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‘All’s Well That Ends Well’: the Strategy of Electoral  
(Mis)Behavior in Competitive-Authoritarian Regimes

Ines Levin



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## **Abstract**

In competitive authoritarian regimes, formal democratic institutions and periodic elections are sponsored by the authoritarian ruler, but voting outcomes are sometimes manipulated to prevent government turnover. In this paper, I investigate the conditions under which a unified opposition might decide to challenge the official election outcome, the conditions under which the authoritarian incumbent might find it profitable to manipulate the election outcome, as well as the conditions under which voters might decide to vote strategically for their least-preferred alternative in order to help avoid a costly post-electoral conflict. I find that the incumbent's decision about whether to commit fraud or acknowledge the true election outcome, as well as the opposition's decision about whether to contest or accept official election results, depends on the opposition's knowledge about the occurrence of fraud, as well as on the likelihood of successful collective action against the regime. Fears of post electoral violence may lead incumbent or opposition supporters to vote strategically for their least preferred alternative, and the probability that they do so depends on their expectations about the opposition's reaction to official election results.

## **Keywords**

Voter fraud, electoral violence, competitive authoritarianism, strategic voting, game theory.

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# 1 Introduction

In the culmination of the third-wave of democratization that started in the mid seventies, most regimes did not democratize fully, but turned into what scholars have come to call *electoral authoritarian* regimes (Huntington, 1991; Diamond, 2002; Howard and Roessler, 2002; Levitsky and Way, 2002; Schedler, 2002).<sup>1</sup> In this paper, I focus on the nature of voter behavior, and incentives for electoral malfeasance and the challenge of election results in elections held under *autocratic competition*. In contrast to elections taking place under *hegemonic competition*, these elections are contested by one or more opposition candidates (Diamond, 2002; Howard and Roessler, 2002). However, as pointed out by Levitsky and Way (2002, p. 53), “incumbents routinely abuse state resources, deny the opposition adequate media coverage, harass opposition candidates and their supporters, and in some cases manipulate electoral results.” I find that the incumbent’s decision about whether to commit fraud or acknowledge the true election outcome, as well as the opposition’s decision about whether to contest or accept official election results, depends on the opposition’s knowledge about the occurrence of fraud, as well as on the likelihood of successful collective action against the regime. Also, fears of post electoral violence may lead incumbent or opposition supporters to vote *strategically* for their least preferred alternative, and the probability that they do so depends on their expectations about the opposition reaction to official election results.

The 2009 Zimbabwe presidential election serves as an example of how government manipulation can drive the electoral process far from the democratic ideal of “fair, honest and free elections” (Diamond, 2002). In this election, the candidate from the Movement for Demo-

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<sup>1</sup>According to Diamond (2002, p. 26), out of 167 regimes classified as formal democracies in 2001, 21 fell into the *competitive authoritarian* category, with the remaining regimes consisting of 73 *liberal* democracies, 31 *electoral* democracies, 17 *ambiguous* regimes, and 25 *hegemonic electoral authoritarian* regimes. Also, Diamond identifies 25 *politically closed authoritarian* regimes, that do not make use of democratic forms such as elections, and thus do not fall into the electoral authoritarian category.

cratic Change (MDC), Morgan Tsvangirai, was the main contender against the incumbent candidate of the Zimbabwe African National Union - Patriotic Front (ZANU-PF), Robert Mugabe, who had ruled the country since its independence in 1980. Ahead of the election, the opposition complained about manipulation of voter rolls and the reduced number of polling places in urban areas, where the MDC was stronger.<sup>2</sup> Official results were posted more than a month after the election, with Tsvangirai and Mugabe obtaining 47.9 and 43.2 percent of the vote, respectively, implying a runoff election was necessary.<sup>3</sup> In the meantime, the government raided opposition headquarters and a suspicious recount took place in some constituencies.<sup>4</sup> Later in May, the runoff was officially set for three months after the first round. The opposition alleged the late date was illegal and that the government would use the intervening time to continue terrorizing MDC supporters with violence and threats. Indeed, the level of aggression escalated and on the last Sunday before the election, Tsvangirai withdrew on the grounds of violence against his supporters.<sup>5</sup> Still, Mugabe ran unchallenged in the second round. According to the press, voters were *rounded up* to the polls, and the outcome was a 85.5 percent victory in favor of Mugabe, with turnout figures standing above those observed in the first round. In a July editorial, the New York Times reported that “the brutality with which Robert Mugabe stole Zimbabwe’s election last month embarrassed even his usual friends, allies and enablers.”<sup>6</sup>

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<sup>2</sup>Sapa-AP, March 18, 2008, “Opposition demand electronic voters’ roll.”

<sup>3</sup>The New York Times, May 3, 2008, “Zimbabwe Calls for Runoff, but Opposition Challenges Vote Count.”

<sup>4</sup>The New York Times, April 26, 2008, “Zimbabwe Rounds Up Opposition Members and Election Monitors.” According to AFP (April 22, 2008), a member of the Southern African Development Community who observed the recount stated that “of particular concern was the evidence of ballot-box tampering that I witnessed personally, which points to a concerted effort to rig the election results in order to bring about a [President Robert] Mugabe ‘victory’.”

<sup>5</sup>The New York Times, June 23, 2008, “Mugabe Rival Quits Zimbabwe Runoff, Citing Attacks.”

<sup>6</sup>The New York Times, June 27, 2008, “A Grim Image of Politics in Zimbabwe Emerges.” Previous academic studies (Kriger, 2005; Laakso, 2002; Makumbe, 2002; Sachikonye, 2002) described similar incidents in previous elections in Zimbabwe, including: manipulation of



The 2009 presidential election in Zimbabwe serves as an example of how elections take place under competitive authoritarian regimes. In such systems, opposition parties sometimes challenge unfavorable election results, and organize demonstrations against the outcome, demanding further democratic liberalization (Beaulieu, 2008). Even though opposition parties are generally portrayed as benign actors who challenge official results based on legitimate claims (as in the Zimbabwe example), it is important to consider alternative scenarios where neither the incumbent nor the opposition exhibit positive orientations toward the democratic principles, and where as a result “protest can also come from opposition political parties, who need not be true democrats” (Beaulieu, 2008). In this paper I determine the optimal strategies of the different players considering alternative scenarios—in particular, scenarios where the incumbent faces a democratic opposition, and scenarios where the incumbent faces an authoritarian opposition. Moreover, I consider a scenario that can accommodate a situation where even though the opposition is firmly attached to democratic principles, uncertainty about the true electoral outcome and the extent of fraud may lead the opposition to challenge fair official results.

In this context, when should we expect the opposition to mount a serious challenge against the regime? Perceptions of electoral fraud can help overcome the collective action problem usually associated with participation in social movements. According to Tarrow (1994, p. 18) collective action is facilitated when the opening of political opportunities “lower[s] the

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election law and timing; use of violence, torture, imprisonment and intimidation against opposition supporters; impunity for those perpetrating the attacks; vote buying with cash or promises of land; approval of legislation to repress the opposition by proscribing the organization of rallies; monopoly of the electronic media and use of public resources during the campaign; purposefully damaging the reputation of the judiciary and forced retirement of judges; and damage and occupation of the properties of opposition supporters in rural areas—perpetrated by army-sponsored *war veterans* and even the police. Laakso (2002) writes that during occupations, “invaders terrorized, beat, raped, intimidated and killed alleged supporters of the MDC.” Also, during the voting period Makumbe (2002) mentions the use of ballot box stuffing and police force to drive away citizens waiting in line to cast their ballots in some urban constituencies; and that the government urged poll workers to process votes slowly, leading to 11-12 hour waits in some urban polling places.

costs of collective action, reveal[s] potential allies and show[s] where elites and authorities are vulnerable". When voters share their perceptions of electoral fraud, allegations of electoral malfeasance represent a political opportunity that can be used by the opposition to mobilize voters against the regime. Javeline (2003, p. 109) argues that "specific attributions of blame lower organization and opportunity costs [by allowing] individuals to focus and therefore limit the scope of their proposed collective action." If individuals agree on who to blame for the manipulation of the election outcome, then this may work as a trigger for protests against the regime. Similarly, Tucker (2007, p. 541) claims that the occurrence of major electoral fraud "provides an obvious focal point for action." The more people participate in protests, the smaller the probability an individual is personally attacked, so the costs associated with participation decrease. Further, the greater the likelihood of a successful protest, the larger the benefits associated with the challenge, because a victory entails overturning the election outcome. Therefore, the likelihood of a successful protest against the results is likely to be larger after the occurrence of blatant electoral fraud.<sup>7</sup>

Fear plays a key role in these elections. When the potential cost of post electoral violence is as large as in the Zimbabwe case, where opposition supporters risk losing their property or lives, then a voter's primary objective can shift from affecting the election outcome and expressing support for her favorite candidate, to preventing post-electoral violence. Further, while in normal conditions they would pay attention to the country's most urgent issues,

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<sup>7</sup>Tucker illustrates his argument using the Colored Revolutions in Serbia (Bulldozer Revolution, 2000), Georgia (Rose Revolution, 2003), Ukraine (Orange Revolution, 2004) and Kyrgyzstan (Tulip Revolution, 2005) as examples. He argues that "all four colored revolutions featured instances of (...) major electoral fraud" (Tucker, 2007, p. 537), and in all cases electoral fraud triggered mass protests which sooner or later ended up in the president's resignation, or the judiciary overturning the results. According to Lohmann (1994), when an initial signal reveals some weakness of the regime, subsequent demonstrations can trigger an information cascade where more information about the true nature of the regime is revealed. Thus, even though electoral fraud by itself may not be enough to bring about a downfall of the regime, demonstrations can be used to expose other government weaknesses. This may lead to further changes in the political opportunity structure and an expansion of collective action that may finally force the incumbent to recognize defeat.

fear of post electoral violence may lead voters to disregard issues and just focus on their immediate safety. In this paper, I investigate the role played by fear of post-electoral violence on voter behavior, under different opposition *types*. In particular, I consider three opposition types. First, one that is *non-strategic*, in the sense that it challenges unfavorable election results with some exogenous probability. Two special cases of the latter type are an *acquiescent* opposition, which accepts any election outcome, and an *opportunistic* opposition, which challenges any unfavorable election outcome. Second, I consider a *strategic and perfectly informed* opposition that challenges unfavorable election results with some non-zero probability. Two special cases of this type are a *democratic* opposition, which may only win a contest of the result when the incumbent committed outcome-altering electoral fraud, and an *authoritarian* opposition, which is as likely to mount a successful challenge of the official election outcome when the incumbent won fairly, as when it won by committing outcome-altering fraud. Lastly, I consider a *strategic but imperfectly informed* opposition that is uncertain about the true election outcome, as well as about the occurrence of fraud.

Magaloni (2006, p. 77) argues that—in the context of a strategic situation similar to the one analyzed in this paper—voters who sincerely prefer the opposition might vote for the autocratic incumbent ‘strategically’, out of fear of post-electoral violence in the event the opposition wins the election. I find that this reaction is reasonable within Magaloni’s setting where post-electoral conflicts are the result of legitimate challenges by the opposition of unfair election outcomes. In the model considered in this paper, however, either the incumbent or the opposition might decide to act against democratic precepts; the former may commit electoral fraud, and the latter may decide to challenge even fair election outcomes, respectively. In this context, strategic support for the incumbent directed at preventing post-electoral violence is sometimes reasonable under a democratic opposition, but is not always reasonable under an acquiescent or anti-system opposition. Further, even under a democratic opposition, uncertainty about the occurrence of electoral fraud may result in a challenge of fair outcomes, thus reducing voters’ expected utility associated with strategically

voting for the incumbent in order to prevent a post-electoral conflict, since a fair victory by the incumbent need not prevent an opposition challenge of the official election results, nor the ensuing post-electoral violence.

The following are the main results of the paper: when the opposition is strategic, it contests unfavorable official outcomes whenever the cost of the challenge is small relative to the probability it wins the contest, adjusted for the gains from holding office. Additionally, when it is strategic but uncertain about the true election outcome, it updates beliefs based on the costs of post electoral violence and the costs of committing fraud, and acts accordingly. Regarding the incumbent, the likelihood of fraud increases with the probability of winning a challenge of the results, as well as in the spoils from holding office, but decreases with the probability that the opposition contests the official election outcome. Finally, regarding voter behavior, there are situations where opposition supporters might prefer to vote strategically—to prevent post-electoral violence—and other situations where incumbent supporters are the ones who might want to desert the preferred alternative.

The rest of the paper is structured as follows. In the next two sections, I study voter choice between an autocratic incumbent and a unified opposition, the incumbent's decision regarding whether to commit electoral fraud or not, and the opposition's decision regarding whether to challenge the official election result or not, under different opposition types; non-strategic, strategic and perfectly informed, and strategic but imperfectly informed. Subsequently, I explain how changes in the structure of the game might lead to situations where the incumbent faces incentives to commit fraud even after receiving a majority of the vote. After that, I briefly describe three real world examples where observed outcomes are consistent with some of the conclusions of game-theoretic analysis. I conclude by explaining how the different sections of the paper fit together to provide a comprehensive and simple theory of how voter behavior, electoral fraud, and post-electoral conflict take place under autocratic competition.

## 2 The Basic Model

The sequential structure of the game is similar to that discussed in Magaloni (2006, p. 77). First, voters decide whether to support the incumbent or vote for a *unified* opposition. Then, after observing the true election outcome, the incumbent decides whether to commit electoral fraud or report the true result. In those cases where a majority of voters supported the opposition candidate, the incumbent may commit *outcome-altering fraud*; and in those cases where a majority of voters supported the incumbent, the incumbent may still commit *superfluous fraud* in order to inflate its vote share. Lastly, after observing the official election results, the opposition may accept or challenge the official election result. The extensive form of the game is shown in Figure 1. In the analysis of the different cases, I modify the representation to improve the exposition, but the sequence of decisions remains the same.

The game has eight possible outcomes, all depicted in Figure 1. When a majority of voters support the incumbent and the latter commits superfluous fraud, the opposition can either accept the tainted result (Outcome A: *Superfluous Fraud, Unchallenged*), or challenge it (Outcome B: *Superfluous Fraud, Challenged*). Then, when a majority of voters support the incumbent and there is no electoral fraud, the opposition can either accept the fair official result (Outcome C: *Fair Incumbent Victory, Unchallenged*), or challenge it (Outcome D: *Fair Incumbent Victory, Challenged*). When, instead, a majority of voters support the opposition but the incumbent commits outcome-altering fraud, the opposition can again either accept the fraudulent result (Outcome E: *Outcome-Altering Fraud, Unchallenged*), or challenge it (Outcome F: *Outcome-Altering Fraud, Challenged*). Lastly, when a majority of voters support the opposition and the incumbent does not commit electoral fraud, the opposition always accepts the fair official result (Outcome G: *Fair Opposition Victory, Unchallenged*).

In those cases in which the opposition decides to challenge the election outcome, the probability of an opposition victory ( $\beta$ ) depends on the latter's ability to overcome collective action problems and successfully organize mass protests against the official result. Empirical evidence suggests that successful collective action is more likely after the occurrence of

*blatant* electoral fraud, since widespread fraud serves as a “focal point for action.” Thus, I assume that the probability of an opposition victory when a majority of voters supported the incumbent (denoted  $\underline{\beta}$ ), is not greater than the probability of an opposition victory when a majority of voters supported the opposition and the incumbent committed outcome-altering fraud (denoted  $\bar{\beta}$ )—that is, it is assumed that  $\bar{\beta} \geq \underline{\beta}$ .

## 2.1 Utilities

Voters’ policy benefits depend on which candidate wins the election. If the opposition does not challenge the official election result and the incumbent remains in government, a typical voter  $i$  obtains benefit  $u_{iI}$ , which depends on the average issue distance between the voter and the incumbent along the policy space. If instead the opposition is officially declared the winner, and there is government turnover, a typical voter  $i$  obtains benefit  $u_{iO}$ , which depends on the average issue distance between the voter and the opposition along the policy space. So far, I have described voter benefits associated with unchallenged election outcomes. In those cases where the incumbent is officially declared the winner but the opposition challenges the election outcome, the utility perceived by voters will additionally depend on the likelihood the opposition wins the contest ( $\beta$ ) and the cost to voters of the post-electoral conflict ( $c_{vi}$ ). Specifically, if the opposition challenges the official election outcome, voters’ expected utility equals:  $(1 - \beta) \cdot u_{iI} + \beta \cdot u_{iO} - c_{vi}$ . The term  $c_{vi}$  includes the psychological and economic costs of exposure to violence, a deteriorating economic environment, and increased government encroachment on civil liberties and freedoms. I assume that  $c_{vi}$  follows a uniform distribution in the interval  $(0, \bar{c}_v)$  and search for cutoff strategies of the form: *vote for candidate  $j$  if  $c_{vi} < K \cdot u_i$* , where  $K$  is a constant and  $u_i$  is defined as the *excess preference for the incumbent*—computed as  $u_i = u_{iI} - u_{iO}$ . Thus, voter choice depends on the excess preference for the incumbent, as well as on the degree of fear of post-electoral violence.

The payoff perceived by the incumbent, in turn, depends on whether it is able to remain in government. If the incumbent wins the election without committing electoral fraud, and

the opposition does not challenge the official result, then the incumbent perceives  $g$ —where  $g$  represents the spoils from holding office. If the incumbent commits either superfluous or outcome-altering electoral fraud, doing so costs him an amount  $c_f$  that is subtracted from the benefits from eventually holding office. Thus, if the incumbent commits fraud and the opposition challenges the results, the incumbent only perceives  $g$  with probability  $(1 - \beta)$ , minus the cost of committing fraud ( $c_f$ ), so its expected utility from holding office equals:  $(1 - \beta) \cdot g - c_f$ . Finally, if the opposition wins and the incumbent does not commit electoral fraud, and there is no challenge of the results, then the incumbent obtains zero benefits. The cost of committing fraud faced by the incumbent ( $c_f$ ) is revealed just before the incumbent makes the decision of whether to commit fraud or not, so it is not observed by voters on the day of the election. However, it is assumed that voters share the belief that the cost of committing fraud is uniformly distributed between zero and  $\bar{c}_f$ . In order to guarantee that beliefs about the likelihood of fraud are well-defined, I assume that  $\bar{c}_f > g$ , meaning that the maximum possible cost of manipulating the election results—say, if a civil war ensued—is larger than the spoils from office.

Conversely, the payoff perceived by the opposition, depends on whether it is able to win the election through regular electoral means or by challenging the official election result. If the opposition wins the election without the need to challenge the results, it obtains a payoff  $g$  corresponding to the spoils from holding office. In contrast, if the incumbent is officially declared the winner and the opposition challenges the election result, it faces a cost  $c_p$  regardless of the outcome of the post-electoral contest. Thus, if the opposition challenges the official election results, it only perceives  $g$  with probability  $\beta$ , minus the cost of the challenge ( $c_p$ ), so its expected utility from holding office when challenging the results equals:  $\beta \cdot g - c_p$ . Lastly, if the incumbent is officially declared the winner and the opposition does not challenge the results, then the opposition obtains zero benefits. The cost of the post-electoral conflict faced by the opposition ( $c_p$ ), is revealed just before the opposition makes the decision of whether to challenge the official election result. Still, voters and the incumbent

share the belief that  $c_p$  is uniformly distributed between zero and  $\bar{c}_p$ . In order to guarantee that beliefs about the likelihood of a post-electoral contest are well-defined, I assume that  $\bar{c}_p > \beta \cdot g$ , meaning that the maximum possible cost of successfully challenging the results is larger than the expected benefit associated with challenging the official election results.

## 2.2 Opposition Types

I compute the equilibrium results for the following scenarios:

- *Non-strategic opposition*: One that challenges the results with some exogenous probability  $\delta$ .
- *Strategic and perfectly informed opposition*: One that determines whether it is optimal to challenge or accept the results, based on information which includes the true election outcome and observations about whether the incumbent committed fraud or not.
- *Strategic and imperfectly informed opposition*: One that behaves strategically but does not observe the true election outcome, or whether the incumbent committed fraud or not.

## 3 Analysis

Under the first two opposition types (non-strategic, and strategic and perfectly informed), the game is one of incomplete but perfect information; actors know the previous actions of other players, but there is uncertainty about the final payoff. In these cases, I use backward induction to find the subgame perfect equilibria (SPE) of the different games. This solution concept requires that actors best respond to other players' actions within each subgame. Under the third opposition type (strategic and imperfectly informed), the game has both incomplete and imperfect information; some actors do not know the previous actions of other players, and there is uncertainty about the final payoffs. In this case, I search for the perfect



Bayesian equilibria of the game (PBE). Under a PBE actors have beliefs about the actions of other players, and equilibrium behavior is be consistent with beliefs. Next, I do a verbal discussion of the results of the game-theoretic analysis. For a detailed formal derivation of the results, see the appendix.

### 3.1 Non-Strategic-Opposition

I first consider a scenario where the opposition does not behave strategically; that is, where the opposition's decision about whether to challenge the election outcome or not, does not depend on whether the incumbent committed electoral fraud, but on an exogenous probability  $\delta$ . The parameter  $\delta$  determines the opposition non-strategic *sub-type*, with the extreme cases being:

- *Acquiescent opposition* ( $\delta = 0$ ): One that never challenges an incumbent victory; not even following blatant outcome-altering fraud.
- *Opportunistic opposition* ( $\delta = 1$ ): One that always challenges an incumbent victory; even following a clearly free and fair election.

In the generic case in which a non-strategic opposition challenges the election outcome with some exogenous probability  $\delta$ , I find the following:

First, since the incumbent only cares about winning a majority of the vote, it will never commit superfluous fraud following a favorable election outcome, where by *favorable* I mean that most voters supported the incumbent. However, in the case of an unfavorable outcome, the incumbent will commit outcome-altering fraud whenever the cost of manipulating the election result is lower than the expected benefit of winning the election. Holding the cost of fraud constant, the likelihood this condition is satisfied increases with the spoils from office, and decreases with the likelihood of a post-electoral contest of the official election result, as well as with the likelihood of regime transition following a post-electoral contest. This implies that, everything else constant, the likelihood of fraud is greater when the incumbent

faces an acquiescent opposition (in which case there is zero chance of a post-electoral fraud and regime transition following the occurrence of fraud) than when it faces an opportunistic opposition (in which case the occurrence of outcome-altering fraud always leads to a post-electoral conflict).

Even within this very simple framework, it is possible to begin to evaluate under which conditions voters might have an incentive to vote strategically for the least-preferred candidate, instead of sincerely, in order to help prevent the occurrence of a costly post-electoral conflict. As explained in the previous section, it is assumed that voters' utilities are a function of expected policy benefits and the cost of a potential challenge to the election outcome. Thus, in the context of a non-strategic opposition that challenges *any* incumbent victory with a certain probability, voters face no incentive to vote strategically for the incumbent in order to allow it to win legitimately and prevent a post-electoral of a fraudulent outcome, the reason being that the opposition is as likely to challenge a fair incumbent victory as a fraudulent one. Paradoxically, exactly the opposite might take place: if the cost to voters of a post-electoral conflict is sufficiently high, voters who prefer the incumbent might face incentives to vote strategically for the opposition in order to prevent the occurrence of a post-electoral contest, specially so the smaller the likelihood the incumbent wins the contest. Voters who prefer the opposition, however, always behave sincerely; they have nothing to gain by voting strategically for the incumbent.

### **3.2 Strategic Opposition (Perfectly Informed)**

A strategic and perfectly informed opposition is one that first observes the true election outcome, then observes whether the incumbent committed fraud or not, and lastly decides whether to challenge the official election results or not, based on which action provides the greatest expected utility. I find that the likelihood the opposition decides to challenge the official election result decreases with the cost of a post-electoral conflict, and increases with the spoils from office, as well as with the chance that it wins a post-electoral contest

against the incumbent. Since the likelihood that the opposition wins a contest against the incumbent is greater following the occurrence of outcome-altering fraud than when a majority of voters actually supported the incumbent, post-electoral conflicts are more likely to take place following the occurrence of outcome-altering fraud.

Within this modified framework, it is again possible to consider different opposition sub-types. In particular, I consider different scenarios depending on the probability  $\underline{\beta}$  that the opposition mounts a successful challenge of a fair election outcome. Thus, the parameter  $\underline{\beta}$  determines the opposition strategic *sub-type*, with the extreme cases being:

- *Democratic opposition* ( $\underline{\beta} = 0$  and  $\bar{\beta} > 0$ ): One that is not able to successfully mobilize supporters against the official election result, unless the incumbent committed outcome-altering electoral fraud, in which case there is some non-zero probability that the opposition wins the post-electoral conflict.
- *Authoritarian opposition* ( $\underline{\beta} = \bar{\beta}$  and  $\bar{\beta} > 0$ ): One that is as likely to successfully mobilize supporters against the official election result following the occurrence of outcome-altering fraud, as following a situation where most voters actually supported the incumbent. That is, where the chance the opposition wins a post-electoral conflict is independent of the fairness of the official result.

Note that an *authoritarian* opposition is not the same as an *opportunistic* opposition. While opportunism is a characteristic of the leadership in charge of deciding whether or not to challenge the election outcome, authoritarianism is a characteristic of the opposition's base of support within the electorate. While opportunism implies that leaders take advantage of any opportunity that may allow them to take office (regardless of the probabilities of success), authoritarianism implies that the collective efforts of opposition supporters following the outburst of a post-electoral conflict are independent of the occurrence of outcome-altering fraud, as authoritarian opposition supporters feel no attachment to democratic principles (they might fail in their collective efforts, but not due to moral considerations). Still, it

is clear that both opportunistic and authoritarian opposition sub-types are examples of anti-regime oppositions, where at least some actors within the opposition (either leaders or followers) hold no real concern for the integrity of the electoral process and only care about seeing the incumbent removed from office. In those cases in which neither leaders nor followers feel any attachment to democratic principles, the opposition should be characterized as both opportunistic and authoritarian; a non-strategic opposition sub-type, since its behavior does not depend on either the incumbent's or voters' actions.

In the generic case of a strategic opposition, I again find that since the benefits from holding office only depend on the identity of the winning candidate (not on the candidate's or party's vote share), superfluous fraud is fruitless and strictly dominated when a majority of voters voted for the incumbent. However, when a majority of voters vote for the opposition, the incumbent again has incentives to commit outcome-altering electoral fraud. In the latter case, the likelihood of fraud again increases with the spoils from office, and decreases with the cost of fraud, as well as with the likelihood that the opposition wins a post-electoral contest. The latter probability,  $\bar{\beta}$ , affects the likelihood of fraud through two different channels: first, because it helps determine the expected outcome of a potential post-electoral contest, and second, because it affects the likelihood the opposition chooses to challenge an unfair election outcome, the greater this probability, the greater the threat posed by a potential challenge of the official election result by the opposition, and the lower the likelihood of fraud.

Specifically, given the distribution of the cost of committing fraud, while the probability of outcome-altering fraud equals

$$\alpha_1 = (1 - \bar{\beta} \cdot \delta) \cdot \frac{g}{\bar{c}_f}$$

under a non-strategic opposition with exogenous probability  $\delta$  of challenging the official election results; the probability of outcome-altering fraud equals

$$\alpha_2 = \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$$

under a generic strategic opposition. Thus, the likelihood the incumbent commits outcome-altering fraud is smaller in the latter case whenever

$$\delta < \bar{\beta} \cdot \frac{g}{\bar{c}_p}$$

For a given  $\delta$ , this condition is more likely to be satisfied the larger  $\bar{\beta}$ , the greater the spoils from office  $g$ , and the smaller the maximum cost of the post-electoral conflict  $\bar{c}_p$  faced by the opposition. In other words, the likelihood of fraud is smaller under a strategic opposition when the latter has strong incentives (due to the high expected “profit”) to challenge a fraudulent election outcome.

Voter behavior also differs depending on the opposition type (non-strategic or strategic) and sub-type (democratic or authoritarian). While under a non-strategic opposition a voter preferring the opposition always behaves sincerely, under a strategic opposition those who prefer the opposition might have an incentive to vote strategically for the incumbent to prevent a post-electoral conflict. This might happen when the cost of a post-electoral conflict is high, and when the probability of a post-electoral conflict following a situation where most voters voted for the opposition (increasing in the likelihood of outcome-altering fraud and in likelihood that the opposition challenges a fraudulent incumbent victory) is larger than the probability of a post-electoral conflict following an election where most voters voted for the incumbent (increasing in the likelihood that the opposition challenges a fair incumbent victory).

But not only those voters who prefer the opposition might sometimes face incentives to vote strategically. When the cost of a post-electoral conflict is large and the probability of a post-electoral conflict following an election where most voters voted for the incumbent is larger than the probability of a post-electoral conflict following a situation where most voters

voted for the opposition, then a voter preferring the incumbent might vote strategically for the opposition in order to prevent the occurrence of a costly post-electoral conflict.

Note that while the first “strategic voting” condition (the one that predicts strategic desertion by opposition supporters in favor of the incumbent) is more likely to be satisfied under a democratic opposition than under an authoritarian opposition; the second strategic voting condition (the one that predicts strategic desertion by incumbent supporters in favor of the opposition) is more likely to be satisfied under an authoritarian opposition than under a democratic opposition. Thus, manifest opposition willingness to challenge even fair outcomes might contribute to deterring strategic electoral desertion by opposition supporters (since under such circumstances, a “fair” incumbent victory would not prevent the occurrence of a costly post-electoral conflict), and to promoting strategic electoral desertion by incumbent supporters. These results suggests that, under certain circumstances, a democratic opposition might face incentives to pose as an authoritarian opposition, since doing so may yield electoral benefits.

### **3.3 Strategic Opposition (Imperfectly Informed)**

I now consider a situation where the opposition is uncertain about the occurrence of fraud—specifically, it does not observe the previously choices made by voters and the incumbent, so it does not know the state of the world (i.e., whether outcome-altering fraud took place or not) at the moment of making its own decision. However, the opposition is able to construct beliefs about the state of the world based on information about voter preferences, the cost faced by voters in the event of a post-electoral conflict, the cost of fraud faced by the incumbent, and the incumbent’s expected utility from remaining in office. This situation is interesting because it creates a dilemma for a strategic opposition: even though it might prefer not to challenge a fair incumbent victory (because of its attachment to democratic values, or because of the low chance of winning a challenge of fair election results), the absence of precise information about the true election outcome may lead it to challenge a

fair outcome even when it would strongly prefer not to do so were it perfectly informed about the state of the world.

In order to study this imperfect information situation, I assume that the opposition updates its beliefs about the behavior of voters and incumbent based on information about the observed costs of a post-electoral conflict faced by voters and of committing fraud faced by the incumbent. I find two pure strategy equilibria (where players make deterministic decisions) and one mixed strategy equilibria (where players make probabilistic decisions) of this game; where by equilibrium I refer to sets of decisions made by the different players (voters, the incumbent, and the opposition), where none of them has an incentive to deviate from the equilibrium strategy, and where the behavior of voters and the incumbent is consistent with the opposition's beliefs.

One equilibrium situation takes place when voters vote for the incumbent either sincerely or strategically if

$$c_v < K_1 (\underline{\beta}, \bar{\beta}, g, \bar{c}_p, \bar{c}_f) \cdot (u_I - u_O)$$

where  $K_1$  is a constant, whose value depends on the likelihood that the opposition wins either a fair or an unfair challenge, the spoils from office enjoyed by the winning party, and on the maximum costs of committing fraud faced by the incumbent and of challenging the official result faced by the opposition (the exact mathematical expression is derived in appendix C.1). In those cases in which voters sincerely prefer the incumbent (that is, when  $u_I > u_O$ ), the above condition implies that voters behave sincerely whenever the cost of a post-electoral conflict that they face is sufficiently low. When this condition is satisfied, the opposition believes that most voters voted for the incumbent, and will only challenge the election outcome if the cost it faces in the event of a post-electoral conflict is lower than the expected benefits of the challenging a fair outcome ( $\underline{\beta} \cdot g$ ). The latter condition would, of course, never be satisfied in the case of a democratic opposition, since then the opposition would never be able to successfully organize collective action against the fair official result.

In this situation, the incumbent will never commit fraud in the event of a fair victory, but will commit outcome-altering fraud to prevent an opposition victory whenever the cost of omitting fraud is lower than the expected benefit of doing so. Since voters' optimal strategy is to support the incumbent, the incumbent decision regarding whether to commit outcome-altering fraud only takes place off the equilibrium path. Given the distribution of  $c_f$ , the probability of outcome-altering fraud off the equilibrium path ( $\alpha_3$ ) equals

$$\alpha_3 = \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$$

The latter probability is larger under a democratic opposition, in which case:  $\alpha_3 = \frac{g}{\bar{c}_f}$ , than under an authoritarian opposition, in which case:  $\alpha_3 = \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$ . Also, note that the probability of outcome-altering fraud off the equilibrium path is larger under a generic imperfectly informed opposition than under a generic perfectly informed opposition. The latter result follows intuitively, since off the equilibrium path the opposition is under the erroneous belief that most voters supported the incumbent, so it challenges the fraudulent result less frequently, thus creating incentives for the incumbent to commit fraud more frequently off the equilibrium path.

Another equilibrium situation takes place when voters vote for the opposition either strategically or sincerely if

$$c_v > K_2 (\underline{\beta}, \bar{\beta}, g, \bar{c}_p, \bar{c}_f) \cdot (u_I - u_O)$$

where  $K_2$  is a constant, whose value depends on the likelihood that the opposition wins either a fair or an unfair challenge, the spoils from office enjoyed by the winning party, and on the maximum costs of committing fraud faced by the incumbent and of challenging the official result faced by the opposition (the exact mathematical expression is derived in appendix C.1). In those cases in which voters sincerely prefer the opposition (that is, when  $u_I > u_O$ ), the above condition implies that voters behave strategically whenever the cost of a post-electoral



conflict they might face if the incumbent is declared the winner is sufficiently high. When this condition is satisfied, the opposition believes it should be declared the election winner, and will challenge the election outcome if the cost it faces in the event of a post-electoral conflict is lower than the expected benefits of challenging an unfair outcome ( $\bar{\beta} \cdot g$ ). The latter condition is as likely to be satisfied in the case of a democratic opposition as in the case of an authoritarian opposition. In this situation, the incumbent will never commit superfluous fraud in the event of a fair victory (something that would only happen off the equilibrium path), but will commit outcome-altering fraud to prevent an opposition whenever the cost of committing fraud is lower than the expected benefit of doing so. Since voters' optimal strategy is to support the opposition, the incumbent decision regarding whether to commit outcome-altering fraud now takes place along the equilibrium path. Given the distribution of  $c_f$ , the probability of outcome-altering fraud along the equilibrium path ( $\alpha_4$ ) equals

$$\alpha_4 = \left( 1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p} \right) \cdot \frac{g}{\bar{c}_f}$$

The latter probability does not depend on the opposition sub-type (democratic or authoritarian), and is similar to the probability of outcome-altering fraud in the case of a generic perfectly-informed opposition.

Lastly, there is also a mixed strategy equilibrium where all players (the representative voter, the incumbent, and the opposition) behave probabilistically by mixing over possible actions. In order to solve the problem, I search for sets of probabilities (of voting for the incumbent, committing fraud, and challenging the official election result, respectively), such that all players feel indifferent toward the available actions, given others' mixing probabilities (and therefore, since they feel indifferent, do not have any incentive to deviate from a strategy that prescribes choosing each action with a given probability).

A mixed strategy equilibrium exists when:

- Voters vote for the incumbent with probability  $p$ , where

$$p = \frac{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p)}{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p) - (\underline{\beta} \cdot g - \tilde{c}_p)}$$

where  $\tilde{c}_p = \frac{\bar{c}_p}{2}$  is the expected value of  $c_p$  that determines voters' and incumbent's beliefs about the opposition's behavior, since they make their decisions before the cost of the post-electoral conflict faced by the opposition is revealed.

- The incumbent never commits superfluous fraud ( $\alpha_I = 0$ ), but commits outcome-altering fraud with probability  $\alpha_O$ , where

$$\alpha_0 = \frac{\left(1 - \frac{\beta}{\bar{\beta}} \cdot \frac{g - \tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}{\left(1 + \frac{g - \tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}$$

- Voters and the incumbent believe the opposition challenges the election outcome with probability  $\eta$ , where

$$\eta = \frac{g - c_f}{\bar{\beta} \cdot g}$$

Note that the opposition's indifference between accepting and challenging the outcome given  $p$  and  $\alpha_O$  holds as long as the realized cost of the post-electoral conflict ( $c_p$ ) equals its expected value  $\tilde{c}_p$ . After observing the official election result and the realized value of  $c_p$ —which might be lower or larger than its expected value  $\tilde{c}_p$ —the opposition will challenge the official election result if

$$c_p < \frac{p \cdot \underline{\beta} \cdot g + (1 - p) \cdot \alpha_O \cdot \bar{\beta} \cdot g}{p + (1 - p) \cdot \alpha_O}$$

Note that after observing  $c_p$  the opposition will not feel indifferent between accepting and challenging the official election result, and will thus behave deterministically most of the time. Still, the fact that the opposition is unlikely to mix over actions with probabilities  $\eta$  and  $(1 - \eta)$  does not affect the equilibrium beliefs or behaviors of voters and the incumbent,

since they do not observe  $c_p$  but act based on the expected value of this cost ( $\tilde{c}_p$ ); thus, even if eventually it turns out that  $c_p$  is different than  $\tilde{c}_p$ , they have no incentives to alter their belief about  $\eta$ , nor to deviate from the equilibrium values of  $p$  and  $\alpha_O$ .

### 3.4 The Logic of Superfluous Fraud

In previous sections I found that whenever the incumbent receives a majority of the vote, it faces no incentives to commit superfluous fraud. However, it is important to note that at least three modifications of the game-theoretic setting might lead to situations where the incumbent might find it profitable to artificially inflate its vote share even after receiving a majority of the vote. First, in legislative elections held under proportional representation, the share of the spoils from office perceived by the incumbent government might depend on its vote share. In that case, the incumbent might be willing to fraudulently inflate its vote share in order to capture a larger portion of the spoils from office (see Magaloni 2010). Second, if the authoritarian incumbent runs elections only to “legitimize the regime and its policies” (Craig and Cornelius, 1995, p. 257) and opposition parties are only allowed to exist in order to “[help legitimize] the regime and contain conflict within the national political elite” (Craig and Cornelius, 1995, p. 266), as in the case of Mexico during the period of PRI hegemony, then the incumbent might resort to superfluous fraud in order to signal an appearance of strength; this may be done in order to deter members of an acquiescent opposition from turning into real competitors.

The incumbent might also face incentives to commit superfluous fraud when electoral manipulation takes place in a decentralized manner *during* the electoral process instead of after the incumbent learns the true election result. In particular, superfluous fraud is more likely to take place when agents of the incumbent government are in charge of coercing voters and manipulating votes and election returns in scattered locations and at different stages of the electoral process; while the voting is taking place and during the vote count, implying that the incumbent does not yet have exact information about the true election outcome,

and that it might be difficult to coordinate the “manipulation effort” as to achieve fraud of a particular magnitude. In those cases, the incumbent might estimate the level of fraud necessary to ensure a certain victory; the greater the incumbent’s uncertainty about the true election outcome, the greater the magnitude of superfluous fraud. Thus, the logistics of the different types of voter fraud, as well as the uncertainty about the true election outcome, might lead to some degree of superfluous fraud on many occasions, specially when the cost of superfluous fraud is low and when the opposition is likely to tolerate voter fraud up to a certain extent.

## 4 Real World Examples

The results of the game-theoretic analysis done in previous sections can be used to study and interpret the outcomes of real-world elections held in the context of autocratic competition.

The findings corresponding to an acquiescent opposition are consistent with the situation observed in Mexico before the split off of the hegemonic Institutional Revolutionary Party (PRI) in the late eighties. Before that time, the PRI periodically ran safely in national elections, and the main opposition parties did not pose a serious challenge to the party’s hegemony. According to Craig and Cornelius (1995, p. 249) “occasional eruptions of elite or mass-dissent were dissipated by co-opting the dissident’s leaders into the state-sanctioned parties or interest organizations, or they were repressed.” Moreover, according to the authors, “the weakness of opposition parties made it possible for the PRI-government apparatus to control election outcomes without blatant rigging” (Craig and Cornelius, 1995, p. 257). This is consistent with the finding that, under an acquiescent opposition the incumbent party will win the election without the need of resorting to electoral fraud.

The findings corresponding to an anti-regime opposition, in turn, can contribute to understanding the case of the 1994 election in Lesotho. In May 1998 Lesotho’s ruling party “Lesotho Congress of Democrats” (LCD) overwhelmingly won the national elections obtain-

ing 79 out of 80 legislative seats. The process was monitored by multiple international observers including the European Union and the United Nations Development Programme, who reported that the election had been conducted according to international standards. Still, opposition parties contested the results in the courts and in the streets, and requested the intervention of the South African Development Community (SDAC). According to Southall (1999, p. 684), “the case that the election was rigged is largely without substance” and the crisis was caused by the nature of results produced by the first-past-the-post electoral system. This case is interesting because the opposition was able to win the challenge in spite of the questionable fairness of the fraud allegations. One possible reason why opposition parties were able to mobilize successfully against the incumbent is because the first-past-the-post electoral system was perceived to be bringing about unfair outcomes, and this caused part of the population to exhibit ‘anti-system’ attitudes.

Lastly, the results corresponding to a democratic opposition are consistent with the events leading to the fall of Fujimori after the 2000 Peruvian presidential election. In the latter case, serious allegations of electoral fraud were made during the first round of voting. Opposition candidate Alejandro Toledo was able to convince voters of the need to boycott the presidential runoff (Carter Center, 2000). This resulted in a large increase in invalid ballots cast as a sign of protest, reaching close to 30% of the total vote. According to Tanaka (2000), Fujimori’s unfair victory derived in the “opening of three battle fronts: one international, one at the Congress, and one of street mobilization” (translated from Tanaka 2000, p. 12) used by the opposition to challenge the fairness of the election result. Finally, Fujimori called for new elections and fled the country.<sup>8</sup> In earlier sections I found that when there is agreement about the occurrence of electoral fraud, a democratic opposition is likely to challenge the official election result, and the probability that this happens increases with the

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<sup>8</sup>The New York Times, “Peru’s President Calls an Election and Will Not Run” (September 17, 2000) and “Fujimori Lingers in Japan, Fueling the Confusion Back in Peru” (November 19, 2000).

chance that the opposition wins the post-electoral contest. As argued in the introduction and further illustrated by the *Colored Revolutions* (Tucker, 2007), the more blatant the fraud, the higher the probability the opposition is able to organize successful collective action against the regime.

## 5 Discussion

It has been argued that when the opposition is willing to challenge election outcomes “the real risks emerge when the ruling party loses: will it accept defeat and yield power peacefully, or will it choose to steal the election from the opposition, even if this entails serious post-electoral conflict?” (Magaloni, 2006, pp. 77-78). According to this argument, a serious post-electoral conflict may take place when the incumbent won the election by resorting to electoral fraud. In that case, fears of post-electoral conflict may benefit the regime because they motivate citizens to vote for the incumbent to prevent a post-electoral conflict, and it enables the incumbent to win the election legitimately without incurring the costs of committing fraud. But does this result hold when the opposition is not democratic—one that is opportunistic and challenges any election outcome, regardless of whether there was fraud or not—or if it is democratic but imperfectly informed, that it does not know whether the incumbent won fairly or through manipulation of election returns?

I find that the only case where opposition supporters might vote strategically for the incumbent to prevent violence, is in the case of a perfectly informed strategic opposition. When the challenger is non-strategic—ranging from acquiescent to opportunistic—or when it is strategic but lacks information about the election outcome, then fears of post-electoral violence need not benefit the incumbent at the expense of the opposition. Moreover, under multiple circumstances, if the likelihood of fraud is small—for instance, when the cost of committing fraud is large—then opposition supporters have no incentives to desert their preferred candidate. Moreover, when the opposition challenges any unfavorable result, voters

preferring the incumbent are the ones who may have incentives to vote strategically and desert their favorite candidate, not opposition supporters.

In addition to results concerning voter behavior, I found that the likelihood the incumbent behaves dishonestly decreases with the cost of committing electoral fraud, as well as with the probability the opposition successfully challenges the results. This implies that if there is optimism about the success of a challenge, then the incumbent has incentives to behave honestly. Also, the likelihood of fraud increases with the spoils from office. Thus, the more the incumbent can use its tenure for personal gain, the more likely it will try to manipulate unfavorable election results. Second, the likelihood a democratic opposition contests the results increases with the probability it wins the challenge, but decreases with the cost of the fight. The implication is that the easier and cheaper it is to mount successful collective action, the more prone the opposition will be to challenge the outcome. Also, similar to the incumbent, the probability the opposition challenges an unfavorable outcome increases with the spoils from office.

In my analysis, I assumed the opposition is *unified*, so the incumbent cannot focus on manipulating the votes cast for one particular opposition party. Weingast (1997) shows that when two social groups share different views regarding the incumbent's respect for citizens' rights, then the latter can use this situation to abuse the right of one group, and still have the other group acquiesce to the abusive behavior. The only way in which an incumbent can be forced into not transgressing the rights of any social group, is if both groups are able to coordinate into not acquiescing to any government abuse. One interesting direction for future research would be to extend the model to a multi-party situation, where the incumbent can choose to steal the votes from one particular party, but count ballots cast in support of the other party.

International observers play no role in my model. Still, Carothers (1997) and Hyde (2008) mention that monitoring by election observers may help promote democratic principles, detect and deter electoral fraud, increase voter confidence in the procedural fairness of the

election, help organize foundational elections, provide technical assistance to local election observers, and disseminate standards of election administration. Paradoxically Beaulieu and Hyde (2009) find evidence that the frequency of pre-election boycotts is larger when international observers are present. This may be explained in part, because incumbents adapt by employing new manipulation strategies that go undetected by election observers (Simpser, 2008). In future research, it would be important to consider a situation where the deployment of election observers is used by incumbents to signal their honest or deceitful intentions.

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# Appendices

## A Non-Strategic Opposition

In this section I use backward induction to find the Subgame Perfect Nash Equilibrium (SPNE) of the game when the opposition is non-strategic and challenges any incumbent victory (fair or unfair) with an exogenous probability  $\delta$  (see Figure 2).

### A.1 Incumbent Behavior

If a majority of voters support the incumbent ( $v = I$ , upper section of the tree), the incumbent's expected utility is given by:

$$u(I|v = I) = \begin{cases} (1 - \delta) \cdot g + \delta \cdot (1 - \underline{\beta}) \cdot g & \text{if } \textit{No Fraud}, \\ (1 - \delta) \cdot (g - c_f) + \delta \cdot [(1 - \underline{\beta}) \cdot g - c_f] & \text{if } \textit{Fraud} \end{cases}$$

Since  $c_f > 0$ , fraud is strictly dominated when a majority of voters voted for the incumbent.

Instead, if a majority of voters voted for the opposition ( $v = O$ , lower section of the tree), the incumbent's expected utility is given by:

$$u(I|v = O) = \begin{cases} 0 & \text{if } \textit{No Fraud}, \\ (1 - \delta) \cdot (g - c_f) + \delta \cdot [(1 - \bar{\beta}) \cdot g - c_f] & \text{if } \textit{Fraud} \end{cases}$$

The incumbent commits fraud if  $c_f < (1 - \bar{\beta} \cdot \delta) \cdot g$ , otherwise it communicates the true election outcome. The larger the right-hand-side of this inequality, the greater the likelihood of fraud. Thus, when  $v = O$  the likelihood of fraud decreases with the probability the opposition wins a contest as well as with the probability the opposition contests the election outcome, and increases with the spoils from holding office.

## A.2 Voter Behavior

The representative voter does not observe  $c_f$ , but knows that  $c_f \sim U(0, \bar{c}_f)$ . Thus, it thinks that the probability of fraud in the lower part of the tree is given by the probability that  $c_f < (1 - \bar{\beta} \cdot \delta) \cdot g$ , which equals  $\alpha = (1 - \bar{\beta} \cdot \delta) \cdot \frac{g}{\bar{c}_f}$ . The voter's expected utility is given by the following expression:

$$u(V) = \begin{cases} (1 - \delta) \cdot u_I + \delta \cdot [(1 - \underline{\beta}) \cdot u_I + \underline{\beta} \cdot u_O - c_v] & \text{if } v = I, \\ (1 - \alpha) \cdot u_O + \alpha \cdot \{(1 - \delta) \cdot u_I + \delta \cdot [(1 - \bar{\beta}) \cdot u_I + \bar{\beta} \cdot u_O - c_v]\} & \text{if } v = O \end{cases}$$

Since  $\bar{\beta} > \underline{\beta}$ , a voter preferring the opposition always votes sincerely.

Also, note that if  $\delta = 0$  as in the case of an *acquiescent opposition*, then a voter preferring the incumbent also votes sincerely.

Next, I consider voter behavior when  $\delta > 0$ . In this case, a voter preferring the incumbent behaves sincerely if:

$$c_v < \frac{[1 - \underline{\beta} \cdot \delta - \alpha \cdot (1 - \bar{\beta} \cdot \delta)] \cdot (u_I - u_O)}{\delta \cdot (1 - \alpha)}$$

Otherwise, the voter votes 'strategically' for the opposition to prevent the occurrence of a post-electoral conflict.

If  $u_I$  and  $\alpha$  are 'large enough'—such that  $u_I - u_O > \delta \cdot c_v$  and  $\alpha > (1 - \bar{\beta}) \cdot \frac{g}{\bar{c}_f} > \frac{\beta}{\bar{\beta}}$ —then sincerity condition always holds. The intuition for this result is the following: when the probability of fraud is large, then there is a large probability that the voter experiences  $c_v$  even if it supports the opposition, so it prefers to vote sincerely for the incumbent.

By substituting  $\alpha = (1 - \bar{\beta} \cdot \delta) \cdot \frac{g}{\bar{c}_f}$  and considering different values of  $\delta$ , it is pos-

sible to obtain voters' and parties' optimal strategies for different opposition types. Let  $\sigma_v(u_I, u_O, c_v)$  indicate the representative voter's strategy for a given level of  $u_I - u_O$  and  $c_v$ , with  $\sigma_v(c_v) \in \{I, O\}$ , where  $I$  indicates voting for the incumbent, and  $O$  indicates voting for the opposition; and let  $\sigma_I(c_f, \sigma_v)$  indicate the incumbent's strategy given  $c_f$  and the choice of the representative voter, with  $\sigma_I(c_f, \sigma_v) \in \{F, \bar{F}\}$ , where  $F$  indicates committing fraud, and  $\bar{F}$  indicates acknowledging the election outcome. Optimal strategies will depend on the opposition's type.

First, I present the results for an *acquiescent opposition*; one that never challenges an unfavorable outcome.

Result 1 [Acquiescent Opposition ( $\delta = 0$ ): If  $\sigma_v = I$ , the incumbent does not commit fraud. However, the incumbent does commit fraud if  $\sigma_v = O$  and  $c_f < g$ . Also, if  $\sigma_v = O$  and  $c_f > g$ , then the incumbent behaves honestly. Regarding voter behavior, it is always optimal for the representative voter to behave sincerely.

Second, I present the results for an *opportunistic opposition*; one that always challenges an unfavorable outcome.

Result 2 [Opportunistic Opposition ( $\delta = 1$ ): If  $\sigma_v = I$ , the incumbent never commits fraud. However, the incumbent does commit fraud if  $\sigma_v = O$  and  $c_f < (1 - \bar{\beta}) \cdot g$ . Last, if  $\sigma_v = O$  and  $c_f > (1 - \bar{\beta}) \cdot g$ , then the incumbent behaves honestly. Regarding voter behavior, if  $u_I - u_O < 0$ , the voter always behaves sincerely. If instead  $u_I - u_O > 0$  and  $c_v < \frac{[1 - \underline{\beta} - (1 - \bar{\beta})^2] \cdot \frac{g}{c_f} \cdot (u_I - u_O)}{1 - (1 - \bar{\beta}) \cdot \frac{g}{c_f}}$ , then the voter supports the incumbent. Otherwise, if  $u_I - u_O > 0$  and  $c_v > \frac{[1 - \underline{\beta} - (1 - \bar{\beta})^2] \cdot \frac{g}{c_f} \cdot (u_I - u_O)}{1 - (1 - \bar{\beta}) \cdot \frac{g}{c_f}}$ , then the voter supports the opposition.

Last, I present the results for a generic non-strategic opposition; one that challenges the results with some positive exogenous probability.

Result 3 [Non-Strategic Opposition ( $0 < \delta < 1$ ): If  $\sigma_v = I$ , the incumbent never commits fraud. However, the incumbent does commit fraud if  $\sigma_v = O$  and  $c_f < (1 - \bar{\beta} \cdot \delta) \cdot g$ , then the incumbent commits fraud. Last, if  $\sigma_v = O$  and  $c_f > (1 - \bar{\beta} \cdot \delta) \cdot g$ , then the incumbent behaves honestly. Regarding voter behavior, if  $u_I - u_O < 0$ , the voter always behaves sincerely. If instead  $u_I - u_O > 0$  and  $c_v < \frac{[1 - \underline{\beta} \cdot \delta - (1 - \bar{\beta} \cdot \delta)^2] \cdot \frac{g}{c_f} \cdot (u_I - u_O)}{\delta \cdot [1 - (1 - \bar{\beta}) \cdot \frac{g}{c_f}]}$ , then the voter supports the incumbent. Otherwise, if  $u_I - u_O > 0$  and  $c_v > \frac{[1 - \underline{\beta} \cdot \delta - (1 - \bar{\beta} \cdot \delta)^2] \cdot \frac{g}{c_f} \cdot (u_I - u_O)}{\delta \cdot [1 - (1 - \bar{\beta}) \cdot \frac{g}{c_f}]}$ , then the voter supports the opposition.

According to these results, when the opposition is non-strategic, a voter preferring the opposition always behaves sincerely, regardless of the probability the opposition challenges the results. Differently, a voter preferring the incumbent always behaves sincerely for an

acquiescent opposition ( $\delta = 0$ ), but may vote ‘strategically’ to reduce the likelihood of a post-electoral conflict when there is a non-zero probability that the opposition challenges the results ( $\delta > 0$ ). The motivation for doing so is that when the incumbent has little incentives to commit fraud, there is a large chance that the opposition is declared the official winner when the latter is supported by the representative voter. Therefore, a voter preferring the incumbent might be able to prevent post-electoral violence by voting for its least preferred alternative.

## B Strategic Opposition (Perfectly Informed)

In this section I compute equilibrium behaviors when the opposition is strategic and decides whether to challenge the results after observing voter and incumbent choices (see Figure 3). Again, I use backward induction to find the Subgame Perfect Nash Equilibrium (SPNE) of the game.

### B.1 Opposition Behavior

In the upper section of the tree, the challenger’s expected utility is:

$$u(O|v = I) = \begin{cases} 0 & \text{if } \textit{Accept}, \\ \underline{\beta} \cdot g - c_p & \text{if } \textit{Challenge} \end{cases}$$

Thus, the opposition challenges the results if  $c_p < \underline{\beta} \cdot g$ .

Then, in the lower section of the tree, the challenger’s expected utility (when the incumbent commits fraud) is:

$$u(O|v = O) = \begin{cases} 0 & \text{if } \textit{Accept}, \\ \overline{\beta} \cdot g - c_p & \text{if } \textit{Challenge} \end{cases}$$

Thus, the opposition challenges the results if  $c_p < \overline{\beta} \cdot g$ —that is, when the cost of a post-electoral conflict ( $c_p$ ) is lower than the expected benefit of challenging the election outcome ( $\overline{\beta} \cdot g$ ).

### B.2 Incumbent Behavior

The incumbent does not observe  $c_p$ , but knows that  $c_p \sim U(0, \bar{c}_p)$ . Let  $\eta_I$  denote the probability that the opposition challenges the official result when the representative voter voted for the incumbent (upper section of the tree), and  $\eta_O$  denote the probability that the opposition challenges the official result when the representative voter voted for the opposition and the incumbent committed outcome-altering electoral fraud (lower section of the tree). Based on knowledge about the distribution of  $c_p$ , the incumbent believes that the probability of challenge in the upper section of the tree equals  $\eta_I = \underline{\beta} \cdot \frac{g}{\bar{c}_p}$ . Similarly, the incumbent thinks the probability of challenge in the lower section of the tree equals  $\eta_O = \overline{\beta} \cdot \frac{g}{\bar{c}_p}$ . Note that  $\eta_O > \eta_I$ , since  $\overline{\beta} > \underline{\beta}$ .

In the upper section of the tree, the incumbent's expected utility is given by:

$$u(I|v = I) = \begin{cases} (1 - \eta_I) \cdot g + \eta_I \cdot (1 - \underline{\beta}) \cdot g & \text{if } \textit{No Fraud}, \\ (1 - \eta_I) \cdot (g - c_f) + \eta_I \cdot [(1 - \underline{\beta}) \cdot g - c_f] & \text{if } \textit{Fraud} \end{cases}$$

Since  $c_f > 0$ , fraud is strictly dominated when  $v = I$ .

In the lower section of the tree, the incumbent's expected utility is given by:

$$u(I|v = O) = \begin{cases} 0 & \text{if } \textit{No Fraud}, \\ (1 - \eta_O) \cdot (g - c_f) + \eta_O \cdot [(1 - \bar{\beta}) \cdot g - c_f] & \text{if } \textit{Fraud} \end{cases}$$

Thus, the incumbent commits fraud if  $c_f < (1 - \eta_O \cdot \bar{\beta}) \cdot \frac{g}{\bar{c}_f}$ . Substituting for  $\eta_O$ , this inequality equals  $c_f < \left(1 - \bar{\beta}^2 \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$ . These results indicate that the probability the incumbent commits fraud increases with  $(1 - \bar{\beta})$ , with  $g$ , as well as with the maximum cost of the challenge ( $\bar{c}_p$ ), and decreases with the maximum cost of committing fraud ( $\bar{c}_f$ ). Although  $c_f$  is not observed before the incumbent moves, we can use the assumption that  $c_f \sim U(0, \bar{c}_f)$  to compute the probability ( $\alpha$ ) that the incumbent commits fraud. This probability equals  $\alpha = (1 - \eta_O \cdot \bar{\beta}) \cdot \frac{g}{\bar{c}_f}$ .

### B.3 Voter Behavior

The voter's expected utility is given by the following expression:

$$u(V) = \begin{cases} (1 - \eta_I) \cdot u_I + \eta_I \cdot [(1 - \underline{\beta}) \cdot u_I + \underline{\beta} \cdot u_O - c_v] & \text{if } v = I, \\ (1 - \alpha) \cdot u_O + \alpha \cdot \{(1 - \eta_O) \cdot u_I + \eta_O \cdot [(1 - \bar{\beta}) \cdot u_I + \bar{\beta} \cdot u_O - c_v]\} & \text{if } v = O \end{cases}$$

Thus, the voter supports the incumbent if:

$$(\eta_I - \alpha \cdot \eta_O) \cdot c_v < [1 - \underline{\beta} \cdot \eta_I - \alpha \cdot (1 - \bar{\beta} \cdot \eta_O)] \cdot (u_I - u_O).$$

Note that if  $\eta_I < \alpha \cdot \eta_O$ , then a voter preferring the incumbent always behaves sincerely. In particular, notice that  $\eta_I = 0$ , when  $\underline{\beta} = 0$ , so in that special case incumbent supporters always behave sincerely. Differently, if  $\eta_I > \alpha \cdot \eta_O$ , it might be optimal for the voter to vote strategically for the opposition. In that case, the likelihood of fraud and challenge in the lower part of the tree is so small, that a voter preferring the incumbent might want to vote for the opposition to prevent post-electoral conflict.

Substituting for  $\eta_I = \underline{\beta} \cdot \frac{g}{\bar{c}_p}$  and  $\eta_O = \bar{\beta} \cdot \frac{g}{\bar{c}_p}$ , I get that the voter supports the incumbent if:

$$c_v < \frac{\left[1 - \underline{\beta}^2 \cdot \frac{g}{\bar{c}_p} - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right)^2\right] \cdot (u_I - u_O)}{\left[\underline{\beta} - \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \bar{\beta}\right] \cdot \frac{g}{\bar{c}_p}}$$

Note that the denominator of the right hand expression  $(\eta_I - \alpha \cdot \eta_O)$  is positive if  $\frac{\underline{\beta}}{\bar{\beta}} >$

$\left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f}$ . This happens when the probability of fraud in the lower part of the tree is ‘small enough’, so there is a higher chance of preventing post-electoral violence by supporting the opposition, than behaving sincerely.

Differently, if the voter prefers the opposition, then it votes ‘strategically’ for the incumbent if  $(\alpha \cdot \eta_O - \eta_I) \cdot c_v > \left[ \left(1 - \underline{\beta} \cdot \eta_I\right) - \alpha \cdot \left(1 - \bar{\beta} \cdot \eta_O\right) \right] \cdot (u_O - u_I)$ . Note that this may only happen if  $\eta_I < \alpha \cdot \eta_O$ , i.e. when the likelihood of fraud and challenge is so large in the lower part of the tree, that a voter might want to vote for the incumbent to reduce the chance of a post-electoral conflict.

Substituting for  $\eta_I = \underline{\beta} \cdot \frac{g}{c_p}$  and  $\eta_O = \bar{\beta} \cdot \frac{g}{c_p}$ , I get that the voter supports the incumbent if:

$$c_v > \frac{\left[ 1 - \underline{\beta}^2 \cdot \frac{g}{c_p} - \frac{g}{c_f} \cdot \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right)^2 \right] \cdot (u_O - u_I)}{\left[ \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f} \cdot \bar{\beta} - \underline{\beta} \right] \cdot \frac{g}{c_p}}$$

Voting strategically for the incumbent is only reasonable if  $\eta_I < \alpha \cdot \eta_O$ —i.e. if  $\frac{\underline{\beta}}{\bar{\beta}} < \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f}$ . In that case, the likelihood of a challenge is lower in the upper section of the tree, and this might give the voter an incentive to vote ‘strategically’ for the incumbent to prevent a post-electoral conflict.

Finally, note that *everything else constant*,  $P(v = I | u_O > u_I)$  is increasing in  $\frac{g}{c_f}$ , since it increases the chance of fraud in the lower section of the tree; increasing in  $\frac{g}{c_p}$ , since it increases the chance of a challenge in the lower section of the tree (more than it does in the upper section), increasing in  $\bar{c}_v$ ; and decreasing in  $u_I - u_O$ .

If we consider the likelihood the representative voter behaves strategically, it is important to notice that both are increasing in  $c_v$ , and they exist only when the expected gains from preventing a post-electoral conflict are larger than those from helping elect their favorite candidate, i.e., when  $\eta_I > \alpha \cdot \eta_O$  or  $\eta_I < \alpha \cdot \eta_O$ , for a voter preferring the incumbent, or one preferring the opposition, respectively.

The notation used to identify the strategies of the representative voter and the incumbent resemble the ones in the previous section. In addition, I let  $\sigma_O(c_p, \sigma_v, \sigma_I)$  denote the opposition’s strategy, where  $c_p$  indicates the cost of challenging the results,  $\sigma_I$  indicates the incumbent strategy in the second period, and  $\sigma_v$  indicates the voter’s strategy in the first period. Also, I let  $\sigma_O(c_p, \sigma_v, \sigma_I) \in \{A, P\}$ , where  $A$  indicates accepting the official election outcome, and  $P$  indicates challenging the results.

Result 4 (Strategic and Perfectly Informed Opposition): If  $\sigma_v = I$  and  $c_p < \underline{\beta} \cdot g$ , then the opposition challenges the official results. Otherwise, If  $\sigma_v = I$  and  $c_p > \underline{\beta} \cdot g$ , then the opposition accepts the outcome. If  $\sigma_v = O$  and  $c_p < \bar{\beta} \cdot g$ , then the opposition challenges the official results. Otherwise, if  $\sigma_v = O$  and  $c_p > \bar{\beta} \cdot g$ , then the opposition accepts the outcome. Second, if  $\sigma_v = I$ , then the incumbent does not commit fraud. However, if  $\sigma_v = I$  and  $c_f < \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent commits fraud. Otherwise, if  $\sigma_v = I$  and  $c_f > \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent behaves honestly. Finally, if

$(\eta_I - \alpha \cdot \eta_O) \cdot c_v < [(1 - \underline{\beta} \cdot \eta_I) - \alpha \cdot (1 - \bar{\beta} \cdot \eta_O)] \cdot (u_I - u_O)$ , where  $\eta_I = \underline{\beta} \cdot \frac{g}{c_p}$ ,  $\eta_O = \bar{\beta} \cdot \frac{g}{c_p}$  and  $\alpha = \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f}$ , then the voter supports the incumbent. Otherwise, it supports the opposition.

Result 5 : Let  $\eta_I = \underline{\beta} \cdot \frac{g}{c_p}$ ,  $\eta_O = \bar{\beta} \cdot \frac{g}{c_p}$ . Then, a voter preferring the incumbent ( $u_I - u_O > 0$ ) may behave strategically only when  $\eta_I > \alpha \cdot \eta_O$  and  $c_v > \frac{[(1 - \underline{\beta}^2 \cdot \frac{g}{c_p}) - \frac{g}{c_f} \cdot (1 - \bar{\beta}^2 \cdot \frac{g}{c_p})^2] \cdot (u_I - u_O)}{[\underline{\beta} - (1 - \bar{\beta}^2 \cdot \frac{g}{c_p}) \cdot \frac{g}{c_f} \cdot \bar{\beta}] \cdot \frac{g}{c_p}}$ . Differently, a voter preferring the opposition ( $u_I - u_O < 0$ ) may behave strategically only when  $\eta_I < \alpha \cdot \eta_O$  and  $c_v > \frac{[(1 - \underline{\beta}^2 \cdot \frac{g}{c_p}) - \frac{g}{c_f} \cdot (1 - \bar{\beta}^2 \cdot \frac{g}{c_p})^2] \cdot (u_O - u_I)}{[(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}) \cdot \frac{g}{c_f} \cdot \bar{\beta} - \underline{\beta}] \cdot \frac{g}{c_p}}$ .

I use the term *democratic opposition* to refer to the case where  $\underline{\beta} = 0$ . In this case, the opposition is able to successfully mount collective action against the regime only when the latter won the election by resorting to electoral fraud. Below I restate Result 4 for the special case of a *democratic opposition*.

Result 6 [Democratic Opposition (Strategic and Perfectly Informed with  $\underline{\beta} = 0$ ): If  $\sigma_v = I$ , then the opposition never challenges the official results. However, the opposition challenges the official results if  $\sigma_v = O$  and  $c_p < \bar{\beta} \cdot g$ . Otherwise, if  $\sigma_v = O$  and  $c_p > \bar{\beta} \cdot g$ , then the opposition accepts the outcome. Second, if  $\sigma_v = I$ , then the incumbent does not commit fraud. However, if  $\sigma_v = I$  and  $c_f < \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent commits fraud. Otherwise, if  $\sigma_v = I$  and  $c_f > \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent behaves honestly. Finally, if  $(\eta_I - \alpha \cdot \eta_O) \cdot c_v < [1 - \alpha \cdot (1 - \bar{\beta} \cdot \eta_O)] \cdot (u_I - u_O)$ , where  $\eta_O = \bar{\beta} \cdot \frac{g}{c_p}$  and  $\alpha = \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f}$ , then the voter supports the incumbent. Otherwise, it supports the opposition.

Next, I compare the likelihood of fraud under a non-strategic opposition, with the likelihood of fraud under a strategically and perfectly informed opposition.

Result 7 (Comparison of Incumbent Behavior with Non-Strategic vs. Strategic Opposition): From the voter's point of view, the probability the incumbent commits fraud when  $\sigma_v = O$  equals  $\alpha_1 = (1 - \bar{\beta} \cdot \delta) \cdot \frac{g}{c_f}$  in the case of a non-strategic opposition, and  $\alpha_2 = \left(1 - \bar{\beta}^2 \cdot \frac{g}{c_p}\right) \cdot \frac{g}{c_f}$  in the case of a strategic and perfectly informed opposition. Thus, the likelihood the incumbent commits fraud is larger in the first case when  $\delta < \bar{\beta} \cdot \frac{g}{c_p}$ , where  $\delta$  is the exogenous probability a non-strategic opposition challenges the official election results.

## C Strategic Opposition (Imperfectly Informed)

In this section, I assume the opposition does not observe either voter or incumbent behavior, but updates its beliefs by taking into account the observed costs of post-electoral conflict



and of committing fraud (see Figure 4). In this case, I find the Bayesian Perfect Equilibrium (PBE) of the game by computing the optimal opposition decision such that both the voter and the incumbent have no incentive to deviate from beliefs.

The notation used to identify the strategies of the representative voter and the incumbent resemble the ones in the previous sections. However, the challenger no longer observes  $\sigma_v$  or  $\sigma_I$ . Instead, it observes the official election winner which I denote  $W \in \{I, O\}$ . Thus, I let  $\sigma_O(c_p, W)$  denote the opposition's strategy in response to  $c_p$  and  $W$ . Also, I again let  $\sigma_O(c_p, W) \in \{a, c_p\}$ , where  $A$  indicates accepting the official election outcome, and  $c_p$  indicates challenging the results.

## C.1 Pure Strategy Equilibria

1. Suppose the opposition and the incumbent behave according to the following rules:

$$\sigma_O(c_p, W) = \begin{cases} c_p & \text{if } W=I \text{ and } c_p < \underline{\beta} \cdot g \\ a & \text{if } W=I \text{ and } c_p > \underline{\beta} \cdot g \end{cases}$$

$$\sigma_I(c_f, \sigma_v) = \begin{cases} c_f & \text{if } \sigma_v = O \text{ and } c_f < \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot g \\ nf & \text{if } \sigma_v = O \text{ and } c_f > \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot g \\ nf & \text{if } \sigma_v = I \end{cases}$$

Then, the voter believes that in case  $\sigma_v = O$ , fraud takes place with probability  $\alpha = \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$ . Also, it believes that a challenge takes places with probability  $\eta = \underline{\beta} \cdot \frac{g}{\bar{c}_p}$ . Given these expectations, the vote supports the incumbent whenever:

$$c_v < \frac{\left(1 - \underline{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\underline{\beta} - \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \underline{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$$

Notice that the opposition observes  $c_v$ , and uses this to construct expectations about voter behavior. If the inequality holds, the opposition believes the voter will support the incumbent, and therefore will challenge the results if  $c_p < \underline{\beta} \cdot g$ , otherwise, it will accept the official election outcome. Finally, the incumbent observes  $c_v$  and  $\sigma_v$ , but does not observe  $c_p$ . However, it knows that  $c_p \sim U(0, \bar{c}_p)$ , and that the opposition believes the voter supported the regime. Therefore thinks a challenge takes place with probability  $\eta = \underline{\beta} \cdot \frac{g}{\bar{c}_p}$ . In that case, it never commits fraud when  $\sigma_v = I$ , it is strictly dominated for  $c_f > 0$ . Differently, in the out-of-equilibrium path, i.e. when  $\sigma_v = O$ , it commits fraud if  $c_f < \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot g$ , and otherwise it behaves honestly. Thus, this

behavior is always an equilibrium whenever  $c_v < \frac{\left(1 - \underline{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\underline{\beta} - \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \underline{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$ .

2. Suppose the opposition and the incumbent behave according to the following rules:

$$\sigma_O(c_p, W) = \begin{cases} c_p & \text{if } W=I \text{ and } c_p < \bar{\beta} \cdot g \\ a & \text{if } W=I \text{ and } c_p > \bar{\beta} \cdot g \end{cases}$$

$$\sigma_I(c_f, \sigma_v) = \begin{cases} c_f & \text{if } \sigma_v = O \text{ and } c_f < \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot g \\ nf & \text{if } \sigma_v = O \text{ and } c_f > \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot g \\ nf & \text{if } \sigma_v = I \end{cases}$$

Then, the voter believes that in case  $\sigma_v = O$ , fraud takes place with probability  $\alpha = \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f}$ . Also, it believes that a challenge takes places with probability  $\eta = \bar{\beta} \cdot \frac{g}{\bar{c}_p}$ . Given these expectations, the vote supports the opposition whenever:

$$c_v > \frac{\left(1 - \underline{\beta} \cdot \bar{\beta} \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\bar{\beta} - \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \bar{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$$

Notice that the opposition observes  $c_v$ , and uses this to construct expectations about voter behavior. If the inequality holds, the opposition believes it was supported by the representative voter, and therefore will challenge the results if  $c_p < \bar{\beta} \cdot g$ , otherwise, it will accept the official election outcome. Finally, the incumbent observes  $c_v$  and  $\sigma_v$ , but does not observe  $c_p$ . However, it knows that  $c_p \sim U(0, \bar{c}_p)$ , and that the opposition believes the voter supported the regime. Therefore it thinks a challenge takes place with probability  $\eta = \bar{\beta} \cdot \frac{g}{\bar{c}_p}$ . In that case, it never commits fraud in the out-of-equilibrium path, i.e., when  $\sigma_v = I$ . Differently, in case  $\sigma_v = O$ , it commits fraud if  $c_f < \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot g$ , and otherwise it behaves honestly. Thus, this behavior

is always an equilibrium whenever  $c_v > \frac{\left(1 - \underline{\beta} \cdot \bar{\beta} \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\bar{\beta} - \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \bar{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$ .

Result 8 [Strategic and Imperfectly Informed Opposition (pure strategy equilibria)]:

1. If  $u_I - u_O < 0$ , or  $u_I - u_O > 0$  and  $c_v > \frac{\left(1 - \underline{\beta} \cdot \bar{\beta} \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\bar{\beta} - \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \bar{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$ , then the

opposition challenges the results whenever  $W = I$  and  $c_p < \bar{\beta} \cdot g$ . Otherwise, if  $W = O$ , or  $W = I$  and  $c_p > \bar{\beta} \cdot g$ , it accepts the results. Also, if  $\sigma_v = I$ , or if  $\sigma_v = O$  and  $c_f > \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot g$ , then the incumbent behaves honestly. However, if  $\sigma_v = O$  and  $c_f < \left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) \cdot g$ , then the incumbent commits fraud [ $\sigma_I(c_f, \sigma_v) = F$ ]. Finally, the voter supports the opposition.

2. If  $u_I - u_O > 0$  and  $c_v < \frac{\left(1 - \bar{\beta}^2 \cdot \frac{g}{\bar{c}_p}\right) - \frac{g}{\bar{c}_f} \cdot \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right)^2}{\left[\bar{\beta} - \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{\bar{c}_p}\right) \cdot \frac{g}{\bar{c}_f} \cdot \bar{\beta}\right] \cdot \frac{g}{\bar{c}_p}} \cdot (u_I - u_O)$ , then the opposition chal-

lenges the results whenever  $W = I$  and  $c_p < \underline{\beta} \cdot g$ . Otherwise, if  $W = O$ , or  $W = I$  and  $c_p > \underline{\beta} \cdot g$ , it accepts the results. Also, if  $\sigma_v = I$ , or if  $\sigma_v = O$  and  $c_f > \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent behaves honestly. However, if  $\sigma_v = O$  and  $c_f < \left(1 - \bar{\beta} \cdot \underline{\beta} \cdot \frac{g}{c_p}\right) \cdot g$ , then the incumbent commits fraud [ $\sigma_I(c_f, \sigma_v) = F$ ]. Finally, the voter supports the incumbent.

In sum, the main results with a strategic but imperfectly informed opposition are the following: First, similar to the case of a non-strategic opposition, voters who prefer the opposition always behave sincerely. The reason is that for any strategy carried out by the opposition, the likelihood of a challenge is the same in the upper and lower section of the tree, and in that case the expected utility of behaving sincerely is larger than the one corresponding to a vote for the incumbent. Second, for sufficiently large  $c_v$ , there is a pure strategy equilibrium where it may be optimal for a voter preferring the incumbent to behave strategically. In that case, the threshold values of  $\sigma_O$  and  $\sigma_I$  resemble those found for a strategic and perfectly informed opposition when  $\sigma_O = O$ .

Also, for sufficiently low  $c_v$ , there is another pure strategy equilibrium where it may be optimal for the voter to behave sincerely. In that case, the threshold values for  $\sigma_O$  resemble those found for a strategically and perfectly informed opposition when  $\sigma_O = I$ . Last, in the out-of-equilibrium path—i.e., choice of  $\sigma_I(c_f, \sigma_v = O | \sigma_v = I)$ , the incumbent commits fraud with a higher frequency relative to the case of a strategic and perfectly informed opposition with  $\sigma_v = O$ . This is reasonable because given that the opposition expects  $\sigma_v = I$ , it challenges the results less frequently, and this motivates the incumbent to commit fraud more frequently in the out-of-equilibrium path.

## C.2 Mixed Strategy Equilibrium

In order to find the mixed strategy equilibrium of this game, it is necessary to find beliefs about the likelihood of a challenge ( $\eta$ ), of the occurrence of outcome-altering fraud ( $\alpha_O$ ), and that the voter voted for the incumbent instead of the opposition candidate ( $p$ ), such that the opposition is expected to be indifferent to either accepting or challenging the election result, the incumbent is indifferent to committing outcome-altering fraud or communicating the true outcome, and the voter is indifferent to voting for either candidate.

{Incumbent Behavior

In the upper section of the tree, the incumbent's expected utility is given by:

$$u(I|v = I) = \begin{cases} (1 - \eta) \cdot g + \eta \cdot (1 - \underline{\beta}) \cdot g & \text{if No Fraud,} \\ (1 - \eta) \cdot (g - c_f) + \eta \cdot [(1 - \underline{\beta}) \cdot g - c_f] & \text{if Fraud} \end{cases}$$

Since  $c_f > 0$  and  $\eta$  is the same regardless of whether the incumbent commits fraud or not, then the incumbent never commits fraud when  $v = I$ —it is again strictly dominated, so  $\alpha_I = 0$ .

In the lower section of the tree, the incumbent's expected utility is given by:

$$u(I|v=O) = \begin{cases} 0 & \text{if No Fraud,} \\ (1-\eta) \cdot (g-c_f) + \eta \cdot [(1-\bar{\beta}) \cdot g - c_f] & \text{if Fraud} \end{cases}$$

In this case, since  $\eta$  depends on beliefs about  $\alpha_O$ ,  $\eta$  must be such that the incumbent has no incentive to deviate from  $\alpha_O$ . This happens when:

$$(1-\eta) \cdot (g-c_f) + \eta \cdot [(1-\bar{\beta}) \cdot g - c_f] = 0$$

The value of  $\eta$  that leaves the incumbent indifferent between committing fraud and communicating the true election outcome equals

$$\eta = \frac{g-c_f}{\bar{\beta} \cdot g}$$

#### *Voter Behavior*

The voter's expected utility is given by the following expression:

$$u(V) = \begin{cases} (1-\eta) \cdot u_I + \eta \cdot [(1-\underline{\beta}) \cdot u_I + \underline{\beta} \cdot u_O - c_v] & \text{if } v = I, \\ (1-\alpha_O) \cdot u_O + \alpha_O \cdot [(1-\eta) \cdot u_I + \eta \cdot [(1-\bar{\beta}) \cdot u_I + \bar{\beta} \cdot u_O - c_v]] & \text{if } v = O \end{cases}$$

Thus, the voter is indifferent to supporting the incumbent or the opposition if:

$$(1-\eta) \cdot u_I + \eta \cdot [(1-\underline{\beta}) \cdot u_I + \underline{\beta} \cdot u_O - c_v] = (1-\alpha_O) \cdot u_O + \alpha_O \cdot \{(1-\eta) \cdot u_I + \eta \cdot [(1-\bar{\beta}) \cdot u_I + \bar{\beta} \cdot u_O - c_v]\}$$

This equation holds if

$$\alpha - 0 = \frac{(1-\underline{\beta} \cdot \eta) \cdot (u_I - u_O) - c_v}{(1+\bar{\beta} \cdot \eta) \cdot (u_I - u_O) - c_v}$$

Substituting for the equilibrium level of  $\eta$  found in the previous step, the value of  $\alpha_O$  that leaves the voter indifferent to voting for the incumbent or the opposition equals

$$\alpha_0 = \frac{\left(1 - \frac{\underline{\beta}}{\bar{\beta}} \cdot \frac{g-\tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}{\left(1 + \frac{g-\tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}$$

where  $\tilde{c}_f = \frac{\bar{c}_f}{2}$  is the expected value of  $c_f$  that is used to construct voters' beliefs, since voters make their decisions before the cost of committing fraud faced by the incumbent is revealed.

#### *Opposition Behavior*

In case the opposition observes an unfavorable outcome, i.e., an official incumbent victory, then it does not know whether the outcome is fair, or whether the incumbent won by resorting to electoral fraud. Still, it has beliefs  $p$  about the probability the voter supported the incumbent,  $\alpha_I$  about the probability the incumbent committed fraud in the upper section of the tree, and  $\alpha_O$  about the probability the incumbent committed fraud in the lower section

of the tree.

The opposition's expected utility given an incumbent victory is:

$$u(O|I \text{ Victory}) = \begin{cases} 0 & \text{if } \textit{Accept}, \\ p \cdot (\underline{\beta} \cdot g - c_p) + (1-p) \cdot \alpha_O (\bar{\beta} \cdot g - c_p) & \text{if } \textit{Challenge} \end{cases}$$

Thus, voters and the incumbent expect the opposition to be indifferent between accepting and challenging the election outcome if

$$p \cdot (\underline{\beta} \cdot g - \tilde{c}_p) + (1-p) \cdot \alpha_O (\bar{\beta} \cdot g - \tilde{c}_p) = 0$$

where  $\tilde{c}_p = \frac{\bar{c}_p}{2}$  is the expected value of  $c_p$  that is used to construct voters' and incumbent's beliefs, since voters and the incumbent make their decisions before the cost of the post-electoral conflict faced by the opposition is revealed.

This equation holds when

$$p = \frac{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p)}{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p) - (\underline{\beta} \cdot g - \tilde{c}_p)}$$

By substituting voters' beliefs about  $\alpha_O$  into the last expression, it is possible to find the opposition's equilibrium belief about  $p$  that makes it indifferent to either accepting or challenging the official election result when the cost of challenging the official election result equals  $\tilde{c}_p$ . Given this value of  $p$  voters and the incumbent expect the opposition to have no incentive to deviate from the equilibrium value of  $\eta$  found above. In turn, given the incumbent's belief about  $\eta$ , the incumbent is indifferent to committing outcome-fraud or communicating the true election outcome, and thus has no incentive to deviate from the equilibrium value of  $\alpha_O$  found before. Lastly, given the equilibrium value of  $\alpha_O$  the representative voter is indifferent to voting for the incumbent or the opposition, and thus has no incentive to deviate from the equilibrium value of  $p$  found in the last step. Thus, the set of probabilities  $\alpha_I, \alpha_O, \eta, p$  found in this section constitutes a mixed strategy equilibrium of the game, since all players have incentives to behave in line with other player's beliefs.

Note that the opposition's indifference given  $p$  and  $\alpha_O$  holds as long as  $c_p = \tilde{c}_p$ . When this does not hold, the opposition will challenge the election outcome whenever  $c_p < \frac{p \cdot \bar{\beta} \cdot g + (1-p) \cdot \alpha_O \cdot \bar{\beta} \cdot g}{p + (1-p) \cdot \alpha_O}$ . However, this will not affect the equilibrium beliefs or behaviors of voters and the incumbent, since they do not observe  $c_p$  but act based on the expected value of this cost ( $\tilde{c}_p$ ); thus, even if eventually it turns out that  $c_p \neq \tilde{c}_p$ , they have no incentives to alter their belief about  $\eta$ , nor to deviate from the equilibrium values of  $p$  and  $\alpha_O$ .

Result 9 [Strategic and Imperfectly Informed Opposition (mixed strategy equilibria)]:

Let  $\alpha_0 = \frac{\left(1 - \frac{\beta}{\bar{\beta}} \cdot \frac{g - \tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}{\left(1 + \frac{g - \tilde{c}_f}{g}\right) \cdot (u_I - u_O) - c_v}$ , and  $p = \frac{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p)}{\alpha_O \cdot (\bar{\beta} \cdot g - \tilde{c}_p) - (\underline{\beta} \cdot g - \tilde{c}_p)}$ . When parameters are such that

$\alpha_O$  and  $p$  are well defined, then: If  $c_p < \frac{p \cdot \bar{\beta} \cdot g + (1-p) \cdot \alpha_O \cdot \bar{\beta} \cdot g}{p + (1-p) \cdot \alpha_O}$ , the opposition challenges the official election outcome, and otherwise accepts it. In addition, the incumbent never commits fraud when  $\sigma_v = I$ , but manipulates the outcome with probability  $\alpha_O$  when  $\sigma_v = O$ . Finally, the representative voter supports the incumbent with probability  $p$ .

## D Figures

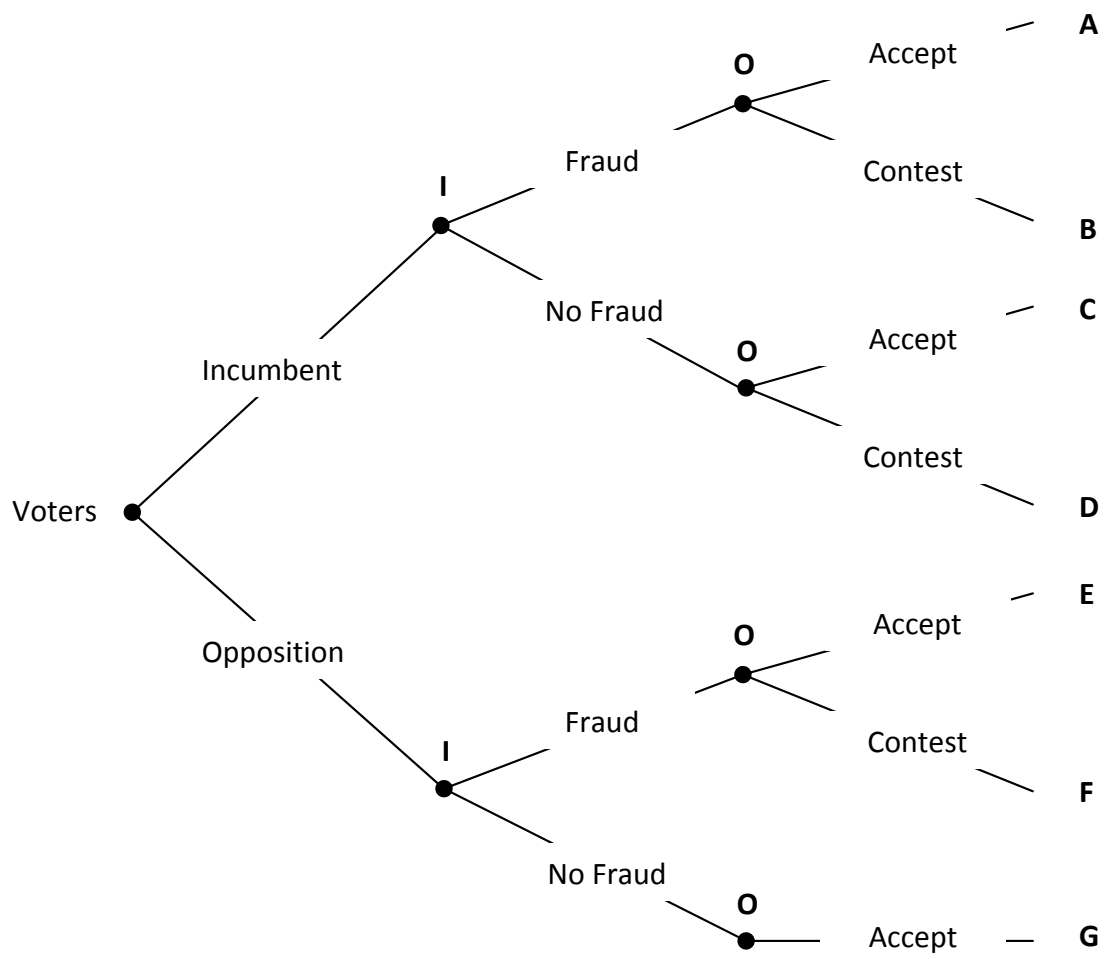


Figure 1: Basic Game Structure

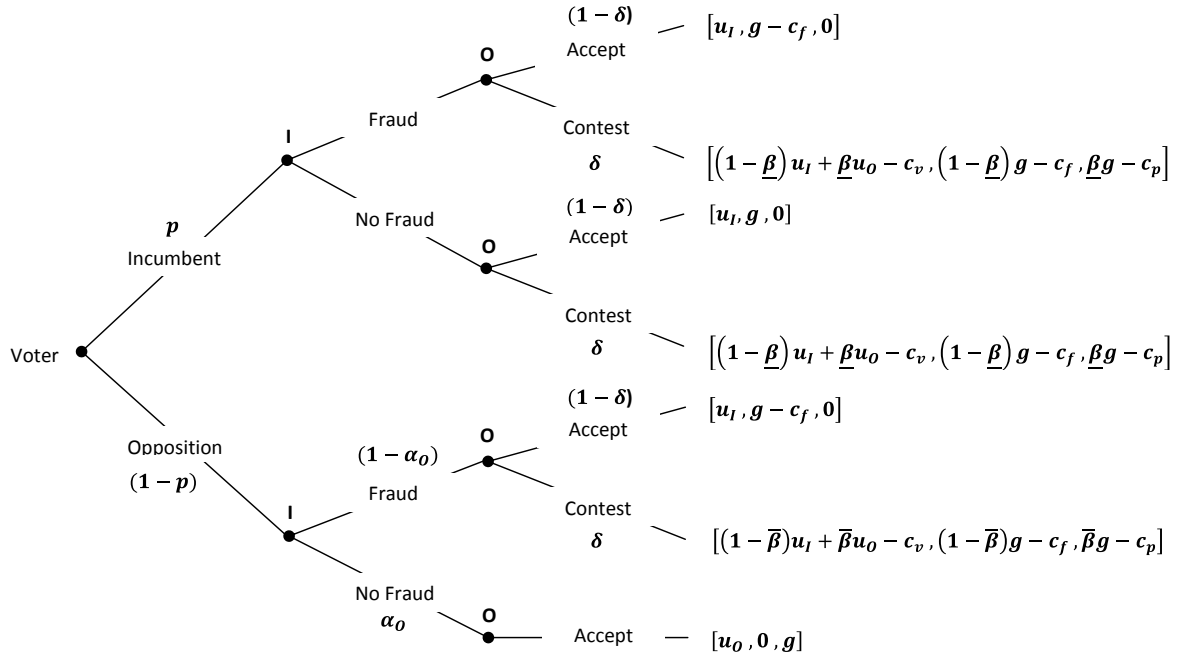


Figure 2: Game Structure with a Non-Strategic Opposition

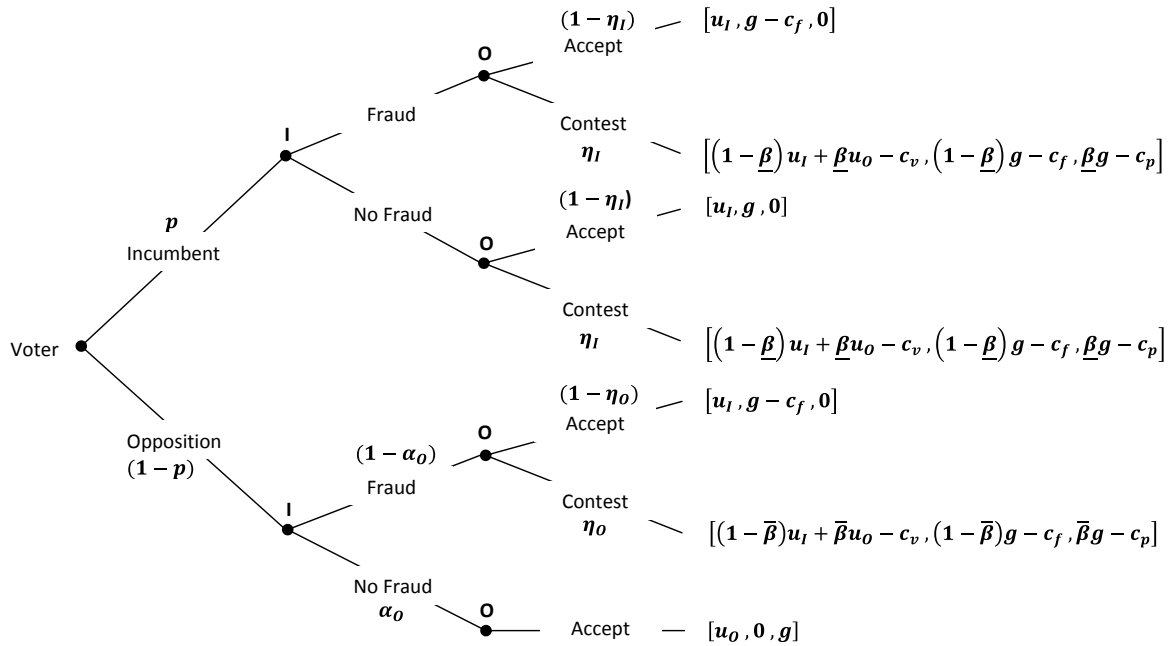


Figure 3: Game Structure with a Strategic Opposition (Informed)

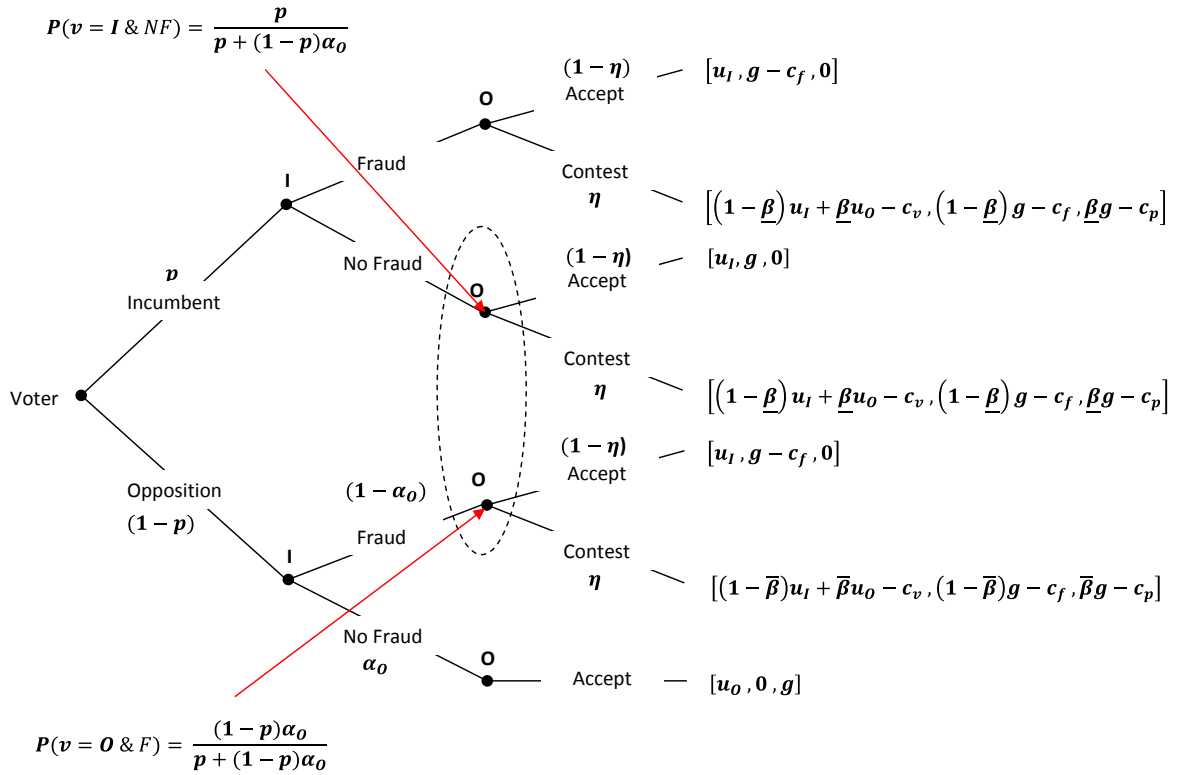


Figure 4: Game Structure with a Strategic Opposition (Uninformed)