098</td>
<td>0.188</td>
<td>-0.025</td>
<td>-0.026</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year before × 2nd quartile of corruption</td>
<td>0.577</td>
<td>0.588*</td>
<td>-0.156</td>
<td>-0.112</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year before × 3rd quartile of corruption</td>
<td>0.059</td>
<td>-0.092</td>
<td>-0.264</td>
<td>-0.292*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year before × 4th quartile of corruption</td>
<td>-0.075</td>
<td>-0.241</td>
<td>0.018</td>
<td>-0.042</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mayor and municipal controls**: ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

**State fixed effects**: ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

**Observations**: 919 906 919 906 919 906 919 906

**Adjusted R²**: 0.047 0.380 0.050 0.382 0.172 0.232 0.171 0.231

*Notes. This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on Public employment as percentage of the municipality population. From columns (1) to (4) the outcome variable is for permanent employment, whereas for columns (5) to (8) is for transitory employment. ‘Before’ is a dummy denoting whether the release of the audit reports occurred before elections or not. ‘Corruption’ is a dummy denoting whether the report showed evidence of corruption. ‘Share corruption’ is the ratio between the total amount of funds involved in the broad violation over the total amount audited for the municipality. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Brollo (2011) and Brollo et al. (2013) for more details. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was a elected as mayor in a non-consecutive period and the margin of victory in the previous election. Errors are clustered at municipal level.***, **, *, significant at the 1, 5, and 10 percent level, respectively.

the information, I analyze mayors’ behavior in municipalities with local media presence.

**Incumbents’ electoral support**

In order to understand the type of candidates reacting to reputation shocks, I analyze candidates’ previous margin of victory. This would give a sense of how politically strong the incumbent is, and whether candidates with high political power behave differently from those with lower electoral support.

It is not obvious how candidates would react to reputation shocks depending on their previous electoral support and the type of the revealed information. On one hand having a large core of voters might provide politicians with enough buffer to win elections even without any response. If this is the case, they won’t exert substantial effort to react to
reputation shocks. In turn, incumbents with low electoral support may be forced to react if they want to keep holding office. However, if weak incumbents’ chances of winning are low due to the shock and their low previous margin of victory then they might be less prone to react. The contrary would happen with incumbent with a high share of supporters, because the large core of voters can help them overturn the detrimental information. If the information is beneficial, electorally strong incumbents (i.e. high previous margin of victory) might reduce their campaigning effort given that they are confident that their approval is high amongst a large part of the electorate. This might not be the case for incumbents with low previous margin of victory. In their case, in order to convince a larger part of the electorate they still need to exert substantial effort.

Table 3.6 shows the effects of reputation shocks on per capita campaign expenditures by incumbents’ previous electoral support. Columns (1) to (4) show the estimates for incumbents with below-the-median previous electoral support, whereas columns (5) to (8) is for incumbents with above-the-median previous margin of victory. As shown in the table, incumbents with low previous win margin decrease their campaign expenditure if exposed to a beneficial shock, although this is not statistically significant. Similarly, detrimental reputation shocks affecting weak incumbents does not show an statistically significant difference depending on whether they occur before or after the election. On the other hand, a detrimental reputation shocks affecting strong incumbents motivate a reaction. Column 6 shows that strong incumbents facing a detrimental shock before election increase their per capita campaign expenditure by 0.91 Brazilian Reals.\textsuperscript{24} Strong incumbents facing beneficial reputation shocks reduce considerably their campaign expenditure compare with strong incumbents receiving beneficial shocks after the election. Note that the size of the effects are fairly similar for incumbents with low and high previous win margin, but the standard errors are much larger for weak incumbents.

Media presence

The presence of the media is important for attaining electoral accountability (Besley and Prat, 2006; Ferraz and Finan, 2008; Snyder and Strömberg, 2010; Strömberg, 2015). This is particularly relevant when exposing corruption scandals (Puglisi and Snyder Jr, 2011; Di Tella and Franceschelli, 2011). Here I analyze how incumbents’ adapt their behavior when more media is available. I focus on the presence of local radio stations, which has been shown to be relevant for electoral accountability in the Brazilian context (Ferraz and Finan, 2008).

\textsuperscript{24}The effects are twice or three times larger than for incumbent with low electoral support.
TABLE 3.6: Effect of reputation shocks on campaign expenditures per capita by previous win margin

<table>
<thead>
<tr>
<th>Dependent variable: Campaign expenditures per capita</th>
<th>Below median previous win margin</th>
<th>Above median previous win margin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (1)</td>
<td>Quartile (2)</td>
</tr>
<tr>
<td>Before</td>
<td>-1.059* (0.632)</td>
<td>-1.293 (0.817)</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>-0.792 (0.537)</td>
<td>-0.679 (0.435)</td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>0.920 (0.682)</td>
<td>1.733*** (0.617)</td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td>-0.766 (0.887)</td>
<td>-1.545** (0.779)</td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>-0.773 (0.711)</td>
<td>-1.100* (0.569)</td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>-1.195 (0.744)</td>
<td>-1.080* (0.556)</td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td>1.145 (1.216)</td>
<td>1.126 (1.215)</td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
<td>0.987 (0.921)</td>
<td>1.858** (0.755)</td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
<td>1.364 (0.926)</td>
<td>2.191** (0.878)</td>
</tr>
</tbody>
</table>

| Mayor and municipal controls                         | ✓                              | ✓                              |
| State fixed effects                                  | ✓                              | ✓                              |
| Observations                                         | 395                            | 395                            |
| Adjusted $R^2$                                       | 0.178                          | 0.232                          |

Notes. This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on campaign expenditure by incumbent with above and below the median previous margin of victory. ‘Before’ is a dummy denoting whether the release of the audit reports occurred before elections or not. ‘Corruption’ is a dummy denoting whether the report showed evidence of corruption. ‘Share corruption’ is the ratio between the total amount of funds involved in the broad violation over the total amount audited for the municipality. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Brollo (2011) and Brollo et al. (2013) for more details. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was a elected as mayor in a non-consecutive period and the margin of victory in the previous election. Errors are clustered at municipal level. ***, **, *, significant at the 1, 5, and 10 percent level, respectively.

It is not obvious how incumbents would react in the presence of the media, provided that they cannot influence the media to prevent information from being released.25 On the one hand, if the information shock enhances mayors’ reputation then the presence of local media would be seen as positive. This, contingent on the media reporting the information. However, it is much more common to observe the media reporting ‘negative’ information than ‘positive’ information (Soroka, 2006). If this bias in the media is such that it fails to report beneficial reputation shocks in the same way as detrimental shocks, then the presence of local media should not affect incumbents’ behavior. If the local media is more likely to report negative outcomes from the audits, two things

25Besley and Prat (2006) shows in which circumstances the incumbent can capture the media in order to prevent the spread of detrimental information.
Chapter 3. Reputation shocks and incumbents’ reaction

might happen. The incumbent might exert higher effort to compensate for this effect. It could also be that incumbents make no effort to compensate the information shock, since doing so would be too costly. Similarly, if no local media exists, then it could be that a mayor facing a detrimental reputation shock increases the effort exerted since the ‘damage’ is contained. It could also be that they do not exert any additional effort as there is no need to compensate since not many voters were informed about the results of the audit.

Table 3.7 shows the results of information affecting reputation on per capita campaign expenditures depending whether the municipality has or not a local radio station. Columns (1) to (4) show the estimates for municipalities without radio station and columns (5) to (8) is for those with a local radio station. As shown in the table, incumbents in municipalities without radio station decrease their campaign expenditure if exposed to a beneficial shock before elections. In turn, a detrimental reputation shocks induces an statistically significant increase in per capita campaign expenditure if it occurs before the election. On the other hand, for municipalities with local media presence, facing a beneficial or detrimental reputation shocks don’t induce incumbent to statistically significantly adjust their campaign expenditures.

Funding sources

To analyze how mayors adapt their campaign expenditures I check their funding sources and whether the reputation shocks affect them. First I start with graphical analysis, then I focus on regressions analysis. Figure 3.1 shows the average proportion of each funding source that are used to finance candidates’ campaigns. The figure separates incumbents by those who received the reputation shock before or after the election, and depending on whether the reputation shock is beneficial (below the median corruption) or detrimental (above the median corruption). Incumbents with a beneficial audit report use less of their own resources to fund the campaign when the information of the reports is released before the elections. This is equally compensated by a higher share funded by donations from private individuals and firms. This suggests a substitution effect in the way campaigns are funded. On the other hand, for incumbents with a negative audit report, the way the campaigns are funded does not affect the share used by private individuals and others. There is a decrease in the share funded by firms which is substituted by a higher share funded through incumbents’ own resources.

Table 3.8 estimates the effect of reputation shocks on funding sources in per capita terms. Despite the fact that receiving a beneficial reputation shock before elections
### Table 3.7: Effect of reputation shocks on campaign expenditures per capita by media presence

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>No radio station</th>
<th>Exists radio station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median Quartile</td>
<td>Median Quartile</td>
</tr>
<tr>
<td></td>
<td>(1) (2) (3) (4)</td>
<td>(5) (6) (7) (8)</td>
</tr>
<tr>
<td>Before</td>
<td>-82.576**(-84.260**)</td>
<td>-29.038 (-26.449)</td>
</tr>
<tr>
<td></td>
<td>(41.633) (41.194)</td>
<td>(40.764) (45.706)</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>-81.520** (-66.700*)</td>
<td>-20.273 (-6.009)</td>
</tr>
<tr>
<td></td>
<td>(41.618) (39.581)</td>
<td>(38.294) (42.203)</td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>121.121** (111.617**)</td>
<td>114.337 (99.998)</td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td>-149.561* (-134.334*)</td>
<td>-85.818 (-105.467)</td>
</tr>
<tr>
<td></td>
<td>(51.639) (50.787)</td>
<td>(69.784) (78.786)</td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>-103.424* (-90.023)</td>
<td>-32.630 (-20.180)</td>
</tr>
<tr>
<td></td>
<td>(57.972) (55.492)</td>
<td>(46.082) (52.249)</td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>-135.890** (-112.182**)</td>
<td>-27.320 (-6.009)</td>
</tr>
<tr>
<td></td>
<td>(58.788) (54.433)</td>
<td>(52.848) (58.023)</td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td>147.223 (143.974)</td>
<td>73.337 (84.186)</td>
</tr>
<tr>
<td></td>
<td>(111.512) (109.069)</td>
<td>(89.646) (93.126)</td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
<td>161.132** (163.169**)</td>
<td>58.079 (38.425)</td>
</tr>
<tr>
<td></td>
<td>(71.053) (68.989)</td>
<td>(62.346) (71.475)</td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
<td>157.241** (135.510**)</td>
<td>204.493 (198.595)</td>
</tr>
<tr>
<td></td>
<td>(68.259) (66.833)</td>
<td>(167.449) (163.845)</td>
</tr>
<tr>
<td>Mayor and municipal controls</td>
<td>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Observations</td>
<td>635 624 635 624 201 199 201 199</td>
<td>635 624 635 624 201 199 201 199</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.145 0.215 0.148 0.216 0.031 0.045 0.031 0.052</td>
<td>0.145 0.215 0.148 0.216 0.031 0.045 0.031 0.052</td>
</tr>
</tbody>
</table>

**Notes.** This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on campaign expenditure by municipalities with and without radio presence. ‘Before’ is a dummy denoting whether the release of the audit reports occurred before elections or not. Corruption is a dummy denoting whether the report showed evidence of corruption. Share corruption is the ratio between the total amount of funds involved in the broad violation over the total amount audited for the municipality. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Broiló (2011) and Broiló et al. (2013) for more details. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the gain for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was elected as mayor in a non-consecutive period and the margin of victory in the previous election. Errors are clustered at municipal level. ***, **, * significant at the 1, 5, and 10 percent level, respectively.

It triggers a decrease in campaign spending, it seems that the reduction is coming from all the funding sources, and particularly from privates individuals’ donation. Analogously, the increase in campaign expenditure for incumbents facing a detrimental reputation shock does not come from one source in particular. The increase in spending is covered equally by own resources, private individuals’ donations and firms’ donations.

### 3.6 Incumbents’ reaction and probability of being re-elected

In section 3.4 I showed that incumbents respond differently to reputation shocks depending on whether the information is beneficial or detrimental. Although the decision to react is endogenous, it is interesting to analyze whether those responses have an


**Figure 3.1:** Average share of the campaign expenditures covered by each funding source.

Notes. The figure shows the average proportion of campaign expenditure funded by different sources. The figure separates incumbents depending the reputation shock and by the timing of the release of the audit reports with respect to the next election (after or before). Reputation shock is defined as beneficial when below the median corruption and detrimental when above the median corruption. The definition of corruption used is based on the share of audited resources that were involved in irregularities.

Particularly, how was the electoral performance of incumbents whose reputation was damaged but reacted by increasing their campaign expenditure? On the other hand, do incumbents with high reputation have better electoral prospects despite the decrease in campaign spending?

Table 3.9 shows the probability that an incumbent is reelected depending on the reputation shock and the level of per capita campaign expenditures. Incumbents with high per capita campaign expenditure are reelected over 70 percent of the times, on average, regardless of whether the information improved or damaged their reputation. The effect of campaign expenditures on electoral performance is much larger for incumbents with low levels of corruption than for those with high levels of corruption. The difference for incumbents facing beneficial reputation shocks is 23 percentage points, whereas it is 11 percentage points for those facing detrimental shocks. Having low campaign expenditure damages candidates with beneficial reputation more.

**Detrimental reputation shocks**

---

26Recall that reputation shocks do not affect incumbents’ probability of rerunning.
Chapter 3. Reputation shocks and incumbents’ reaction

### Table 3.8: Effect of reputation shocks on Campaigning funding sources (per capita)

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Own funds</th>
<th>Private individuals’ donations</th>
<th>Firms’ donations</th>
<th>Other sources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Median</td>
<td>(2) Quartile</td>
<td>(3) Median</td>
<td>(4) Quartile</td>
</tr>
<tr>
<td>Before</td>
<td>-0.08</td>
<td>-0.185</td>
<td>-0.389*</td>
<td>-0.504 *</td>
</tr>
<tr>
<td></td>
<td>(0.225)</td>
<td>(0.280)</td>
<td>(0.228)</td>
<td>(0.284)</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>-0.165</td>
<td>-0.361</td>
<td>0.006</td>
<td>-0.083</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.233)</td>
<td>(0.105)</td>
<td>(0.098)</td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>0.301</td>
<td>0.428</td>
<td>0.230</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td>(0.256)</td>
<td>(0.262)</td>
<td>(0.206)</td>
<td>(0.137)</td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
<td>-0.573*</td>
<td>-0.268</td>
<td>-0.282*</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td>(0.292)</td>
<td>(0.370)</td>
<td>(0.163)</td>
<td>(0.200)</td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td>-0.091</td>
<td>-0.429</td>
<td>-0.179</td>
<td>-0.068</td>
</tr>
<tr>
<td></td>
<td>(0.259)</td>
<td>(0.308)</td>
<td>(0.112)</td>
<td>(0.113)</td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td>-0.550**</td>
<td>-0.413</td>
<td>0.046</td>
<td>-0.076</td>
</tr>
<tr>
<td></td>
<td>(0.251)</td>
<td>(0.285)</td>
<td>(0.159)</td>
<td>(0.129)</td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td>0.357</td>
<td>0.648</td>
<td>0.197</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td>(0.402)</td>
<td>(0.526)</td>
<td>(0.256)</td>
<td>(0.248)</td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
<td>0.465</td>
<td>0.775**</td>
<td>0.073</td>
<td>0.136</td>
</tr>
<tr>
<td></td>
<td>(0.371)</td>
<td>(0.382)</td>
<td>(0.180)</td>
<td>(0.174)</td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
<td>0.408</td>
<td>0.357</td>
<td>0.440</td>
<td>0.148</td>
</tr>
<tr>
<td></td>
<td>(0.317)</td>
<td>(0.307)</td>
<td>(0.321)</td>
<td>(0.175)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mayor and municipal controls</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>State fixed effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Observations</td>
<td>818</td>
<td>818</td>
<td>818</td>
<td>818</td>
<td>818</td>
<td>818</td>
<td>818</td>
<td>818</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.161</td>
<td>0.168</td>
<td>0.104</td>
<td>0.104</td>
<td>0.033</td>
<td>0.043</td>
<td>0.062</td>
<td>0.057</td>
</tr>
</tbody>
</table>

Notes. This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on campaign funding sources (per capita). ‘Before’ denotes whether the release of the audit reports occurred before elections or not. ‘Corruption’ is a dummy denoting whether the report showed evidence of corruption. ‘Share corruption’ is the ratio between the total amount of funds involved in the broad violation over the total amount audited for the municipality. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19, see Brollo (2011) and Brollo et al. (2013) for more details. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, and the gini for 2000. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, from the ruling Workers’ party (PT), and dummy if mayor was a elected as mayor in a non-consecutive period. 

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Own funds</th>
<th>Private individuals’ donations</th>
<th>Firms’ donations</th>
<th>Other sources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Median</td>
<td>(2) Quartile</td>
<td>(3) Median</td>
<td>(4) Quartile</td>
</tr>
<tr>
<td>Before</td>
<td>-0.08</td>
<td>-0.185</td>
<td>-0.389*</td>
<td>-0.504 *</td>
</tr>
<tr>
<td></td>
<td>(0.225)</td>
<td>(0.280)</td>
<td>(0.228)</td>
<td>(0.284)</td>
</tr>
<tr>
<td>Above median corruption</td>
<td>-0.165</td>
<td>-0.361</td>
<td>0.006</td>
<td>-0.083</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.233)</td>
<td>(0.105)</td>
<td>(0.098)</td>
</tr>
<tr>
<td>Before × Above median corruption</td>
<td>0.301</td>
<td>0.428</td>
<td>0.230</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td>(0.256)</td>
<td>(0.262)</td>
<td>(0.206)</td>
<td>(0.137)</td>
</tr>
</tbody>
</table>

Table 3.9 indicates that the effect of campaign expenditure on the probability of re-election is larger than the effect of detrimental or beneficial information regarding incumbents’ reputation. This suggests that incumbents could be able to compensate the detrimental effect of information on their reputation by increasing their campaign expenditure.

To further study this I contrast the electoral performance of corrupt incumbents increasing their per capita campaign spending versus those who did not change their spending behavior. To do so I estimate the following equation.

$$ Y_{ist} = \alpha + \beta_0 \text{Before}_{ist} + \beta_1 \text{Reaction}_{ist} + Z'_{ist} \phi + \omega_s + \lambda_t + \epsilon_{ist} , $$  (3.2)
TABLE 3.9: Probability of being reelected in (%) by reputation shock and campaign expenditure.

<table>
<thead>
<tr>
<th>Reputation shock</th>
<th>Campaign expenditure (pc)</th>
<th>Below median corruption</th>
<th>Above median corruption</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below median</td>
<td>56</td>
<td>62</td>
<td>-6</td>
<td></td>
</tr>
<tr>
<td>Above median</td>
<td>79</td>
<td>73</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>23</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Notes. This table shows the probability of being reelected depending on the level of per capita campaign expenditures and reputation shock. Corruption is defined as the ratio between the total amount of funds involved in irregularities over the total amount audited for the municipality. Data for elections 2004 and 2008. The sample only includes incumbents receiving the reputation shock before elections.

where \( Y_{ist} \) is equal to one if incumbent \( i \) from state \( s \) at election \( t \) (2004 or 2008) is reelected, zero otherwise. The variable \( \text{Before}_{ist} \) is equal to one if the release of the report for municipality \( i \) occurred before elections \( t \), otherwise it is zero. The variable \( \text{Reaction}_{ist} \) is equal to one for those incumbents affected by the shock and that their per capita campaign expenditure are above the median of those affected by a detrimental reputation shock, otherwise is zero. As before, \( Z'_{ist} \) represents municipal and mayor characteristics, \( \omega_s \) and \( \lambda_t \) are state and term fixed effects, respectively, and \( \varepsilon_{ist} \) is the error term clustered at municipal level.

Table 3.10 shows the results of estimating the equation 3.2. I additionally separate the per capita campaign expenditures in quartiles to see if there effects are different for higher and lower spending. The higher the quartile, the higher per capita campaign expenditure. The results show that incumbents receiving a detrimental reputation shock before election and that do not have high per capita campaign expenditure (i.e. low or no responsive to reputation shocks) are reelected less often. Interestingly, those who face a detrimental reputation shock but have high per capita campaign expenditure are reelected more often. In this sense, increasing the campaign expenditure from the lower quartile to the upper quartile increases the probability of being reelected in 16 percentage points (= 0.286 - 0.125). This effect is not only statistically significant but also represents a 26 percent increase in the chances of reelection. The sign of the effects are congruent for all specifications and electoral outcomes. Ferraz and Finan (2008) show that mayors affected by corruption allegations are punished at the polls. Table 3.10 shows that this effect depends on incumbents’ reaction. Particularly, the effects
Chapter 3. Reputation shocks and incumbents’ reaction

### Table 3.10: Effect of incumbents’ reaction on probability of being reelected by reputation shocks

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Detrimental reputation shock</th>
<th>Beneficial reputation shock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Before</td>
<td>-0.054 (0.060)</td>
<td>-0.038 (0.057)</td>
</tr>
<tr>
<td>Incumbents’ reaction</td>
<td>0.124* (0.068)</td>
<td>0.086 (0.066)</td>
</tr>
<tr>
<td>Reaction quartile 1</td>
<td>0.205** (0.097)</td>
<td>0.185** (0.093)</td>
</tr>
<tr>
<td>Reaction quartile 2</td>
<td>0.090 (0.097)</td>
<td>0.070 (0.096)</td>
</tr>
<tr>
<td>Reaction quartile 3</td>
<td>0.361*** (0.088)</td>
<td>0.286*** (0.087)</td>
</tr>
</tbody>
</table>

Mayor and municipal controls ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
State fixed effects ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Observations 439 433 439 433 397 390 397 390
Adjusted $R^2$ 0.049 0.107 0.072 0.123 0.030 0.048 0.033 0.052

Notes. This table reports the effect of detrimental and beneficial reputation shocks (in the form of revelation of corruption or lack of it) and incumbents’ reaction (in the form of an increase in campaign expenditure per capita) on the probability of being reelected. ‘Before’ denotes whether the release of the audit report occurred before the elections. ‘Incumbents’ reaction’ denotes those incumbents with a per capita campaign expenditure above the median of those affected by a detrimental reputation shock. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the Gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was a elected as mayor in a non-consecutive period and the margin of victory in the previous election. The sample in columns (1) to (8) is composed by incumbents where the share of funds involved in irregular transactions is above (below) the median of eligible incumbents. Mayoral terms 2003–2004 and 2005–2008. Robust standard errors clustered at the municipality level in parentheses. ****, ***, *, significant at the 1, 5, and 10 percent level, respectively.

On campaign expenditures are crucial in mediating the effects of detrimental reputation shocks on electoral outcomes.

**Beneficial reputation shocks and incumbents’ response**

As shown in section 3.4, incumbents decrease their campaign spending when exposed to beneficial reputation shocks. Given that campaign expenditures are crucial in obtaining electoral support, it is possible that the decrease in their effort at campaigning negatively affects their electoral prospects (see table 3.9).

I estimate model 3.2 for incumbents whose reputation improved. There is one relevant difference related to how the variable ‘reaction’ is defined. This is important for interpreting the results. Given the results of section 3.4 a reaction - in the case of incumbents with an improved reputation - is a decrease in spending. Therefore, the first quartile denotes incumbents with highest reactions, that is, those decreasing their campaign expenditure relatively more.
Columns (5) to (8) of table 3.10 show the effect of beneficial reputation shocks and incumbents’ reaction on the chances of being reelected. The results show that information improving incumbents’ reputation have a beneficial electoral impact (increasing the probability of being reelected in 24 pp). But this is true as long as candidates do not decrease their campaign expenditures by a significant magnitude. Indeed, incumbents who decrease their per capita campaign expenditure too heavily (first quartile) are 8 to 11 percentage points less likely to be reelected, despite their improved reputation. This result could suggest a problem of over-confidence. Due to their improved reputation, incumbents might believe that their future electoral prospects are enhanced, thus leading to a decrease in effort. However, they might not be fully aware of the impact of decreasing their campaign spending. This is particularly relevant for the Brazilian context. Indeed, recent articles highlight the role of citizens in asking for clientelist benefits (Nichter and Peress, 2017; Bobonis et al., 2017). It is common that citizens ask favors from incumbents. Therefore, voters might expect to receive favors, and when these demands are unfulfilled, they might punish the incumbent (Nichter and Peress, 2017). If the beneficial reputation shock allows incumbents not to succumb to these pressure during their campaigns and therefore not deliver personalized benefits, then they might face a considerable set back during the election.

3.7 Conclusion

The impact of information on electoral accountability has received a lot of attention in the literature. Nevertheless candidates’ ability to react to information shocks prior to the elections taking place has often been neglected. In this study I analyze how beneficial or detrimental information on incumbents’ reputation changes politicians’ behavior.

Using information from Brazil’s municipal audit program, I separate reputation shocks into beneficial and detrimental depending on how much evidence of irregularities in the use of public funds were found by the auditors. I show that Brazilian mayors that were affected by beneficial information shocks significantly reduced their campaign expenditure compared to candidates of the same quality. On the other hand, incumbents that saw their reputation damaged by the information, increased their effort in campaigning. This political instrument seems to be preferred by mayors in comparison with public employment and conditional cash transfers programs probably due to their capacity to reach voters and easiness to manipulate them.
Beneficial or detrimental information on incumbents’ reputation does not necessarily have a direct effect on electoral outcomes. Given that incumbents can adapt their behavior accordingly, this reaction counterbalances the reputation shock. Indeed, incumbents facing detrimental reputation shocks are less likely to be reelected if their campaign expenditures are not high enough. Interestingly, the crowding out effect that beneficial information produces on incumbents’ effort exertion (measure by campaign expenditures), implies that incumbents receiving a beneficial reputation shock might have worse electoral outcomes than otherwise. Therefore, accounting for incumbents’ reaction to information could explain the mixed evidence found in the literature.

One particular avenue for future research is to determine more precisely what type of transactions between incumbents and voters are more common. Particularly, in clientelistic contexts voters expect to receive favors from incumbents, and when these demands are not met, they punish candidates at the polls.
3.A Appendices to Chapter 3

3.A.1 Data description

The corruption measure employed in this study comes from Brollo (2011) and Brollo et al. (2013). I construct several measures described in section 3.2. These measures are based on the ‘broad’ corruption measure used in these articles: the dummy and the fraction. The measure includes irregularities as the following.

- Severe illegal procurement practices: (i) competition has been limited, (ii) bid value has been manipulated, (iii) an irregular firm wins the bid process, (iv) minimum number of bids is not attained, and (v) required procurement procedure is not executed.

- Fraud: e.g. Simulated auction with fake signatures of some firms.

- Favoritism: e.g. donations from the city to some people.

- Over-invoicing: public goods/services are purchased for a value above the market price.

- Diversion of funds.

- Paid but not proven.

For further details refer to Brollo (2011) and Brollo et al. (2013).

3.A.2 Other tables and figures
Chapter 4. Contest model with reference-dependent preferences

FIGURE 3.2: Campaign expenditures and high rank politicians

Notes. Panel (a) shows the distribution of the candidates’ campaign expenditures over the total campaign expenditures within each municipality for the winner of the election, the runner-up and the third highest ranked candidate. Panel (b) shows the average amount of money (in constant Reals of 2000 per hundred inhabitant) received by rerunning incumbents and other high ranked candidates (either winner or runner-up) by type of source. The sample includes municipalities where information about all candidates’ expenditures were available, there were at least three candidates and mayor re-contested the election. Data for 2004 and 2008 Brazilian municipal elections.

FIGURE 3.3: Proportion of corrupt mayors by states in Brazil

Note: The figure shows the proportion of mayors in which the audit reports at least one irregularity over the total municipalities audited in each state. Data comes from Brollo (2011) and Brollo et al. (2013). This includes lotteries 2 to 29, related to mayoral terms 2001-04 and 2005-08. Only municipalities with less than 450,000 inhabitants are included. Brazilia is not included. The legend shows the range for each quartile of the distribution.
Chapter 4. Contest model with reference-dependent preferences

Table 3.11: Number of cities within each state in the sample

<table>
<thead>
<tr>
<th>Region</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acre</td>
<td>12</td>
<td>7.02</td>
</tr>
<tr>
<td>Amapá</td>
<td>17</td>
<td>9.94</td>
</tr>
<tr>
<td>Amazonas</td>
<td>19</td>
<td>11.11</td>
</tr>
<tr>
<td>Pará</td>
<td>62</td>
<td>36.26</td>
</tr>
<tr>
<td>Rondônia</td>
<td>19</td>
<td>11.11</td>
</tr>
<tr>
<td>Roraima</td>
<td>10</td>
<td>5.85</td>
</tr>
<tr>
<td>Tocantins</td>
<td>32</td>
<td>18.71</td>
</tr>
<tr>
<td><strong>North-East</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alagoas</td>
<td>29</td>
<td>6.04</td>
</tr>
<tr>
<td>Bahia</td>
<td>106</td>
<td>22.08</td>
</tr>
<tr>
<td>Ceará</td>
<td>57</td>
<td>11.88</td>
</tr>
<tr>
<td>Maranhão</td>
<td>67</td>
<td>13.96</td>
</tr>
<tr>
<td>Paraíba</td>
<td>48</td>
<td>10.00</td>
</tr>
<tr>
<td>Pernambuco</td>
<td>55</td>
<td>11.46</td>
</tr>
<tr>
<td>Piauí</td>
<td>49</td>
<td>10.21</td>
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<tr>
<td>Rio Grande do Norte</td>
<td>47</td>
<td>9.79</td>
</tr>
<tr>
<td>Sergipe</td>
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<td>4.58</td>
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<tr>
<td><strong>Central-West</strong></td>
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<td></td>
</tr>
<tr>
<td>Goiás</td>
<td>62</td>
<td>46.62</td>
</tr>
<tr>
<td>Mato Grosso</td>
<td>41</td>
<td>30.83</td>
</tr>
<tr>
<td>Mato Grosso do Sul</td>
<td>30</td>
<td>22.56</td>
</tr>
<tr>
<td><strong>South-East</strong></td>
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<td></td>
</tr>
<tr>
<td>Espírito Santo</td>
<td>24</td>
<td>6.90</td>
</tr>
<tr>
<td>Mínas Gerais</td>
<td>161</td>
<td>46.26</td>
</tr>
<tr>
<td>Rio de Janeiro</td>
<td>35</td>
<td>10.06</td>
</tr>
<tr>
<td>São Paulo</td>
<td>128</td>
<td>36.78</td>
</tr>
<tr>
<td><strong>South</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paraná</td>
<td>66</td>
<td>28.33</td>
</tr>
<tr>
<td>Rio Grande do Sul</td>
<td>108</td>
<td>46.35</td>
</tr>
<tr>
<td>Santa Catarina</td>
<td>59</td>
<td>25.32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,365</td>
<td></td>
</tr>
</tbody>
</table>

Notes. This table reports the number of observations within each state during mayoral terms 2001-2004 and 2005-2008. Sample includes only eligible mayors from audited municipalities for lotteries 2-29.
### TABLE 3.12: Summary statistics by treatment status - Elections 2004 and 2008

<table>
<thead>
<tr>
<th></th>
<th>Reputation shock after election</th>
<th>Reputation shock before election</th>
<th>Difference</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td><strong>A: Reputation shocks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>741</td>
<td>0.783</td>
<td>624</td>
<td>0.758</td>
</tr>
<tr>
<td>Share corruption</td>
<td>704</td>
<td>4.600</td>
<td>570</td>
<td>5.541</td>
</tr>
<tr>
<td><strong>B: Mayor characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>741</td>
<td>0.935</td>
<td>624</td>
<td>0.928</td>
</tr>
<tr>
<td>Married</td>
<td>741</td>
<td>0.784</td>
<td>624</td>
<td>0.790</td>
</tr>
<tr>
<td>Age</td>
<td>741</td>
<td>46.742</td>
<td>624</td>
<td>46.399</td>
</tr>
<tr>
<td>Education</td>
<td>741</td>
<td>6.221</td>
<td>624</td>
<td>6.208</td>
</tr>
<tr>
<td>Previous mayor</td>
<td>741</td>
<td>0.012</td>
<td>624</td>
<td>0.053</td>
</tr>
<tr>
<td>Previous win margin</td>
<td>726</td>
<td>0.133</td>
<td>616</td>
<td>0.132</td>
</tr>
<tr>
<td><strong>C: Municipal characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln GDP per capita</td>
<td>741</td>
<td>5.615</td>
<td>624</td>
<td>5.607</td>
</tr>
<tr>
<td>Population</td>
<td>741</td>
<td>28282.47</td>
<td>624</td>
<td>25639.67</td>
</tr>
<tr>
<td>AM Radio station</td>
<td>741</td>
<td>25.641</td>
<td>624</td>
<td>23.237</td>
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<tr>
<td>Gini index</td>
<td>741</td>
<td>55.432</td>
<td>624</td>
<td>55.369</td>
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<tr>
<td>Level of education</td>
<td>741</td>
<td>23.437</td>
<td>624</td>
<td>23.119</td>
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<tr>
<td>Illiteracy rate</td>
<td>741</td>
<td>24.860</td>
<td>624</td>
<td>25.043</td>
</tr>
<tr>
<td>Share urban population</td>
<td>739</td>
<td>59.186</td>
<td>623</td>
<td>58.271</td>
</tr>
<tr>
<td><strong>D: Political instruments</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campaign expenditures per capita</td>
<td>461</td>
<td>2.744</td>
<td>422</td>
<td>3.008</td>
</tr>
<tr>
<td>Share permanent employment</td>
<td>739</td>
<td>3.035</td>
<td>624</td>
<td>3.072</td>
</tr>
<tr>
<td>Share transitory employment</td>
<td>739</td>
<td>0.868</td>
<td>624</td>
<td>1.090</td>
</tr>
<tr>
<td>Share beneficiaries Bolsa Familia</td>
<td>736</td>
<td>6.272</td>
<td>623</td>
<td>7.388</td>
</tr>
<tr>
<td>Benefits pc Bolsa Familia</td>
<td>736</td>
<td>31.61</td>
<td>623</td>
<td>30.127</td>
</tr>
</tbody>
</table>

**Notes.** This table reports the comparison of the mean for mayor, political, and socioeconomic characteristics of municipalities for which the reports from the audit were disclosed before and after the corresponding election 2004 and 2008. The sample includes only audited municipalities in lotteries 2-29 where mayors were eligible to rerun. ***, **, *, significant at the 1, 5, and 10 percent level, respectively.
### Table 3.13: Effect of reputation shocks on incumbents’ candidacy

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Rerun</th>
<th>Corruption</th>
<th>Share corruption</th>
<th>Median</th>
<th>Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td>-0.027</td>
<td>-0.015</td>
<td>-0.018</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.027)</td>
<td>(0.053)</td>
<td>(0.030)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Corruption</td>
<td></td>
<td>0.003</td>
<td>0.010</td>
<td>-0.012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.031)</td>
<td>(0.042)</td>
<td>(0.042)</td>
<td></td>
</tr>
<tr>
<td>Before × corruption</td>
<td></td>
<td>-0.015</td>
<td>-0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.059)</td>
<td>(0.059)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share corruption</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × share corruption</td>
<td></td>
<td>-0.001</td>
<td>-0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above median corruption</td>
<td></td>
<td>0.049</td>
<td>0.047</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.035)</td>
<td>(0.035)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × Above median corruption</td>
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<td>-0.066</td>
<td>-0.072</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.051)</td>
<td>(0.050)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd quartile of corruption</td>
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<td>0.017</td>
<td>-0.003</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.061)</td>
<td>(0.062)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd quartile of corruption</td>
<td></td>
<td>0.047</td>
<td>0.046</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.045)</td>
<td>(0.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th quartile of corruption</td>
<td></td>
<td>0.060</td>
<td>0.046</td>
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<td></td>
<td></td>
<td>(0.045)</td>
<td>(0.046)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × 2nd quartile of corruption</td>
<td></td>
<td>-0.049</td>
<td>-0.022</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.094)</td>
<td>(0.097)</td>
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<td></td>
</tr>
<tr>
<td>Before × 3rd quartile of corruption</td>
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<td>-0.088</td>
<td>-0.090</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.065)</td>
<td>(0.064)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before × 4th quartile of corruption</td>
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<td>-0.064</td>
<td>-0.062</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.063)</td>
<td>(0.063)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes.** This table reports the effect of reputation shocks (in the form of revelation of corruption or lack of it) on candidates’ decision of rerunning. ‘Before’ is a dummy equal to one if the release of the audit reports occurred before elections or not. ‘Corruption’ is a dummy equal to one if the report showed evidence of corruption. ‘Share corruption’ is the ratio between the total amount of funds involved in irregularities over the total amount audited for the municipality. ‘Median’ is a dummy equal to one if the share of resources in irregular transactions is above the median of the distribution, otherwise is zero. ‘Quartile’ separates the distribution of the ‘Share corruption’ in quartiles. Data from lotteries 2-29 are included. Share corruption is not available for lottery 19. Municipal controls: log GDP per capita, log population, whether the municipality has a radio AM in 2005, the level of education of municipality in 2000, the gini for 2000, the rate of illiteracy and the share of urban population. Mayor controls: gender (1 if male), married, age, education, term dummy, dummy if mayor was born in the same municipality, party dummy if candidate is from the ruling Workers’ party (PT), dummy if mayor was a elected as mayor in a non-consecutive period and the margin of victory in the previous election. Errors are clustered at municipal level.

***, **, *, significant at the 1, 5, and 10 percent level, respectively.
Chapter 4

A contest model with reference-dependent preferences

4.1 Introduction

The social and economic consequences of civil conflict are devastating. According to the World Bank a civil conflict costs the average developing country roughly 30 years of GDP growth (WorldBank, 2011). It produces a high number of fatalities, permanent psychological damage and population displacements. The World Bank estimates that 1 in 4 people in the world (>1.5 billion) live in states affected by conflict. Therefore, it is important to understand the drivers of civil conflict in order to successfully design effective conflict-preventing policies.\footnote{Throughout the chapter conflict and war are used interchangeably.}

I present a two-stage contest model with reference-dependent preferences to study the drivers of conflict and its intensity if it occurs. Conflict is commonly modeled as a winner-take-all contest, where participants spend resources on arming to increase their probability of winning. However, most of these models have implications that are not in line with the evidence (Blattman and Miguel, 2010). Most contest models of conflict fail to distinguish between the decision of engaging in conflict from the decision of arming, if conflict occurs.\footnote{There are exceptions, Esteban and Ray (2008b), or Corchón and Yıldızparlak (2013) among others.} Therefore, peace is defined as when no contestants invest in arming (Hirshleifer, 1991b). However, in equilibrium, arming always occur. As a result, arming and fighting are the same, and peace is never attained. This prediction
of ever-present conflict is not in line with the evidence (Blattman and Miguel, 2010). Additionally, most models assume risk neutrality and expected utility agents. However, there is substantial evidence rejecting both of these assumptions (Camerer et al., 2011). Since Kahneman and Tversky (1979)’s seminal article there has been considerable empirical evidence supporting that people use reference points to analyze risky decisions (DellaVigna, 2009).

The model in this chapter departs from traditional contest models in two aspects. First, the decision of engaging in violent conflict is separated from the decision of arming, if war is waged. Second, agents’ utility functions consider both consumption levels as well as gains and losses with respect to a reference point (Kőszegi and Rabin, 2006). This first departure is crucial for analyzing the causes of conflict, and what determines its intensity of conflict occurs. In turn, the second assumption introduces more realistic behavioral risk preferences in a setting modeling social conflict. This is particularly helpful in providing theoretical predictions that are in line with the evidence.

I show that reference points are relevant for understanding the decision of waging war and can explain two well-established empirical facts in the conflict literature. Particularly, agents’ perceptions of the status quo have a direct impact on the decision of engaging in conflict. Whenever the reference point is higher than agents’ current income then conflict is more likely to occur.\(^3\) This result relates to why civil conflicts are more likely to occur after negative income shocks (Miguel et al., 2004; Miguel and Satyanath, 2011; Dube and Vargas, 2013; Berman and Couttenier, 2013). A negative shock reduces the current income, but does not affect the reference point. Hence, people affected by the shock perceive their current situation as a loss.\(^4\)

Additionally, one of the most robust empirical facts is that income reduces the odds of civil conflict (Blattman and Miguel, 2010). Civil conflicts are not only more likely to occur in poor countries (Fearon and Laitin, 2003; Collier and Hoeffler, 2004), but also occurs in the poorest zones within a country (Do and Iyer, 2010; Buhaug et al., 2011).

\(^3\)This goes in line with micro-evidence suggesting that not only material incentives are relevant in the decision to rebel, but also that socio-emotional motivations matter as much as economic incentives (see Justino, 2009 or Humphreys and Weinstein, 2008)

\(^4\)A large body of research in behavioral economics shows that individuals react to (even small) changes with respect to the status quo, and especially when these changes are negative (DellaVigna, 2009; Rabin, 1998). See Miguel and Satyanath, 2011 for a discussion in the context of conflict.
The model suggests a direct mechanism linking income to conflict through agents’ preferences. I show that reference-dependent preferences can explain this empirical regularity if people are more risk-averse for gains than risk-seeker for losses. The intuition is the following, as income increases, the additional gains of winning the conflict also increase but at a smaller rate than the potential additional losses of losing the conflict. Therefore, at some point the potential losses overweight the potential gains of conflict, thus making the status quo a more attractive option than engaging in conflict.

I present a two-stage contest model where two groups fight over the country’s total income. Income is given by a combination of resources and productivity, and the cost of arming is proportional to the productivity level. In the first stage, agents simultaneously decide whether or not to engage in conflict. If war is declared, in the second stage agents choose the optimal investment in army, and conflict is waged. Otherwise, the status quo is maintained. I assume that reference points are state-contingent (Schmidt et al., 2008). That is, conditional on not declaring war, the reference point is given by the status quo. In contrast, when war is declared, the reference point is given by the current income less the cost of conflict, as this cost is borne regardless of the outcome. This implies that, if conflict is waged, then for any initial distribution of income, winning always represents a gain and losing represents a loss.

I show the existence of a Subgame Perfect Nash equilibrium in pure strategies, and characterize the properties of the equilibrium. The model suggests that the processes underpinning the likelihood of conflict and its intensity are different. For instance, an increase in income affects differently the intensity of the conflict depending on its source (whether it comes from an increase in resources or from productivity shocks), but decreases the likelihood of conflict regardless of its source - as long as it does not affect the level of inequality. This suggests that resource discoveries do not trigger new conflict per se. Instead, resource discoveries could reduce the odds of conflict if the benefits are evenly distributed throughout society. In contrast, if resources are discovered in a country which is already suffering from armed conflict, then the fighting intensifies. These results are in line with recent evidence using geocoded datasets on resource discoveries and conflict (Arezki et al., 2015).

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5 Most of the empirical evidence shows that the curvature of the utility function is more linear for losses than for gains. See for instance Booij et al. (2010).

6 Baillon et al. (2017) shows that most people use the status quo as their reference point in high-stakes contexts.

7 The authors find that resource discovery reduces the odds of conflict, but increases the intensity of existing conflicts after 4 to 6 years of discovery, when production actually starts.
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The model shows that if conflict is declared, it is never declared by the rich, but by the poor group. However, the rich group invests more in conflict than the poor if war is declared. This, since the rich have more to lose than to win from warfare. This implies that conflicts are more intense than predicted by standard models.

This chapter contributes to three different strands of the literature. First, it is directly related to the theoretical literature analyzing the determinants of civil conflict. Blattman and Miguel (2010) provide an extensive analysis of the theoretical and empirical literature on civil war. They particularly highlight the need for non-traditional approaches to the resolution and explanation of the onset of civil conflict. A critical element not considered in contests models is the fact that people analyze risky gambles taking into account a reference point (Abeler et al., 2011). The model is bridging this gap by introducing more realistic behavioral assumptions on agents’ decision making processes. The use of reference points is in line with a long-standing strand in conflict literature suggesting that agents’ perceptions of the status quo are powerful motivators for rebellions (Gurr, 1970). In this sense, the model developed in this article is related to the relative deprivation theory (Gurr, 1970) and the grievances mechanism (Collier and Hoeffler, 2004). Also, the model studied in this chapter provides a potential channel for which income affects the odds of conflict.

Second, this chapter contributes to the extensive contest theory literature that started with the seminal contributions by Haavelmo (1954) and Tullock (1980). Recently, some authors have started introducing more behavioral assumptions regarding agents’ preferences to study agents’ behavior in diverse contexts, but this branch of the contest literature is still nascent (Baharad and Nitzan, 2008; Sheremeta, 2015b). I introduce reference-dependent preferences a la Kőszegi and Rabin (2006) in a contest model to study civil conflict.

Finally, in a related line of research, this chapter contributes to the experimental literature on contests (see Abbink, 2012). In particular, a regular finding in this literature is that agents (and groups) behave more aggressively relative to standard Nash equilibrium predictions (Abbink et al., 2010). Authors recognize that there is more to winning a fight than just the prize itself. In the models introduced in this chapter the amount

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8 There are a few studies using ‘non-rational’ preferences. For instance, Berejikian (2002a) analyses a deterrence game where agents have prospect theory preferences. Also, Butler (2007) use prospect theory preferences in a bargaining model of conflict a la Fearon (1995).

9 See Chassang and Padro-i Miquel (2009) for a discussion on the two empirical facts between income and conflict. Low income countries are more prone to civil wars, and that civil wars are likely to occur after negative income shocks.
of effort agents’ exert is higher than in a standard contest model due to the gains and losses of conflict. Therefore, this model presents a theoretical framework to understand the substantial over-investment in fighting efforts found in the experimental literature.

The structure of the chapter is as follows. In section 4.2, I analyze a simple decision problem with the key features to highlight the main mechanisms in the main game-theoretic model. I also discuss why reference-dependent preferences are relevant for explaining the relationship between income and the odds of conflict. In section 4.3 I introduce the full game-theoretic model. In section 4.4 I characterize the equilibrium, and the comparative statics related to the likelihood of conflict and its intensity if it occurs is discussed in section 4.5. Finally, in section 4.6 I conclude.

### 4.2 The basic decision problem

In this section, I introduce a simple decision problem of conflict onset. To focus on the main implications of including reference-dependent preferences, I make several simplifying assumptions which I relax later in section 4.3. In that section, the full game-theoretic model for studying conflict intensity and onset is developed.

**A simple decision problem of conflict onset**

Suppose that in a country of income $Y > 1$, a group which owns $\alpha \in (0, 1)$ share of the income is considering to engage in conflict. In case of winning, the group takes possession of the total income of the country, whereas in case of losing the group gets zero. The probability of winning the conflict is given by $p \in (0, 1)$, and the cost of conflict is zero.\(^{10}\)

Groups analyze risky gambles according to the following power form function (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992):\(^{11}\)

$$
\mu(y|r) = \begin{cases} 
(y - r)^{\beta_1} & \text{when } y \geq r; \\
-\lambda(r - y)^{\beta_2} & \text{when } y < r 
\end{cases}
$$

\(^{10}\)In section 4.3 I endogenize the probability of winning and include positive costs of conflict.

\(^{11}\)In the full game-theoretic model in section 4.3 agents’ also get utility from consumption, as well as gains and losses with respect to a reference point (Kőszegi and Rabin, 2006). Therefore, the game in section 4.3 encompasses standard preferences. In this section however, I focus only on the reference-dependent part of the utility to highlight the implications of including reference points.
where \( y \) is output, \( r \) is the reference point and \( \beta_1, \beta_2 \in (0, 1) \). Thus groups are ‘risk-averse’ for gains and ‘risk-seekers’ for losses. The parameter \( \lambda > 1 \) represents loss aversion, which implies that agents dislike losses more than they like equal-size gains. Let \( r = \gamma Y \) be the group’s reference point, where \( \gamma \in [0, 1] \).

There are two stages. In the first stage, the group decides whether to declare war or not. In the second stage, if the group declares war, conflict is waged and payoffs are delivered. Otherwise, if war is not declared, the status quo is maintained. As a result, peace is defined as when the status quo is maintained.

### 4.2.1 Conflict onset and reference points

To decide whether or not to declare war, the group analyzes the pros and cons of engaging in conflict taking into account the reference point \( r \). The prospects of conflict are given by

\[
U^w \equiv p((1 - \gamma)Y)^{\beta_1} - (1 - p)(\gamma Y)^{\beta_2}.
\]

This could be positive or negative depending on the probability of winning \( p \). In turn, the prospects of the status quo are certain but also depend on the reference point. The prospects of the status quo are given by:

\[
U^{sq} \equiv \begin{cases} (\alpha - \gamma)^{\beta_1}Y^{\beta_1} & \text{when } \alpha \geq \gamma; \\ -\lambda(\gamma - \alpha)^{\beta_2}Y^{\beta_2} & \text{when } \alpha < \gamma. \end{cases}
\]

Let \( \hat{p}(Y, \alpha, \gamma, \lambda) \) be the probability of winning that leaves the group indifferent between engaging in conflict or maintaining the status quo. Therefore, for any \( p \in [0, \hat{p}(Y, \alpha, \gamma, \lambda)] \), peace is the outcome. Define first \( \Omega(\hat{p}(Y, \alpha, \gamma, \lambda)) \) as the set containing the probabilities of winning the conflict for which conflict is preferable.

In this simple decision problem, group perceptions of the status quo has a direct impact on the decision of engaging in conflict or not. Particularly, dissatisfaction with the status quo makes a group more prone to conflict than when they are satisfied with the status quo. Proposition 4.1 refers to this.

**Proposition 4.1.** \( \Omega(\hat{p}(Y, \alpha, \gamma, \lambda))|_{\alpha > \gamma} \subset \Omega(\hat{p}(Y, \alpha, \gamma, \lambda))|_{\alpha = \gamma} \subset \Omega(\hat{p}(Y, \alpha, \gamma, \lambda))|_{\alpha < \gamma} \).

\(^{12}\)For instance, the reference point is the status quo if \( \gamma = \alpha \) or the expected output if \( \gamma = p \).
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Proof. See appendix.

Whenever groups’ reference points are higher than the status quo, they have less motives for maintaining the status quo since it is perceived as a loss. They will be more willing to bear the risk of conflict (and potentially incur in additional cost) for the chances to reach a better potential outcome. On the other hand, if agents perceive their current status as a gain, conflict is less likely to occur given they want to preserve the current situation.

Proposition 4.1 relates to the evidence that civil conflicts are more likely to occur after negative income shocks (Miguel et al., 2004; Miguel and Satyanath, 2011; Dube and Vargas, 2013; Berman and Couttenier, 2013). Suppose there is a shock affecting agents’ income. This could be in the form of natural disasters (droughts, floods, earthquakes, etc), economic crises, decreases in the international price of the commodity traded in a country, among others. In these contexts the chances of conflict increases given that the negative shock reduces the current income, while leaving the reference point unchanged. This implies that the current situation is perceived as a loss after the shock, particularly to the people most vulnerable to these shocks.

The rationale behind proposition 4.1 aligns with literature suggesting that agents’ perceptions of the status quo influence rebellious behaviors (Gurr, 1970).13 These grievances against the status quo can make recruitment for a rebellion easier. Proposition 4.1 can explain then why poor people have higher taste for revolt (MacCulloch, 2004), if they are more dissatisfied with their current situation than rich people. Additionally, another common pattern observed in the literature can also be explained by reference-dependent preferences. Income is amongst the main causes of conflict (Blattman and Miguel, 2010). Conflicts are not only more likely to occur in poor countries (Fearon and Laitin, 2003; Collier and Hoeffler, 2004), but also in the poorest zones within a country (Do and Iyer, 2010; Buhaug et al., 2011). The following proposition shows that this pattern can be explained by reference-dependent preferences under certain conditions.

**Proposition 4.2.** If \( \beta_2 > \beta_1 \) then \( \frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial Y} > 0 \) \( \forall \gamma \in (0, 1) \).

Proof. See appendix.

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13Evidence from Sierra Leone and Liberia shows that among the main reasons of why combatants fight are dissatisfaction with the current status, corruption and/or the desire to overturn the government. See Humphreys and Weinstein (2004), and Pugel (2007).
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Proposition 4.2 implies that as income increases, the set of probabilities of winning the conflict for which conflict is preferred to peace is smaller. This is the case if people are more risk-averse for gains than risk-seeker for losses (i.e. $\beta_2 > \beta_1$). The intuition is as follows: as income increases, the additional gains of winning the conflict increase but at a smaller rate than the additional losses of losing the conflict. Therefore, at some income level the potential losses overweight the potential gains, making the status quo a more attractive option than fighting.

Current models have not been able to explain this empirical regularity. Expected utility preferences can also explain this empirical pattern if agents’ preferences satisfy increasing relative risk aversion as shown in appendix 4.A.1. However, most of the empirical evidence supports either decreasing relative risk aversion (DARA) or non-increasing relative risk aversion (NIRRA) (Mas-Colell et al., 1995; Chiappori and Paiella, 2011; Paravisini et al., 2016).

Proposition 4.3. $\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \alpha} > 0$ and $\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \lambda} > 0$.

Proof. See appendix.

Proposition 4.3 shows that regardless of the reference point, a higher loss aversion and a higher share of the endowment increases the set of probabilities of winning for which peace is the outcome. Given that agents are more affected by losses than by equal sized gains, for agents to prefer conflict the probability of winning must be sufficiently high to compensate for the risk of potential losses. On the other hand, for relatively rich agents to prefer war the probability of winning must also be high enough, since the marginal utility of income is decreasing.

In the next section a game-theoretic model is introduced, where agents receive utility directly from consumption as well as from gains and losses with respect to a reference point (a l’a Kőszegi and Rabin, 2006), and the probability of winning the conflict (if it occurs) endogenously depends on the amount of resources invested in arming.

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14 The bulk of empirical evidence supports that the curvature for losses is more linear than for gains. See Booij et al. (2010). They calculate the average parameters of the power form function for more than 10 studies. The values are $(\beta_1, \beta_2, \lambda) = (0.69, 0.86, 2.07)$.

15 Note that whenever the reference point is the prize itself or having nothing, income does not affect the likelihood of conflict. This is because in the former case there are no gains of winning the conflict, whereas in the latter there are no losses for losing the conflict.

4.3 The Game

Suppose there are two groups \( A \) and \( B \) that share the total production \( 2Y \). The production function is given by a combination of the level of resources \( R \) and the productivity level \( \theta \), thus \( Y = \theta R \). Group \( A \) owns \( Y_A = (1+\alpha)Y \), meanwhile group \( B \) owns \( Y_B = (1-\alpha)Y \), where \( \alpha \in (0,1) \) represents the level of inequality between groups. Therefore, I refer to group \( A \) as the rich group and \( B \) as the poor group.

Groups can compete over the total production if they engage in conflict. The winner of the contest receives \( 2Y \) and the loser 0. The probability of winning the war for group \( i \in \{A,B\} \) is given by the Tullock (1980)’s contest success function:

\[
p_i(G_i, G_j) = \frac{G_i}{G_i + G_j}
\]

where \( G_i \) and \( G_j \) are the war efforts or the investment in army of group \( i \) and \( j \), respectively, with \( i, j \in \{A,B\} \) and \( i \neq j \). The marginal cost of a unit of army is proportional to a country’s productivity level, \( \theta G_i \). This cost is borne regardless the result of the war.

**Utility**

Let the state utility for an output \( y \) given a reference point \( r \) be \( v(y|r) = u(y) + \eta \cdot \mu(y|r) \). \( u(y) \) represents the consumption utility and \( \mu(y|r) \) is the gain-loss utility. \( \eta \in [0,1] \) is the relative strength of gain-loss utility compared to consumption (Kőszegi and Rabin, 2006). Assume \( u(y) = y \), and \( \mu(y|r) \) is given by equation 4.1 with \( \beta_1 = \beta \in (0,1) \), \( \beta_2 = 1 \), and \( \lambda > 1 \).

**Reference points**

Reference points are state-contingent (Schmidt et al., 2008). That is, they depend on whether conflict arises or status quo is maintained. I assume that conditional on maintaining the status quo the reference point is given by groups’ own endowment \( r_i^s = Y_i \).\(^{17}\)

In case of conflict, groups know they will incur in extra cost regardless of the outcome. Therefore, they account for this cost in the reference point. Hence, if war is waged the reference point is given by the current income less the cost of war \( r_i^w = Y_i - \theta G_i \). This

\(^{17}\)There is substantial literature on habit formation and status-quo showing that the saliency of agents’ current situation is relevant in the formation of reference points. Particularly, there is evidence that at high-stakes contexts subjects used the status quo as their reference point (Baillon et al., 2017).
assumption implies that for any current income winning the conflict is always considered as a gain, meanwhile losing is considered as a loss.\textsuperscript{18}

**Timing**

The game has two stages. In the first stage, each group decides whether to declare war or not. In the second stage, if war is declared, groups simultaneously choose the optimal investment in army (or war efforts), war is waged and payoff are delivered. Otherwise, if both abstain from declaring war, the status quo is maintained. Information is complete and the equilibrium concept is Subgame Perfection. I focus on pure strategies.

### 4.4 Equilibrium

I look for a Subgame Perfect Nash Equilibrium of the game described in the previous section. The game is solved backwards.

#### 4.4.1 Stage 2: Deciding conflict intensity

The utility of group $i \in \{A,B\}$ if war is declared can be written as:

$$U_i^{\text{w}}(G_i, G_j; Y_i) = \frac{G_i}{G_A + G_B} Y \tau_i(\alpha) - \eta \lambda Y_i - \theta G_i$$

(4.2)

where $j \in \{A,B\}, i \neq j$ and $\tau_i(\alpha) = 2 + \frac{\eta}{Y} (Y_j^\beta + \lambda Y_i)$ for $i, j \in \{A,B\}, i \neq j$. Note that $Y \tau_i(\alpha)$ is the value of winning the conflict, which is given by the prize itself, the gains of winning and, also, the value of the losses avoided by not losing the conflict. Hence, $\tau_i(\alpha)$ is the relative value of winning the conflict. By the first order conditions and given that investments in army are non-negative, the reaction curves are:\textsuperscript{19}

$$G_A(G_B) = \sqrt{G_B \tau_A(\alpha) R - G_B} \quad \text{and} \quad G_B(G_A) = \sqrt{G_A \tau_B(\alpha) R - G_A}$$

(4.3)

\textsuperscript{18}This is analogous to say that, given that war is declared, its costs do not affect the comparison between winning or losing the war, and thus do not enter in the gain-loss utility. See Abeler et al. (2011) for a similar approach.

\textsuperscript{19}Second order condition is satisfied to find an unique solution in arming.
which implies $G_i = G_j \frac{\tau_i(\alpha)}{\tau_j(\alpha)}$, and therefore, in (pure-strategy Nash) equilibrium the level of army of group $i \in \{A, B\}$ is:

$$G^w_i = R \frac{\tau_i^2(\alpha) \tau_j(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2}$$  \hspace{1cm} (4.4)

Which group invests more in arming depends ultimately on the level of inequality $\alpha$. Given that $\alpha > 0$, then $\tau_A(\alpha) > \tau_B(\alpha)$ and thus $G^w_A > G^w_B$.

In equilibrium, the probability of winning the conflict is $p_i(G^w_i, G^w_j) = \frac{\tau_i(\alpha)}{\tau_A(\alpha) + \tau_B(\alpha)}$ and the payoff for group $i \in \{A, B\}$ if conflict occurs is:

$$U^w_i(G^w_i, G^w_j; Y_i) = \frac{\tau_i^3(\alpha)(\tau_A(\alpha) + \tau_B(\alpha))^2}{\tau_A(\alpha) + \tau_B(\alpha)} Y - \eta \lambda Y_i$$ \hspace{1cm} (4.5)

### 4.4.2 Stage 1: Status quo or conflict

In the first stage, groups decide whether to declare war or maintain the status quo. For peace to be sustained, no group should declare war. Group $A$ prefers to maintain the status quo if:

$$1 + \alpha \geq \frac{\tau_A^3(\alpha)}{(1 + \eta \lambda)(\tau_A(\alpha) + \tau_B(\alpha))^2}$$ \hspace{1cm} (4.6)

This condition always holds. The following proposition states that it is always optimal for the rich group not to declare war.

**Proposition 4.4.** Group $A$ always prefers peace rather than conflict.

**Proof.** See appendix

Given proposition 4.4 then whether peace or war occurs depends only on the decision of the poor group. Hence, the condition for peace is:

$$1 - \alpha \geq \frac{\tau_B^3(\alpha)}{(1 + \eta \lambda)(\tau_A(\alpha) + \tau_B(\alpha))^2}$$ \hspace{1cm} (4.7)

**Proposition 4.5.** Given $(\beta, \eta, \lambda, Y)$, there is a unique level of inequality $\alpha \in (0, 1)$ such that:
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(a) \[ 1 - \alpha = \frac{\tau_A^3(\alpha)}{(1 + \eta \lambda)(\tau_A(\alpha) + \tau_B(\alpha))^2} \]

(b) For \( \forall \alpha \in [0, \bar{\alpha}] \) peace is sustainable.

Proof. See appendix.

Equilibrium
The equilibrium is described by the following: In the first stage, Group A never declares war. B declares war if \( 1 - \frac{\tau_A^3(\alpha)}{(1 + \eta \lambda)(\tau_A(\alpha) + \tau_B(\alpha))^2} < \alpha \), otherwise the status quo is maintained. In the second stage, if war is declared, each group invests

\[ G_i^w = R \frac{\tau_i(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} \]

for \( i, j \in \{A, B\} \) with \( i \neq j \), otherwise no investment is needed.

4.5 Properties of the equilibrium

4.5.1 Conflict Intensity

In case of conflict, group A invests more in army that group B \((G_A^w > G_B^w)\). This is because A has more to lose than to win when fighting compare to B.\(^{20}\)\(^{21}\) Additionally, in equilibrium, the war efforts are higher compared to those that expected utility agents would have, due to the gains and losses of conflict. Suppose groups do not care about gains and losses (i.e. \( \eta = 0 \)), then the optimal investment for each group is \( \frac{R}{2} \). These war efforts are not only lower than \( G_i^w \) but they are also the same for both groups.\(^{22}\)

Define \( G^w = G_A^w + G_B^w \) as the equilibrium intensity of the conflict if war is waged.

\[ G^w = R \frac{\tau_A(\alpha)\tau_B(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} \]

\(^{20}\)Since there are no budget constraints and cost of efforts are symmetric, there is direct no relationship between income and investment in arming. See appendix 4.A.4 for when there are budget constraints.

\(^{21}\)This result is similar to Skaperdas (1991). He suggests that investment in arming can be thought as an insurance against losing the conflict. Thus more risk-averse groups invest more.

\(^{22}\)Significant experimental evidence has found that agents exert higher effort than the predicted by standard expected utility models (Sheremeta, 2015b; Abbink et al., 2010).
Proposition 4.6. The intensity of conflict in equilibrium $G^\alpha$,

(i) decreases with the productivity level ($\theta$), the level of inequality ($\alpha$), and with the degree of risk-aversion for gains (i.e. lower $\beta$) if $(1 - \alpha)Y > 1$; and (ii) increases with the level of resources ($R$), the degree of loss-aversion ($\lambda$), and the relative weight of gain-loss utility to consumption ($\eta$).

Proof. See appendix.

Proposition 4.6 shows that income shocks coming from different sources affect differently the intensity of the conflict. If income increases due to an increase (decrease) in $\theta$ then the conflict intensity decreases (increases). This is not a general feature of standard contest models where the resources invested on winning increase with the size of the prize that is lootable. The differences are driven by the fact that: (i) cost of army depends on the income level (only through $\theta$), (ii) people are risk-averse over gains more than risk-seekers for losses. Conflicts are more intense whenever contestants are less risk-averse for gains (higher $\beta$), conditional on having something to appropriate. This is due to agents with higher $\beta$ perceive higher gains from winning the conflict and hence spend more resources in war. On the other hand, conflicts are more intense when income increases due to an increase in the level of resources.

4.5.2 Conflict Onset

As shown in the previous section whether peace or conflict occurs hinges only on the poor group’s decision. This decision depends directly on the level of inequality, income, degree of loss aversion, risk aversion and relationship between gains-loss versus consumption.

From proposition 4.5, the set where peace is sustainable depends on $\overline{\alpha}$. The following proposition shows how this $\overline{\alpha}$ changes with the parameters.

Proposition 4.7. $\overline{\alpha}$ increases with the income ($Y$), the degree of loss aversion ($\lambda$), the relative weight of gain-loss utility to consumption ($\eta$) and, the degree of risk-aversion of gains (i.e. lower $\beta$).

Proof. Check appendix.
Proposition 4.7 implies that conflict is less likely to occur as income increases. This is regardless of whether it comes from an increase in resources or productivity. It also decreases with the degree of loss aversion or the gain-loss utility. This is due to the fact that the level of inequality that group B can cope with is higher. On the contrary, conflict is more likely when agents are less risk-averse for gains. Given that less risk-averse agents obtain higher utility from gains, they would be more prone to gamble for conflict.\textsuperscript{24}

Finally, when comparing proposition 4.6 and 4.7, several parameters affect conflict intensity and onset in opposite directions. For instance, while a higher degree of loss aversion makes groups less likely to engage in conflict, if war is declared, the intensity would be higher. Similar behavior occurs with $\eta$ and $\beta$. This shows that the likelihood and intensity of conflict follow different processes, regardless of groups’ reference points, and therefore they should not be confused. Separating these two by including a decision for each of them is relevant for a better mapping between empirical evidence and the theory. A particularly salient example is the relationship with income, given its empirical relationship with conflict. An increase in resources - conditional on not changing the income distribution - decreases the odds of conflict, while increasing the intensity if war was already waged. This is because if resource discovery occurs under a non-conflict situation, it increases the level of income, making the status quo a more attractive alternative. In contrast, if resource discovery occurs after war has been declared, it increases the size of the prize in conflict and contestants behave more aggressively.\textsuperscript{25}

### 4.6 Final remarks

The model developed in this chapter relies on the assumption that agents’ behavior towards conflict depends on their reference points. This assumption, based on solidly grounded evidence about agents’ behavior in risky contexts, provides a useful toolkit for explaining empirical regularities that standard theory cannot account for. In this sense, this chapter advocates the use of models that incorporate non-standard behavioral assumptions to analyzing conflict, and other phenomena.

\textsuperscript{24} Under expected utility theory only inequality matters. That is, if $\eta = 0$ group A always prefers the status quo since $Y(1+\alpha) > \frac{Y}{2} \forall \alpha \in [0,1]$. In contrast, group B prefers the status quo whenever $Y(1-\alpha) \geq \frac{Y}{2}$. Hence, for any $\alpha > \frac{1}{2}$ B prefers conflict.

\textsuperscript{25} Recently, using geocoded dataset on resource discovery and conflict, Arezki et al. (2015) finds that resource discovery reduces the likelihood of conflict improving local income. Also, after 4 to 6 years of discovery, when production starts, there is a increase intensity in existing conflicts.
According to this theory, policies focusing on behavioral motives can provide a new set of tools to effectively reduce the odds of conflict. There is evidence that tackling agents’ negative perception on society could prevent criminal and violent behaviors (Blattman et al., 2015). This altogether suggests that enhancing agents’ perception of their current status or making the associated costs more salient could reduce conflict.

Additionally, the model highlights the relevance of separating the decision of fighting from arming. The model shows that the two decisions follow different processes and might be affected differently by a similar shock. First, this poses a note of caution in the definition of conflict used in empirical studies. In general, a conflict onset is defined as when the cumulative number of deaths is over a defined threshold (over 25 or 1000 battle-related death). However, this measure of conflict onset is also related with the intensity of conflict (i.e. the number of fatalities). This can produce confusing interpretations of the evidence if one uses standard theory. Second, the timing of the events is relevant in the analysis of conflict. These two implications advocate for more precise and disaggregated data on conflict, with detailed information on the timing of the events and their particular locations.

Finally, it is worth noting that another common way to analyze conflict is by using a bargaining setting. One underlying assumption in the model is that bargaining is not a possible alternative. Indeed, it is very rare to observe bargaining between parties without previously witnessing at least some form of violent conflict. Commonly, rebels need to show strength for their demands to be acknowledged. Fearon (2007) argues that in general we observe more conflict than negotiations. Typically, after fighting for some period, parties gather to negotiate.
4.A Appendices to Chapter 4

4.A.1 Basic decision problem with expected utility preferences

In this appendix I analyze whether expected utility preferences can account for the empirical pattern that income reduces the odds of conflict. I use the basic decision problem outlined in section 4.2. Proposition 4.8 shows that expected utility preferences can explain the empirical regularity if people’s preferences satisfy increasing relative risk aversion (IRRA).

Assume that \( u(.\) is continuous and strictly increasing. Define \( p^*(Y) \) as the probability such that the group is indifferent between the status quo and conflict given the income \( Y \). This is given by \( p^*(Y) = \frac{u(\alpha Y) - u(0)}{u(Y) - u(0)} \).

Proposition 4.8. The probability of conflict decreases with income if and only people’s preferences satisfy increasing relative risk aversion.

Proof. To be more general, suppose that the agent’s income is \( y \), and has to decide whether to maintain her income or take a risky gamble, which with probability \( p \) returns \( \tau_1 \) times her income and with probability \( 1 - p \) returns \( \tau_2 \), where \( \tau_1 > 1 > \tau_2 \geq 0 \).

If \( u(.) \) is continuous and increasing there is a \( p^*(y) \) such that:

\[
\psi(u(y)) \lesssim p^*(y)u_\psi(\tau_1) + (1 - p^*(y))u_\psi(\tau_2)
\] (4.11)

I analyze under which circumstances the left hand side is greater, equal or smaller than the right hand side. Since the \( u(.) \) is ordinal there is an increasing function \( \psi(.) \) such that \( u(\hat{y}) = \psi(u(y)) \), that is, \( u_\hat{y}(\tau) = \psi(u_\psi(\tau)) \forall \tau \). Writing equation 4.11 as:

\[
\psi(u_\hat{y}(1)) \lesssim p^*(y)\psi(u_\hat{y}(\tau_1)) + (1 - p^*(y))\psi(u_\hat{y}(\tau_2))
\]

\[\text{Note that the transformation depends on } t. \text{ See Mas-Colell et al. (1995).}\]
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According to equation 4.10:

\[ \psi(u_y(1)) = \psi(p^*(y)u_y(\tau_1) + (1 - p^*(y))u_y(\tau_2)) \]

Whether the agent prefers the certain income or the risky gamble depends on her attitude towards risk at different income levels, which in turn depends on the functional form of \( \psi(.) \). Indeed, differentiating \( u(ty) = \psi(u(y)) \) with respect to \( y \) twice and dividing the second derivative by the first yields:

\[ r_u(\hat{y}) = \frac{-\psi''(u(y))u'(y)y}{\psi'(u(y))} + r_u(y) \tag{4.12} \]

Given that all components of the first term on the right hand side of equation 4.12 are positive, then whether the relative risk aversion at \( \hat{y} \) is higher or lower than at \( y \) depends only on the sign of \( \psi''(.) \). There are three different cases.

(i) If the agent’s preferences satisfy constant relative risk aversion (CRRA) then \( r_u(ty) = r_u(y) \forall t > 1 \). In this case, \( \psi''(.) = 0 \). Agent is indifferent between the certain income or the risky gamble.

(ii) If the agent’s preferences satisfy IRRA then \( r_u(ty) > r_u(y) \forall t > 1 \). Equation 4.12 implies that \( \psi''(.) < 0 \). Hence, by Jensen’s inequality:

\[ \psi(u_y(1)) = \psi(p^*(y)u_y(\tau_1) + (1 - p^*(y))u_y(\tau_2)) > p^*(y)\psi(u_y(\tau_1)) + (1 - p^*(y))\psi(u_y(\tau_2)) \]

As income increases the agent will prefer getting \( y \) with certainty rather than the risky gamble. This is intuitive since the agent is now more risk averse than before. The contrary occurs if income decreases (i.e. \( t \in (0, 1) \)). In that case, \( \psi(.) \) is convex and the agent prefers the risky gamble.

(iii) The case for decreasing relative risk aversion (DRRA) is opposite to the case of IRRA. That is, if \( t > 1 \) then \( \psi''(.) > 0 \). In contrast, when \( t < 1 \) the agent prefers the certain option since \( \psi''(.) < 0 \).
4. A. 2 Proofs

Proof proposition 4.1

Proof. Fix $\alpha$. Suppose that $r = \gamma Y \leq \alpha Y$, then

$$
\hat{p}(Y, \alpha, \gamma, \lambda) = \left( (\alpha - \gamma) Y^{\beta_1} + \lambda (\gamma Y)^{\beta_2} \right) \left( (1 - \gamma) Y^{\beta_1} + \lambda (\gamma Y)^{\beta_2} \right)^{-1}
$$

(4.13)

Given that $((\alpha - \gamma) Y)^{\beta_1} \geq 0$, this implies that $\hat{p}(Y, \alpha, \gamma, \lambda) |_{\alpha > \gamma} > \hat{p}(Y, \alpha, \gamma, \lambda) |_{\alpha = \gamma}$.

Suppose now that $r = \gamma Y > \alpha Y$, then

$$
\hat{p}(Y, \alpha, \gamma, \lambda) = \frac{\lambda Y^{\beta_2}((1 - \gamma) Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}{(1 - \gamma) Y^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}
$$

(4.14)

Since $-(\gamma - \alpha)^{\beta_2} < 0$ this implies that $\hat{p}(Y, \alpha, \gamma, \lambda) |_{\alpha = \gamma} > \hat{p}(Y, \alpha, \gamma, \lambda) |_{\alpha < \gamma}$. Therefore $\Omega(\hat{p}(Y, \alpha, \gamma, \lambda)) |_{\alpha > \gamma} \subset \Omega(\hat{p}(Y, \alpha, \gamma, \lambda)) |_{\alpha = \gamma} \subset \Omega(\hat{p}(Y, \alpha, \gamma, \lambda)) |_{\alpha < \gamma}$.

$\Box$

Proof proposition 4.2

Proof. Suppose that $\gamma \leq \alpha$, then taking the derivative of $\hat{p}(Y, \alpha, \gamma, \lambda)$ (see equation 4.13) with respect to $Y$,

$$
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial Y} = \frac{\lambda Y^{\beta_2}((1 - \gamma) Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}{((1 - \gamma) Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}
$$

For $\gamma > 0$, given that $\alpha \in [\gamma, 1)$ then $\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial Y} > 0$ if $\beta_2 > \beta_1$.

Suppose now that $\gamma > \alpha$, then from equation 4.14 we have:

$$
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial Y} = \frac{\lambda Y^{\beta_2}((1 - \gamma) Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}{((1 - \gamma) Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2}}
$$

For $\gamma < 1$, given that $\alpha \in (0, \gamma)$, then $\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial Y} > 0$ if $\beta_2 > \beta_1$.

$\Box$

Proof proposition 4.3
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Proof. Suppose that \( \alpha \geq \gamma \), and to reduce notation let \( \zeta = ((1 - \gamma)Y)^{\beta_1} + \lambda (\gamma Y)^{\beta_2} \)

\[
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \alpha} = \frac{\beta_1 Y((\alpha - \gamma)Y)^{\beta_1 - 1}}{\zeta^2} > 0
\]

\[
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \lambda} = \frac{(\gamma Y)^{\beta_2}}{\zeta^2} > 0
\]

Suppose now that \( \alpha < \gamma \), then

\[
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \alpha} = \frac{\lambda \beta_2 Y^2(\gamma - \alpha)^{\beta_2 - 1}}{\zeta^2} > 0
\]

\[
\frac{\partial \hat{p}(Y, \alpha, \gamma, \lambda)}{\partial \lambda} = \frac{Y^{\beta_2}(\gamma^{\beta_2} - (\gamma - \alpha)^{\beta_2})}{\zeta^2} > 0
\]

\( \square \)

Proof proposition 4.4

Proof. First note that \( \frac{\tau_1}{(1 + \eta \lambda)} \left( \frac{\tau_1}{\tau_1 + \tau_B} \right) > \frac{\tau_1^3}{(1 + \eta \lambda)(\tau_1 + \tau_B)^2} \). Hence, if \( 1 + \alpha > \frac{\tau_1}{(1 + \eta \lambda)} \left( \frac{\tau_1}{\tau_1 + \tau_B} \right) \) then condition 4.6 holds. Therefore, suppose that:

\[
1 + \alpha < \frac{\tau_A}{(1 + \eta \lambda)} \left( \frac{\tau_A}{\tau_A + \tau_B} \right) \quad (4.15)
\]

\[\Leftrightarrow (1 + \alpha)(1 + \eta \lambda)(\tau_A + \tau_B) < \tau_A^2 \]

After some algebra it is possible to re-write the previous inequality as follows:

\[
4\alpha + 2\eta \lambda (1 + \alpha) + \eta^2 \lambda^2 (1 + \alpha)(1 - \alpha) - (3 - \alpha)(1 - \alpha)^\beta \eta Y^{\beta - 1} + \eta Y^{\beta - 1}((1 + \alpha)^{\beta + 1} - \eta Y^{\beta - 1}(1 - \alpha)^{2\beta}) + \eta^2 \lambda Y^{\beta - 1}(1 + \alpha)((1 + \alpha)^\beta - (1 - \alpha)^\beta) < 0 \quad (4.16)
\]

The first lower bracket is positive due to the fact that \( (1 + \alpha)^{\beta + 1} \geq (1 - \alpha)^{2\beta} > \eta Y^{\beta - 1}(1 - \alpha)^{2\beta} \), since \( \beta \in (0, 1) \) and \( \eta Y^{\beta - 1} \in (0, 1) \). Therefore, to satisfy the inequality in 4.16 the sum of the first four terms must be negative and must overcome the effect of the other terms.

It can be shown that the expression left hand side in 4.16 is strictly increasing in \( \alpha \). Hence evaluate it at the limit of \( \alpha \) going to zero. This is equal to: \( 2\eta \lambda + \eta^2 \lambda^2 - \)
2\eta Y^{\beta - 1} - \eta^2 Y^{2\beta - 2} \text{ which is positive since } 2\eta(Y - Y^{\beta - 1}) > 0. \text{ This contradicts inequality } 4.15. \text{ Hence } 1 + \alpha > \frac{\tau_A}{(1 + \eta \lambda)} \left( \frac{\tau_A}{\tau_A + \tau_B} \right), \text{ which in turn implies that inequality } 4.6 \text{ holds.}

\begin{proof}
\begin{equation}
\text{Proof proposition 4.5}
\end{equation}
\end{proof}

First, I show that \( f(\alpha) \) is above 0 and below 0, for \( \alpha = 0 \) and \( \alpha = 1 \), respectively, and therefore there is a fixed point. When \( \alpha \) converges to zero then at the limit both groups are identical. By the proof of proposition 4.4 maintaining the status quo is the preferred option. This implies \( \lim_{\alpha \to 0} f(\alpha) > 0 \). On the other hand if \( \alpha \to 1 \) then \( \lim_{\alpha \to 1} f(\alpha) < 0 \) since \( \Phi(\alpha, \beta, \eta, \lambda, Y) \) is also continuous in \( \alpha \).

Therefore since \( \lim_{\alpha \to 0} f(\alpha) > 0 \) and \( \lim_{\alpha \to 1} f(\alpha) < 0 \) and the function is continuous in \( \alpha \) by Brouwer fixed-point theorem there exists an \( \alpha(\beta, \eta, \lambda, Y) \) such that \( f(\alpha(\beta, \eta, \lambda, Y)) = 0 \), which implies that \( 1 - \alpha(\beta, \eta, \lambda, Y) = \Phi(\alpha(\beta, \eta, \lambda, Y), \beta, \eta, \lambda, Y) \).

Now to show that the fixed point is unique I show that the function \( f(\alpha) \) is strictly decreasing \( \forall \alpha \), that is, \( \frac{\partial f(\alpha)}{\partial \alpha} = -(1 + \frac{\partial \Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial \alpha}) \) is always negative.

I do the proof by contradiction. Suppose that \( 1 + \frac{\partial \Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial \alpha} \leq 0 \), then this is analogous to:

\[
\Leftrightarrow \frac{(1 + \eta \lambda)(\tau_A + \tau_B)^3}{\tau_B \eta} \leq 3(\tau_A + \tau_B) \left( \lambda - \frac{\beta}{(Y(1 + \alpha))^{1-\beta}} \right) + \frac{2 \beta \tau_B}{Y^{1-\beta}} \left( (1 + \alpha)^{1-\beta} - (1 - \alpha)^{1-\beta} \right) < 0
\]

Note that the right hand side is smaller than \( 3\lambda(\tau_A + \tau_B) \), which implies that:

\[
\Leftrightarrow \frac{(1 + \eta \lambda)(\tau_A + \tau_B)^3}{\tau_B \eta} < 3\lambda(\tau_A + \tau_B)
\]

\[
\Leftrightarrow (1 + \eta \lambda)(\tau_A + \tau_B)^2 < 3\lambda \tau_B \eta
\]

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Since $\tau_A \geq \tau_B \forall \alpha$ then $(1 + \eta \lambda) (\tau_A + \tau_B)^2 \geq (1 + \eta \lambda) 4 \tau_B^2 > \lambda 4 \tau_B^2 \eta > \lambda 3 \tau_B^3 \eta$. But this contradicts inequality 4.17. Then $1 + \frac{\partial f(\alpha, \beta, \eta, \lambda, \gamma)}{\partial \alpha} > 0$, which implies that $\frac{\partial f(\alpha)}{\partial \alpha} < 0 \forall \alpha$. Hence, the fixed point is unique.

**Proof proposition 4.6**

*Proof.* Take the partial derivative of $G^w$ for the following parameters:

**Productivity level ($\theta$):**
$$\frac{\partial G^w}{\partial \theta} = \frac{\eta (\beta - 1) \beta - \theta^2}{(\tau_A + \tau_B)^2} [\tau_A^2 (1 - \alpha) + \tau_B^2 (1 + \alpha)] .$$

Since $\alpha, \eta, \beta \in (0, 1)$, $\frac{\partial G^w}{\partial \theta} < 0$.

**Resources ($R$):**
$$\frac{\partial G^w}{\partial \beta} = \frac{R}{(\tau_A + \tau_B)} [\tau_B^2 (1 - \alpha) Y \theta^{-1} + \tau_A^2 (1 + \alpha)] .$$

Since $\beta \in (0, 1)$, $\frac{\partial G^w}{\partial \beta} < 0$ since $\forall \alpha \in (0, 1), \tau_B^2 < \tau_A^2$ and $(1 - \alpha) Y \theta^{-1} < (1 + \alpha) Y \theta^{-1}$ since $\beta \in (0, 1)$.

**Loss aversion ($\lambda$):**
$$\frac{\partial G^w}{\partial \lambda} = \frac{R}{(\tau_A + \tau_B)} [(1 + \alpha) \tau_B^2 + (1 - \alpha) \tau_A^2] > 0 .$$

**Degree of risk-aversion ($\beta$):** Since $\beta$ only affects part of $\tau_i = \left(2 + \frac{\eta \lambda}{\tau_i} Y_j + \frac{\eta}{\tau_i} Y_j^2 \right)$, then $\frac{\partial \tau_i}{\partial \beta} = \frac{\eta}{\tau_i} Y_j^2$. Given that $Y_j^2 = exp(\beta \ln Y_j)$, then $\frac{\partial \tau_i}{\partial \beta} = \frac{\eta}{\tau_i} Y_j^2 \ln Y_j$.

Therefore,
$$\frac{\partial G^w}{\partial \beta} = \frac{R \theta^2}{(\tau_A + \tau_B)^2} \left[\tau_B^2 (1 - \alpha) \beta \ln((1 - \alpha) Y) + \tau_A^2 (1 + \alpha) \beta \ln((1 + \alpha) Y)\right].$$

If $(1 - \alpha) Y \geq 1$ then $\frac{\partial G^w}{\partial \beta} > 0$.

**Relative weight of gain-loss utility to consumption ($\eta$):**
$$\frac{\partial G^w}{\partial \eta} = \frac{R Y^2}{(\tau_A + \tau_B)^2} \left[\tau_A^2 (2 + \alpha) + (1 - \alpha) Y \beta^{-1} + \tau_B^2 (\lambda (1 - \alpha) + (1 + \alpha) Y \beta^{-1})\right].$$

As all terms are positive, $\frac{\partial G^w}{\partial \eta} > 0$.

**Proof proposition 4.7**

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Proof. By implicit function theorem, for any exogenous variable $x \in \{\beta, \eta, \lambda, Y\}$ in equation 4.8 that:

$$\frac{d\Phi(\beta, \eta, \lambda, Y)}{dx} = -\frac{\partial\Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial x}$$

(4.18)

In proposition 4.5 I proved that $1 + \frac{\partial\Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial x} > 0$ and therefore the sign of the equation 4.18 depends on the sign of $-\frac{\partial\Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial x}$.

Income ($Y$):

$$\frac{\partial\Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial Y} = \frac{\partial\tau^3}{\partial x} \left[ (1 + \eta \lambda) \right] (\tau_A + \tau_B)^2 - \tau_B^3 \left( \frac{\partial\Phi(\eta, \lambda, Y)}{\partial x} \right) \frac{(1 + \eta \lambda)(\tau_A + \tau_B)^2}{(1 + \eta \lambda)^2 (\tau_A + \tau_B)^4}$$

This implies that $\frac{d\Phi(\beta, \eta, \lambda, Y)}{dx} < 0$.

Loss aversion ($\lambda$):

$$\frac{\partial\Phi(\alpha, \beta, \eta, \lambda, Y)}{\partial \lambda} = \frac{\partial\tau^3}{\partial x} \left[ (1 - \alpha)(1 + \eta \lambda)(\tau_A + \tau_B) - \tau_B(\tau_A + \tau_B) - 4\tau_B(1 + \eta \lambda) \right] < 0$$

The term in square brackets is always negative regardless the value of the parameters. Therefore, $\frac{d\Phi(\beta, \eta, \lambda, Y)}{dx} > 0$.

Risk aversion ($\beta$): $\frac{\partial\Phi(\alpha, \beta, \lambda, Y)}{\partial \beta} = \frac{\partial\tau^3}{\partial x} \left[ (3\tau_A + \tau_B)(1 + \alpha)^\beta(\ln(1 + \alpha) + \ln Y) - 2\tau_B(1 - \alpha)^\beta(\ln(1 - \alpha) + \ln Y) \right]$. The term in square brackets is always non negative. Re-write the term as:

$$\frac{\partial\Phi(\alpha, \beta, \lambda, Y)}{\partial \beta} \geq 0$$

This implies that $\frac{d\Phi(\beta, \eta, \lambda, Y)}{dx} \leq 0$.

Relative gains-losses to consumption ($\eta$):

$$\frac{\partial\Phi(\alpha, \beta, \lambda, Y)}{\partial \eta} =$$
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\[
\frac{\tau_B^2(1 + \eta \lambda)Y^\beta - 1((3\tau_A + \tau_B)(1 + \alpha)^\beta - 2\tau_B(1 - \alpha)^\beta)}{(1 + \eta \lambda)^2(\tau_A + \tau_B)^3} \left[ (1 + \eta \lambda)Y^\beta - 1\left( (3\tau_A + \tau_B)(1 + \alpha)^\beta - 2\tau_B(1 - \alpha)^\beta \right) + \lambda (\tau_A + \tau_B) \right] < 0.
\]

The term in square brackets is always non positive. Particularly, if \( \eta > 0 \) or if \( \alpha > 0 \) or if \( Y > 1 \) then \( \frac{\partial \Phi(\alpha, \beta, \lambda, Y)}{\partial \eta} < 0 \) hence \( \frac{\partial \Phi(\beta, \eta, \lambda, Y)}{\partial \eta} > 0 \).

4.A.3 Expectation-based reference point

This appendix analyzes the model from section 4.3 but when the reference point is determined by individual expectations (Kőszegi and Rabin, 2006). In this sense, reference points follow a full distribution of rational expectation.

Let \( F_i^s \) denotes the distribution of rational expectation of agents \( i \in \{A, B\} \) conditional on the first-stage decision \( s \in \{sq, w\} \) where \( sq \) denotes the status-quo and \( w \) war. Hence, \( r_i^s \sim F_i^s \). That is, conditional on no party declaring war \( (s = \{sq\}) \), the reference point is determined by a degenerate distribution \( F_i^{sq} \) where with probability 1 agents maintain their current income. Therefore, the utility function of status quo is the same as in section 4.3. On the other hand, conditional on some party declaring war \( (s = \{w\}) \) the distribution \( F_i^w \) is as follows: for group \( i \in \{A, B\} \) the reference point is \( r_i^w = 2Y - \theta G_i \) with probability \( p(G_i, G_j) \) and \( r_i^w = 0 - \theta G_i \) with probability \( 1 - p(G_i, G_j) \). As is standard in the literature, I assume that the gain or loss sensation each group experiences depends on their rational expectations about potential earnings held at the moment before the conflict is ended.

For simplicity of notation denote \( p_i = p(G_i, G_j) \). Therefore, the utility function of war is:

\[
U_i^w(G_i, G_j; r_i^w \sim F_i^w) = p_i 2Y + (1 - p_i)0 - \theta G_i + \\
+ \eta \cdot p_i [p_i(2Y - \theta G_i - (2Y - \theta G_i))^\beta + (1 - p_i)(2Y - \theta G_i - (0 - \theta G_i))^\beta]
\]
The first gain-loss utility is when group \( i \) wins the conflict (which occur with probability \( p_i \)), where with probability \( p_i \) it was expecting to win the conflict and with probability \( 1 - p_i \) it was expecting to lose the conflict. In the first case, it is not a gain nor a loss, meanwhile in the second case it is a gain. The second gain-loss utility follows the same idea, but when group \( i \) lose the conflict, which occur with probability \( 1 - p_i \). Note that in this case, when group \( i \) was expecting to win the conflict it represents a loss. The utility of war can be re-written as:

\[
U_w(G_i, G_j; r_i \sim F_i) = p_i[2Y + \eta(1 - p_i)((2Y)^\beta - \lambda 2Y)] - \theta G_i
\]

### 4.A.3.1 Equilibrium

I look for Subgame Perfect Nash Equilibrium focusing on symmetric equilibrium on pure strategies.

**Stage 2: Conflict intensity**

Recall that \( p_i = \frac{G_i}{G_A + G_B} \), then first order conditions are described by:

\[
FOC_i : \frac{G_j}{(G_A + G_B)^2}2Y + \eta \frac{G_j(G^2_A + G^2_B - 2G^2_i)}{(G_A + G_B)^4}[(2Y)^\beta - \lambda 2Y] - \theta = 0
\]

where \( i, j \in \{A, B\} \) and \( i \neq j \).

**Proposition 4.9.** If agents have expectation-based reference point, then in a symmetric equilibrium agents' optimal investment in conflict is the same as if they have expected utility preferences.

**Proof.** A symmetric equilibrium implies that \( G^w_A = G^w_B \). Replace this in the first order condition above, then the second term disappears and the first order conditions are the same as when \( \eta = 0 \), which is the case of expected utility preferences. This implies that the optimal investments are \( G^w_i = \frac{R}{2} \forall i \).

This proposition applies for other games where both agents follow expectation-based reference points and there are no constraints in the level of effort they can exert. In this sense, agents’ behaviour cannot be distinguished between this case and the expected utility case. However, this does not mean that groups have the same utility level as
when \( \eta = 0 \) just that groups’ investment is the same. Indeed, the utility of war is given by:

\[
U^w_i(G^w_i, G^w_j; r^w_i \sim F^w_i) = \frac{Y_2}{2}(1 - \eta \lambda) + \frac{\eta}{4}(2Y)^\beta.
\]

The intensity of conflict in a symmetric equilibrium when reference points are based on expectation is given by \( G^w = R \). Hence, proposition 4.6 does not hold in this case, since the intensity of conflict is only affected by the level of resources. Note also that conditional on \((\alpha, \beta, \eta, \lambda, R, \theta)\), conflict is less intense when reference points are based on expectation than when are based on the status quo, since \( 1 < \frac{\tau_A \tau_B}{\tau_A + \tau_B} \).

**Stage 1: Conflict onset**

The peace condition is \( U^{sq}_i(Y_i, r^{sq}_i \sim F^{sq}_i) \geq U^w_i(G^w_i, G^w_j; r^w_i \sim F^w_i) \forall i \). For group A it is analogous to: \( 1 + 2\alpha + \eta \lambda \geq \eta(2Y)^\beta - 1 \) which is satisfied for all values. Then as in proposition 4.4 group A always prefers peace. For group B the condition is analogous to: \( 1 + \eta \lambda - \eta(2Y)^\beta - 1 \geq 2\alpha \). Hence, as in proposition 4.5, given \((\beta, \eta, \lambda, Y)\), there is a unique level of inequality \( \bar{\alpha}(\beta, \eta, \lambda, Y) \) such that group B prefers to declare war whenever \( \alpha \in [\bar{\alpha}(\beta, \eta, \lambda, Y), 1] \) where \( \bar{\alpha}(\beta, \eta, \lambda, Y) = \frac{1 + \eta(\lambda - (2Y)^\beta - 1)}{2} \in [0, 1] \). This implies that a sufficient condition for peace is \( \eta \lambda - \eta(2Y)^\beta - 1 > 2 \), where no one declares war regardless the inequality level. Proposition 4.7 still holds.

### 4.4.4 Budget constraints

The models developed in section 4.3 do not include budget constraints. In this sense, the investment in arming is usually called war efforts instead of war resources (Beviá and Corchón, 2010). In the model the cost of conflict is directly related to the productivity level of the country. That is, the arming cost is an opportunity cost (Collier and Hoeffler, 1998). Most of the conflict literature highlights this an important mechanism affecting the likelihood of conflict (Do and Iyer, 2010; Dube and Vargas, 2013; Berman and Couttenier, 2013; Harari and La Ferrara, 2013). Another way to think about the lack of budget constraint is that there are external funding resources for war, and therefore the budget constraint is not binding. Indeed, one of the most common funding sources for armed opposition rebels comes from external state sponsorship (Salehyan et al., 2014).

Regardless this, in this appendix I analyze the effect of relaxing this assumption. The main results from the models section 4.5 do not change qualitatively. However, when there are budget constraints, the likelihood of conflict and its intensity if it occurs are lower than when there are no budget constraints.
4.A.4.1 Status quo as reference point

Stage 2: Conflict intensity under budget constraints

In the presence of budget constraints, each group cannot invest more than its income in army, that is, \( \theta G_i \leq Y_i \forall i \). However, since inequality is asymmetric, I focus on cases where only the poor group is constrained. Therefore, equation 4.4 implies that the optimal investment in army for group B is: \( G_B^w = R \cdot \min \left\{ \frac{\tau_B \beta_1 (\hat{\alpha})}{\tau_A (\hat{\alpha}) + \tau_B (\hat{\alpha})}, (1 - \alpha) \right\} \).

The relevant cases are when \( \alpha \in (\hat{\alpha} (\beta, \eta, \lambda, Y), 1) \) where \( \hat{\alpha} (\beta, \eta, \lambda, Y) \equiv \hat{\alpha} = 1 - \frac{\tau_B (\hat{\alpha})}{\tau_A (\hat{\alpha}) + \tau_B (\hat{\alpha})} \). Whenever \( \alpha \in [0, \hat{\alpha}] \) the analysis is the same as in section 4.3 since group B’s budget constraint is not binding.

Due to full information, whenever group B is constrained, group A adjusts its optimal investment accordingly. Replacing \( \overline{G}_B^w = R (1 - \alpha) \) in group A’s best response function (see equation 4.3), then \( \overline{G}_A^w = R ((1 - \alpha) \frac{1}{2} \frac{\tau_B}{\tau_A} - 1 + \alpha) \). The overline denotes the fact that group B is constrained. The conflict intensity is \( \overline{G}^w = R (1 - \alpha) \frac{1}{2} \frac{\tau_B}{\tau_A} \). Proposition 4.6 still holds.

However, conflict is less intense than when there are no budget constraints, as the following proposition shows.

**Proposition 4.10.** If there are no external funding sources for war, the intensity of the conflict if it occurs is less or equal than when there are external resources.

**Proof.** When \( \alpha \in [0, \hat{\alpha}] \) the conflict intensity is the same as in equation 4.9 since none of the groups is constrained. When \( \alpha \in (\hat{\alpha}, 1) \), suppose that introducing budget constraints increase the intensity of the conflict, that is, \( R (1 - \alpha) \frac{1}{2} \frac{\tau_B}{\tau_A} > R \frac{\tau_B}{\tau_A + \tau_B} \). Since \( \forall \alpha \in (\hat{\alpha}, 1) \), \( \frac{\tau_B \beta_1 (\hat{\alpha})}{\tau_A (\hat{\alpha}) + \tau_B (\hat{\alpha})} > (1 - \alpha) \) then \( R (1 - \alpha) \frac{1}{2} \frac{\tau_B}{\tau_A} < R \left( \frac{\tau_B \beta_1 (\hat{\alpha})}{\tau_A (\hat{\alpha}) + \tau_B (\hat{\alpha})} \right)^{\frac{1}{2}} \frac{\tau_B}{\tau_A} = R \frac{\tau_B}{\tau_A + \tau_B} \). But this contradicts the first statement. Hence, \( \forall \alpha \in (\hat{\alpha}, 1) \) the intensity of conflict if war is waged is lower than when the economically disadvantaged group is not constrained than when it is not.

Note that not only the intensity of the conflict is lower as proposition 4.10 shows but also group A’s optimal investment in army is lower as well when group B is constrained than otherwise (i.e. \( G_A^w > \overline{G}_A^w \)).27

27This can be easily seen using the Lagrange multiplier associated to B’s budget constraint, which I denoted by \( \psi \). Then in equilibrium the optimal investment are \( \overline{G}_A^w = \frac{R \tau_B (1 + \psi)}{(1 + \psi) \tau_A + \tau_B} \) and \( \overline{G}_B^w = \frac{R \tau_B}{\tau_A + \tau_B} \). Since \( \psi > 0 \) when B is constrained, it is evident that \( G_A^w > \overline{G}_A^w \). Also, the intensity of conflict is \( \overline{G}^w = \frac{R \tau_B}{\tau_A + \tau_B} \).
Chapter 4. Contest model with reference-dependent preferences

Stage 1: Conflict onset under budget constraints

When $\alpha \in (\hat{\alpha}, 1)$ the probabilities of winning are $p_A^w = 1 - p_B^w = 1 - \left( \frac{1-\alpha}{\alpha} \right)^{\frac{1}{2}}$. This implies that group A has higher probability of winning than when group B is not constrained (since $\frac{\tau_B^2 \tau_A}{(\tau_A + \tau_B)^2} > (1 - \alpha)$). This added to the fact that its optimal investment is lower when B is constrained, implies that for any value of the parameters, group A’s utility is higher compared to the case with external funds for war. Particularly, the utilities of war when group B is constrained are:\(^{28}\)

$$
U_A^w(G_A^w, G_B^w; Y_A) = Y(3 - \alpha) - 2(1 - \alpha)^{\frac{1}{2}} \tau_A^3 Y + \eta(1 - \alpha)\beta Y^\beta
$$

(4.19)

$$
U_B^w(G_B^w, G_A^w; Y_B) = \left( \frac{1-\alpha}{\tau_A} \right)^{\frac{1}{2}} Y \tau_B - Y(1 - \alpha)(1 + \eta\lambda)
$$

(4.20)

Given that for any $(\beta, \eta, \lambda, Y)$ and $\alpha \in (\hat{\alpha}, 1)$, $U_A^w(G_A^w, G_B^w; Y_A) > U_A^w(G_A^w, G_B^w; Y_A)$, is proposition 4.4 still valid or now group A has incentives to fight? The peace condition for group A is $U_A^{sq}(Y_A; Y_A) \geq U_A^w(G_A^w, G_B^w; Y_A)$ (see equation 4.6), which is analogous to:

$$
2(1 - \alpha)^{\frac{1}{2}} \tau_A^3 Y \geq 2(1 - \alpha) + \eta(1 - \alpha)^\beta Y^{\beta - 1}
$$

(4.21)

There are some values of the parameters where inequality 4.21 does not hold (and hence, proposition 4.4 does not apply when group B is constrained).\(^ {29}\) This means that A might declare war to B in some cases.\(^ {30}\)

A sufficient condition for A to prefer peace instead of conflict is in the following proposition.

**Proposition 4.11.** Whenever $(\alpha, \beta, \eta, \lambda, Y)$ satisfy $2(1 - \alpha)^{\frac{1}{2}} - \beta [(2 + \eta\lambda)^{\frac{1}{2}} - 1] \geq \eta Y^{\beta - 1}$, group A always prefers peace than conflict.

---

\(^{28}\)If $\eta = 0$ then $U_A^w(G_A^w, G_B^w; Y_A) = Y(3 - \alpha) - 23/2 Y \sqrt{(1 - \alpha)}$ and $U_B^w(G_B^w, G_A^w; Y_B) = Y \sqrt{2(1 - \alpha)} - Y(1 - \alpha)$. As pointed in footnote 24, A always prefers the status quo, meanwhile B prefers war whenever $\alpha > \frac{1}{2}$. This does not change even when B is constrained when $\alpha > \frac{1}{2}$. This is due to $\sqrt{2(1 - \alpha)} > 2(1 - \alpha)$ $\forall \alpha \in (0.5, 1)$.

\(^{29}\)For instance, if the inequality level is sufficiently high ($\alpha$ close to 1), the parameter of risk aversion for gains and the income level are sufficiently low ($\beta$ and $Y$ close to 0 and 1, respectively), then the inequality 4.21 does not hold.

\(^{30}\)Note that this might also be true if there are more than 1 period in the model. As Garfinkel and Skaperdas (2007) show the shadow of the future might generate incentives to fight due to the chances of getting rid off the opponent for ever. Note that in this context reference points are dynamic and therefore after the first period, the reference point would be the whole prize and therefore there are no gains or losses thereafter.
\textit{Proof}. Write condition 4.21 as \(2(1 - \alpha)^{\frac{1}{2}} \tau_A^{\frac{1}{2}} - 2(1 - \alpha) \geq \eta(1 - \alpha)^{\beta} Y^{\beta - 1}\) then,
\[
2(1 - \alpha)^{\frac{1}{2}} \tau_A^{\frac{1}{2}} - 2(1 - \alpha) > 2(1 - \alpha)^{\frac{1}{2}} [\tau_A^{\frac{1}{2}} - 1] > 2(1 - \alpha)^{\frac{1}{2}} [(2 + \eta \lambda)^{\frac{1}{2}} - 1] \geq \eta(1 - \alpha)^{\beta} Y^{\beta - 1}
\]

Divide the last inequality by \((1 - \alpha)^{\beta}\) and the condition arises. \(\square\)

This condition is not very strong. For instance, if \(\beta \in (\frac{1}{2}, 1)\), then the condition in proposition is satisfied. Under this assumption then \(2(1 - \alpha) + \eta (1 - \alpha)^{\frac{1}{2}} > 2(1 - \alpha) + \eta (1 - \alpha)^{\beta} Y^{\beta - 1}\). Therefore if \(2(1 - \alpha)^{\frac{1}{2}} \tau_A^{\frac{1}{2}} \geq 2(1 - \alpha) + \eta (1 - \alpha)^{\frac{1}{2}}\) then condition 4.21 also holds. This is analogous to \((1 - \alpha)^{\frac{1}{2}}(2 \tau_A^{\frac{1}{2}} - \eta) \geq 2(1 - \alpha)\). Since for any \(\alpha, (1 - \alpha)^{\frac{1}{2}} \geq (1 - \alpha), \) then if \(2 \tau_A^{\frac{1}{2}} - \eta \geq 2\), group A would not declare war. Note that \(2 \tau_A^{\frac{1}{2}} - \eta > 2[2 + \eta \lambda (1 + \alpha)]^{\frac{1}{2}} - \eta > 2[2 + \eta]^{\frac{1}{2}} - \eta\) then \(2[2 + \eta]^{\frac{1}{2}} \geq 2 + \eta\) which is always true for any \(\eta \in [0, 1]\) since \(2 > (2 + \eta)^{\frac{1}{2}}\). Hence, under this additional assumption whether conflict arises or not depends only on group B’s decision.

The peace condition for B is \(U_B^{sq}(Y_B, Y_B) \geq U_B^w(G_B^w, G_A^w, Y_B)\), which is analogous to:

\[
1 - \alpha \geq \left( \frac{1 - \alpha}{\tau_A} \right)^{\frac{1}{2}} \frac{\tau_B}{(2 + \eta \lambda)} \tag{4.22}
\]

\textbf{Proposition 4.12.} Given \((\beta, \eta, \lambda, Y)\), there is an inequality level \(\overline{\alpha}(\beta, \eta, \lambda, Y) \in (0, 1)\) such that

\[
(1 - \overline{\alpha}(\beta, \eta, \lambda, Y))^{\frac{1}{2}} (2 + \eta \lambda) = \tau_A(\overline{\alpha}(\beta, \eta, \lambda, Y))^{-\frac{1}{2}} \tau_B(\overline{\alpha}(\beta, \eta, \lambda, Y)) \tag{4.23}
\]

where \(\forall \alpha \in [0, \overline{\alpha}(\beta, \eta, \lambda, Y)]\) peace is sustainable. Moreover, \(\overline{\alpha}(\beta, \eta, \lambda, Y) < \overline{\alpha}(\beta, \eta, \lambda, Y)\), where \(\overline{\alpha}(\beta, \eta, \lambda, Y)\) is defined as in proposition 4.5.

\textit{Proof}. First, I prove that given \((\beta, \eta, \lambda, Y)\) there is an \(\overline{\alpha}(\beta, \eta, \lambda, Y) \in (0, 1)\) such that condition 4.22 is satisfied with equality. This inequality defines the ‘peace set’ as all the \(\alpha \in [0, \overline{\alpha}(\beta, \eta, \lambda, Y)]\) given \((\beta, \eta, \lambda, Y)\). Then I show that for any \((\beta, \eta, \lambda, Y), \overline{\alpha}(\beta, \eta, \lambda, Y) > \overline{\alpha}(\beta, \eta, \lambda, Y)\).

Fix \((\beta, \eta, \lambda, Y)\) and denote \(g(\alpha) = (1 - \alpha)^{\frac{1}{2}} - \frac{\tau_A - \tau_B}{(2 + \eta \lambda)}\), which comes directly from condition 4.22 given that \(\alpha < 1\). This function is continuous in \(\alpha\). Also, \(g(\alpha)|_{\alpha=0} =\)
Chapter 4. Contest model with reference-dependent preferences

\[ 1 - \frac{[2 + \eta \lambda + \eta \gamma^{-1}]^\frac{\beta}{2}}{2 + \eta \lambda} > 0 \] and \( \lim_{\alpha \to 1} g(\alpha) = -\frac{2 + 2\beta \eta \gamma^{-1}}{(2 + \eta \lambda)^{\frac{\beta}{2}}} < 0. \] This implies that there exists a level of inequality \( \tilde{\alpha}(\beta, \eta, \lambda, Y) \in (0, 1) \) such that \( g(\tilde{\alpha}(\beta, \eta, \lambda, Y)) = 0. \) Moreover, this level of inequality is unique since \( g(\alpha) \) is strictly decreasing \( \forall \alpha \in (0, 1). \)

\[
\frac{\partial g(\alpha)}{\partial \alpha} = -\frac{(1 - \alpha)^{-\frac{\beta}{2}}}{2} - \frac{\tau_\alpha^{\frac{1}{2}}}{2 + \eta \lambda} \left[ -\frac{\tau_\beta}{2 \tau_\alpha} \frac{\partial \tau_\alpha}{\partial \alpha} + \frac{\partial \tau_\beta}{\partial \alpha} \right] \leq 0
\]

The last term is always positive since \( \frac{\partial \tau_\beta}{\partial \alpha} < 0 \) and the second term could be positive or negative depending on the level of \( \alpha \) (indeed \( \frac{\partial \tau_\beta}{\partial \alpha} \leq 0. \)

\[
\frac{\partial g(\alpha)}{\partial \alpha} = -\frac{(1 - \alpha)^{-\frac{\beta}{2}}}{2} - \frac{\eta \tau_\alpha^{\frac{1}{2}}}{2 + \eta \lambda} \left[ -\lambda (1 + \frac{\tau_\beta}{2 \tau_\alpha}) + \beta \gamma^{-1} (1 - \alpha)^{\beta^{-1}} \frac{\tau_\beta}{2 \tau_\alpha} + (1 + \alpha)^{\beta^{-1}} \right] \leq 0
\]

This can be rewritten as:

\[ \Leftrightarrow \eta \lambda \left( \frac{2 \tau_\alpha + \tau_\beta}{2 \tau_\alpha} \right) - \eta \beta \gamma^{-1} \left( (1 - \alpha)^{\beta^{-1}} \frac{\tau_\beta}{2 \tau_\alpha} + (1 + \alpha)^{\beta^{-1}} \right) \leq \frac{(2 + \eta \lambda) \tau_\alpha^{\frac{1}{2}}}{2(1 - \alpha)^{\frac{\beta}{2}}} \]

The LHS is smaller than \( \eta \lambda \left( \frac{2 \tau_\alpha + \tau_\beta}{2 \tau_\alpha} \right) \) then comparing this to the RHS is analogous to,

\[ \eta \lambda (2 \tau_\alpha + \tau_\beta)(1 - \alpha)^{\frac{1}{2}} \leq (2 + \eta \lambda) \tau_\alpha^{\frac{3}{2}} \]

Note that \( \eta \lambda (2 \tau_\alpha + \tau_\beta)(1 - \alpha)^{\frac{1}{2}} < 3 \eta \lambda \tau_\alpha (1 - \alpha)^{\frac{1}{2}} < 3 \eta \lambda \tau_\alpha \) then comparing \( 3 \eta \lambda \leq (2 + \eta \lambda) \tau_\alpha^{\frac{1}{2}}. \) Finally note that \( (2 + \eta \lambda)^{\frac{3}{2}} < (2 + \eta \lambda) \tau_\alpha^{\frac{1}{2}}. \) And for any combination of \( \eta \lambda > 0, 3 \eta \lambda < (2 + \eta \lambda)^{\frac{3}{2}} \) which implies that \( g'(\alpha) < 0 \) for all values of the parameters. Therefore, \( \tilde{\alpha}(\beta, \eta, \lambda, Y) \) is unique.

To prove that \( \tilde{\alpha}(\beta, \eta, \lambda, Y) > \overline{\alpha}(\beta, \eta, \lambda, Y) \) for all \( (\beta, \eta, \lambda, Y) \) I show that if \( g(\overline{\alpha}(\beta, \eta, \lambda, Y)) \) > 0 then it must be the case that \( \tilde{\alpha}(\beta, \eta, \lambda, Y) > \overline{\alpha}(\beta, \eta, \lambda, Y) \), to get \( g(\tilde{\alpha}(\beta, \eta, \lambda, Y)) = 0, \) since \( g(\alpha) \) is strictly decreasing in \( \alpha \in (0, 1). \) Evaluate \( g(\alpha) \) at \( \overline{\alpha}(\beta, \eta, \lambda, Y) \), then:

\[ g(\overline{\alpha}(\beta, \eta, \lambda, Y)) = (1 - \overline{\alpha}(\beta, \eta, \lambda, Y))^{\frac{1}{2}} - \frac{\tau_\alpha(\overline{\alpha})^{-\frac{1}{2}} \tau_\beta(\overline{\alpha})}{(2 + \eta \lambda)} \]

\[^{31}\text{It can be shown that } \tau_\alpha(\alpha) \in [2 + \eta \gamma^{-1} + \eta \lambda, 2 + 2\eta \lambda + \eta \lambda \left( \frac{1 - \frac{\beta}{2}}{\beta} \right) \tau_\beta(\alpha)] \text{ and } \tau_\beta(\alpha) \in [2 + \eta \gamma^{-1}, 2 + \eta \gamma^{-1} + \eta \lambda].\]
Note that this implies that for any  \( \beta, \eta, \lambda, Y \) is such that \( 1 - \Phi(\beta, \eta, \lambda, Y) = \Phi(\beta, \eta, \lambda, Y), \beta, \eta, \lambda, Y \). Therefore, the sign of \( g(\alpha(\beta, \eta, \lambda, Y)) \) depends on,

\[
\left( \frac{\tau_A^2(\alpha)}{(1 + \eta \lambda)(\tau_A(\alpha) + \tau_B(\alpha))^2} \right) \left( \frac{\tau_A(\alpha) \tau_B(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} \right) \left( \frac{\tau_A(\alpha) - \tau_B(\alpha)}{(2 + \eta \lambda)} \right) \geq 0 \quad \forall \alpha(\beta, \eta, \lambda, Y)
\]

The last step is due to the fact that both sides are strictly positive. Now since the LHS decreases monotonically with \( \alpha \), then \( \frac{\tau_A(\alpha) \tau_B(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} > \frac{\tau_A(\alpha) (\tau_B(\alpha))^2}{(\tau_A(\alpha) + \tau_B(\alpha))^2} \).

Finally, I show that \( \frac{\tau_A(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} > \frac{(1 + \eta \lambda)}{(2 + \eta \lambda)^2} \) and if this is true, then the inequality above must be satisfied by any \( \alpha \), particularly for \( \alpha(\beta, \eta, \lambda, Y) \). Note that \( \tau_A(\alpha) = 2 + 2 \eta \lambda \) and \( \tau_B(\alpha) = 2 + 2 \beta \eta Y^{\beta - 1} \) then \( \frac{\tau_A(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} = \frac{(1 + \eta \lambda)(4 + 2 \beta \eta Y^{\beta - 1})}{(4 + 2 \eta \lambda + 2 \beta \eta Y^{\beta - 1})^2} \).

Note that this implies that for any \( (\alpha, \beta, \eta, \lambda, Y) \), \( \frac{\tau_A(\alpha)}{(\tau_A(\alpha) + \tau_B(\alpha))^2} > \frac{(1 + \eta \lambda)}{(2 + \eta \lambda)^2} \) and hence it is also true for the particular \( \alpha(\beta, \eta, \lambda, Y), \beta, \eta, \lambda, Y \).

Therefore, since \( g(\alpha) \) decreases in \( \alpha \) given \( (\beta, \eta, \lambda, Y) \), \( \alpha(\beta, \eta, \lambda, Y) > \alpha(\beta, \eta, \lambda, Y) \). This implies that the set of inequalities for which peace is sustainable is higher when group B is constrained than otherwise (i.e. \([0, \alpha(\beta, \eta, \lambda, Y)] \supset [0, \alpha(\beta, \eta, \lambda, Y)]\)).

This proposition implies that the poor group is willing to bear a higher level of inequality when it lacks resources to start a revolt. This confirms the fact that inequality is indeed an important driver for starting conflict but it is necessary to have the means to do it.

Note that this inequality level \( \alpha(\beta, \eta, \lambda, Y) \) satisfies the same properties as in proposition 4.7.

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