

Signaling Honesty: Institutional Strength and Voters' Concern About Corruption in a Model of Electoral Competition^{*}

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Abstract • Resumo


When voters care about the honesty of their political leaders, office-seeker politicians—whether corrupt or not—have strong incentives to behave as if they were actually honest. We build a simple signaling game in which the politician in power is unaware of the share of the electorate who care about corruption. Our model explains some recent findings of the empirical literature on Political Economy, namely that some incumbents engage in anti-corruption policies in the last year of their terms (during campaign for reelection), and that incentives to adopt such measures are stronger when the competition for office is fiercer. Among other determinants, we highlight how politicians' perception of how much voters care about honesty is crucial in their choice. We apply our model to the Brazilian political scenario and show that our predictions are supported by anecdotal evidence and data. In particular, we can explain the change in the behavior of Brazilian incumbents after the 2013 public revolts.

1. Introduction

Recent empirical evidence has suggested that incumbent politicians engage in anti-corruption policies during elections years (Vadlamannati, 2015). In fact, in weakly

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institutionalized countries, where the potential presence of corrupts among the candidates is always a major threat to voters, the politician in power may want to implement policies such as giving the police and other law enforcement institutions autonomy and independence to investigate the government in case of suspicion of corruption.¹ The objective of implementing such measures immediately before the election is clearly to send a signal to voters that one is committed to fighting against public misconduct—and therefore that he is honest. Since anti-corruption policies are more costly for corrupts—who have a higher chance of being caught and punished—than for honest candidates, this sort of signal is indeed informative.

But under which conditions is it optimal for an incumbent to adopt such measures during campaign? When he is corrupt, anti-corruption policies have the obvious costs of increasing the probability of being punished.² In countries where police and justice are inefficient, this cost may be low and thus those policies are more likely to be adopted. However, even when the incumbent is not corrupt, there are opportunity costs associated with anti-corruption policies. On the other hand, in order to assess the benefits, one must take into account how sensitive to issues related to honesty the public is. If, for instance, voters are indifferent to ethics in public administration, it may not be worth taking the risk of being caught and punished—or incur in the opportunity costs.

As discussed above, if the incumbents know that the probability of reelection is high even maintaining the status quo—i.e. not promote policies that fight corruption and public misconduct—, there is no incentive to incur the related costs. In fact, it is reasonable to expect that a high degree of incumbency advantage makes the politician in office less prone to implementing anti-corruption policies. Moreover, if there is a low probability of reelection even adopting such measures, maintaining the status quo may still be the best option. Therefore, when the electoral competition is fierce (the degree of incumbency advantage is moderate), anti-corruption policies are likely to be the best strategy.

The above reasoning is supported by empirical evidence reported by Ferraz and Finan (2011), Sidorkin and Vorobyev (2018) and Vadlamannati (2015). Sidorkin and Vorobyev (2018) uses a rich database and shows that in Russia, corruption is higher closer to the end of regional governors' terms. As the standard political budget cycle reasoning fails in explaining such a pattern, the authors provide an alternative

¹Throughout the paper, we use anti-corruption policies and policies that give police and law enforcers autonomy to investigate and punish corrupts—in public administration mainly—interchangeably. Although anti-corruption may be considered a broad concept and therefore more suitable for a model such as ours, the main example of such policies is the one in which autonomy and independence are given to investigators (Hanssen, 2004; Stephenson, 2004). Since we are also interested in applications, we opt to use both.

²The concept of punishment adopted throughout the paper is broad, and may include fines, jail time and all other costs imposed to convicted corrupts. The only requirement we make is that punishment causes disutility to politicians.

explanation: when a governor gradually learns that he will not be re-appointed, there are incentives to engage in corruption to accumulate wealth before leaving office. Alternatively, when a governor becomes more certain that he will be reelected, he may have higher incentives to smooth rent extraction over time. Sidorkin and Vorobyev (2018) finds consistent supporting evidence for this explanation. The same pattern has already been found in Brazil by Ferraz and Finan (2011): there is significantly less corruption in municipalities where mayors can get reelected. The authors' findings also suggest that electoral rules that enhance political accountability plays a crucial role in constraining the politician's corrupt behavior.

The main evidence that incumbents do use anti-corruption measures as a signal of honesty with the objective of winning elections is provided by Vadlamannati (2015). By using a panel data on 30 Indian states from 1988 to 2009, this study finds that scheduled elections (as opposed to unscheduled ones) are associated with an increase in the number of corruption cases registered by anti-corruption agencies. A substantial effect of the election proximity on the number of cases registered is also found, since the closer the election is the higher the number of corruption cases reported. The political use of such policies becomes even more evident when one observes that in swing states, where the margin of victory for the incumbent in previous elections has been narrow, the same effect is observed.

We present a simple signaling game which explains the empirical regularities discussed above. An office-seeker incumbent, who may be either honest or corrupt, must choose whether or not to implement anti-corruption policies during his campaign for reelection. Because voters do not know his type, signaling honesty may be worthwhile. Our model predicts that the higher the number of voters perceived as worried about corruption, the more prone to adopting measures against public misconduct both types of incumbents are. As a matter of fact, we show that anti-corruption policies are chosen in equilibrium (both separating and pooling) according to the interaction between public concern about corruption and institutional strength. Strong institutions are a necessary condition for the existence of such equilibria. In particular, an equilibrium in which both politicians reveal their types (only the honest one adopts anti-corruption policies) requires that the expected punishment for corruption be sufficiently large and that the concern about corruption be moderate.

We are also able to analyze the impact of changes in the degree of incumbency advantage on politicians' behavior. Our model allows us to interpret the probability of victory without the support of voters who care about honesty as the degree of such an advantage. By doing so, we find that policies aimed at fighting corruption are more likely to be implemented by both types of politician when the competition for office is fierce (low degree of incumbency advantage). Once again, the strength of institutions plays a decisive role in the existence of equilibria. For instance, the existence a pooling equilibrium in which both incumbents choose to send signals of

honesty—by implementing anti-corruption policies—requires that both the majority of politicians in society be honest—a signal of strong institutions, following Caselli and Morelli (2004)—and the degree of incumbency be sufficiently low.

In addition to providing a theoretical base for some recent papers in the empirical literature (e.g. Ferraz & Finan, 2011, Sidorkin & Vorobyev, 2018, and Vadlamannati, 2015), our model's findings are corroborated by data and anecdotal evidence from the Brazilian political scenario. By analyzing the only three presidential democratic elections occurred in Brazil in which there was an incumbent candidate, we show that there was an inflection point in their policies concerning ethics in public administration. While in the elections before 2013 incumbents did not worry about corruption and thus did not implement any significant policy related to it, honesty and other related issues were among the most discussed topics in the 2014 campaign, which made the then incumbent adopt anti-corruption policies in the last year of her term.

The change in the incumbent's behavior may be explained by two factors included in our model. First, in 2013 a series of manifestations and protests against corruption, public misconduct, among others, made politicians aware of the new profile of the average Brazilian voter. For long Brazilians had been seen as tolerant when it comes to corruption (Winters & Weitz-Shapiro, 2013), but the 2013 protests showed politicians that honesty has become an important issue. Second, when compared to Fernando Henrique Cardoso (FHC) and Luis Inácio Lula da Silva, incumbents in the elections of 1998 and 2006, respectively, Dilma Rousseff's incumbency advantage in 2014 was much lower. We present some data that corroborate the two above facts and discuss how both factors may have made Rousseff adopt anti-corruption measures, unlike her predecessors.

The main contribution of our paper is, therefore, provide a model that explains why incumbents have incentives to implement anti-corruption policies (signaling honesty) when they are seeking reelection. In particular, the novelty is to incorporate the voters' concern about corruption as one of the determinants of politicians' behavior. The interaction of this variable with others related to the institutional strength of societies is also novel. Finally, to the best of our knowledge, our application to the recent Brazilian political scenario has not been performed as well. Although we are aware of the limitations of our approach, especially because of data limitations (there have been only three incumbents in presidential elections so far), we believe that it can contribute to the literature on corruption fighting and other related themes.

1.1 Related literature

The model we develop is primarily related to the literature on why and how political institutions affect corruption—and consequently the implementation of policies that fight it. While Myerson (1993) and Persson, Tabellini, and Trebbi (2003) focus

on the performance of different electoral systems in reducing corruption (by using theoretical and empirical approaches, respectively), [Persson, Roland, and Tabellini \(1997\)](#) analyzes the importance of the separation of powers and the consequent effects on political accountability. The concept of institutional strength we adopt in this paper is different from this literature, given that we highlight the role of efficient police and judicial system in punishing corrupts. Furthermore, we follow [Caselli and Morelli \(2004\)](#) by assuming that a large cohort of honest politicians is a signal of strong institutions. Finally, none of the above papers study interaction of institutions with voters' concern about corruption like ours does.

The idea that anti-corruption policies may hurt politicians in office has been studied indirectly by the literature on the optimal level of judicial independence. [Stephenson \(2004\)](#), for instance, finds conditions under which rational voters force the government to cede power over legislative decisions to the courts. Although there is no mention of corruption in that paper, it is similar to ours by allowing that the behavior and characteristics of voters have an impact on the incumbent's choice of sharing judicial powers. [Hanssen \(2004\)](#), on the other hand, explores the impacts of establishing an independent court on future incumbents. The idea is that when one expects to be replaced by a successor with very different policy views, there are incentives to raise the cost of future policy changes. In our model, the cost associated with anti-corruption policies (giving up judicial power) is composed of the opportunity cost—that affects the current incumbent, independent on his type—and the expected punishment in case of corruption—that affects only the corrupt type if reelected.

Our assumption that part of voters values candidates' character is present in papers such as [Kartik and McAfee \(2007\)](#) and [Bernheim and Kartik \(2014\)](#). Similar to our model, [Kartik and McAfee \(2007\)](#) assume that politicians can send signals of character through the policies in their platform. The authors' approach is more generic than ours, given that the considered one-dimensional policy is abstract. Moreover, unlike our approach, there is no incumbent and the politician who lacks character is not punished—it is not necessarily dishonesty. The characteristics of self-selected candidates in corrupt political systems are studied by [Bernheim and Kartik \(2014\)](#). Because they explore how policy instruments such as anti-corruption enforcement affect the expected quality of governance through candidate self-selection, there is a similarity to our model. Their focus, however, it is the selection of candidates rather than the behavior of an office-seeker incumbent.

Our paper is related to several studies in which the politician in office may choose to implement policies that have a direct negative effect on his utility, but that also affect the public's belief and thus may help him to keep the power. [Acemoglu, Egorov, and Sonin \(2013\)](#), for example, studies populism through a model in which both types of incumbent (corrupt and honest) choose policies that are not their favorite with the aim of signaling honesty and thus winning the election. As the

authors assume that the fact that the corrupt type is bribed by a right-wing group is common knowledge—i.e. voters know it—, then the implemented policies are to the left of the politicians’ bliss point—when it is to the left of the median voter, they label this phenomenon as populism. Other similar paper in this literature is [Matsen, Natvik, and Torvik \(2016\)](#), which focus on what it is called “prepopulism” (excessive resource extraction as the mechanism for staying in power). Our model differs from those studies by incorporating the level of voters’ concern about corruption and its interaction with institutions. Moreover, as anti-corruption policies are instrumental in our paper, they can be seen as an expression of populism.

There are also some models applied to non-democratic regimes in which incumbents (i.e. dictators) face trade-offs similar to the one studied in this paper. In [Egorov, Guriev, and Sonin \(2009\)](#), for example, a dictator may choose to allow free media to provide incentives to bureaucrats and therefore to improve the quality of government. However, by doing so he increases the chances of being deposed from office, as free media allows disgruntled citizens to coordinate and thus make an insurrection against the government. In a similar vein, [Chen and Xu \(2017\)](#) and [Shadmehr and Bernhardt \(2017\)](#) study when it is optimal for an authoritarian regime allow citizens to voice opinions publicly. Once again, the cost of implementing such a policy is the higher probability of social instability and revolt. In [Chen and Xu \(2017\)](#), benefits are associated with the possibility of the shared feeling of dissatisfaction toward the government among citizens being revealed, such that the government will detect the danger and improve policies accordingly. It may also disorganize citizens if they find themselves split over policies. In [Shadmehr and Bernhardt \(2017\)](#), on the other hand, communication among citizens may facilitate the dissemination of any negative information about the alternative to the status quo, forestalling revolution. While there is a similarity between our paper and this literature because of the possibility of adoption of policies that might hurt incumbents in exchange for better political prospects, the main differences are the regime type (ours is democracy) and the channel through which policies affect the incumbent’s payoff (electoral incentives in our model).

Given our application to Brazilian political scenario, this paper is related to the empirical literature that investigates why many corrupt politicians get reelected in Brazil. The study of [Pereira and Melo \(2015\)](#), in particular, gives us empirical support for one important assumption made in [section 3](#). By using a dataset on mayoral elections (2,000 and 2004) in the Brazilian State of Pernambuco, [Pereira and Melo \(2015\)](#) shows that the negative marginal effect of corruption on reelection disappears as public expenditure increases (the called “trade-off hypothesis”, according to which voters tolerate corruption in exchange for public goods). However, other papers have found that Brazilian voters do punish corrupt in the elections. [Winters and Weitz-Shapiro \(2013\)](#), for example, tests both the “information hypothesis”, which says that citizens vote for corruption because they do not have enough

information, and the trade-off hypothesis. By using a nationwide survey, authors conclude that neither of the hypothesis is supported in Brazil. Ferraz and Finan (2008) analyzes data from audit reports from Brazilian municipalities and found that the information assumption is valid and that informed voters do punish corrupt incumbents. Finally, Boas, Hidalgo, and Melo (2019) conducts a field experiment during the 2016 municipal elections and concludes that voters' behavior in the abstract reflects the comparatively strong norm against corruption in Brazil, but on election day, their behavior is constrained by factors such as loyalty to local political dynasties and the greater salience of more pressing concerns like employment and health services.

Our paper also makes contributions to the literature that studies the competition and campaign for president during the three elections in which there was an incumbent candidate in Brazil (Machado, 2009; Melo, 2015). In particular, candidates' behaviors and speeches in regard to honesty may be seen as part of the framework we develop here. The broader analysis of anti-corruption policies implemented by some politicians in Brazil in different levels (state, national government, etc) may also connect to our model (Ferraz & Finan, 2008; Mota Prado & Carson, 2016). In fact, we believe that our contribution is multidisciplinary, with a special connection to Political Sciences and fields related.

1.2 Outline

This paper is organized as follows. The next section presents the signaling model between an incumbent, who can be either corrupt or honest, and voters. Section 3 describes the Brazilian political scenario, in particular the change in the incumbent's behavior after 2013, and applies our model to explain it. Finally, section 4 concludes.

2. The model

Consider a society consisting of a constant population, where each member is a voter. There are two possible types of politicians, honest (H) and corrupt (C). We denote the politician's type as $t \in \{H, C\}$ and use the indicator variable T , such that $T = 1$ if $t = H$ and $T = 0$ otherwise, whenever it is necessary. The politician's type is private information, such that the only information voters have is that the share of honest politicians in the pool of candidates is μ , whereas $1 - \mu$ is the share of corrupt ones. Both candidates get a rent $R > 0$ from being in office, which can be thought as coming from several sources, such as salary and ego-rents. The corrupt politician has a further source of rent when he is the incumbent, namely a fixed amount of

money obtained illegally from office,³ which for simplicity we call bribe $B > 0$.⁴ We also assume that whenever a politician loses the election, his utility is equal to zero.

Our model has two periods. In the first one, the incumbent politician chooses whether to implement anti-corruption policies, such as give the police and other law enforcement institutions autonomy and independence to investigate the government in case of suspicious of corruption (see, e.g. Stephenson, 2004 and Hanssen, 2004). The alternative to adopting such policies is to keep the status quo (do nothing). Voters observe the incumbent's policy and then decide which candidate to vote for, whether the incumbent or the challenger. In the second period, the winner candidate holds the office. If the chosen policy in the pre-election period was the anti-corruption one, then there is a positive probability q that the responsible for corruption will be caught and punished. This probability is higher the more efficient the police and the judicial system are. Finally, let $C > 0$ be the punishment imposed on the politician caught corrupting.

Whenever the incumbent chooses to adopt anti-corruption measures, there is a cost $\gamma \in (0, \beta R)$ associated with it,⁵ which is common to both types of politicians, where $\beta \in (0, 1)$ is the intertemporal discount factor of politicians. If we assume a fixed government budget, this cost may represent the opportunity cost of a higher public good provision. For example, the resources directed to the police and judicial system could also be used to provide other public goods which politicians consider important. This assumption implicitly states that fighting corruption brings no direct benefit for politicians. Instead, the only reason that makes them choose it is improving their electoral chances. Another way of establishing this is by assuming that politicians have no preference over anti-corruption policies—that is, there is no ideology about them.

³Our model adopts a general concept of corruption, such that it applies to any type of abuse of public power, office, or resources by elected government officials for personal gain, by extortion, soliciting or offering bribes, for example.

⁴Observe that our definition of corrupt politician implies that he always engages in corruption—such an action *is not* a choice. We can justify this by assuming that each politician is characterized (his type) by his (psychological or moral) cost of misbehaving, following Bernheim and Kartik (2014). Furthermore, for the sake of simplicity, if we suppose that there only two levels of cost (high and low), it is reasonable to call those with high and low cost honest (those who will not engage in corruption) and corrupt (those who will not), respectively. Relaxing this assumption—by allowing a continuum of types, for example—may change our results, given that we would have different costs of signaling for different types. This possibility could be explored in a moral hazard model, for example. See footnote 8.

⁵This assumption guarantees that $F_*^H > 0$ (see its definition in equation (4)). In fact, if $F_*^H \leq 0$, several of the possible equilibria of the game (see section 2.4) would be ruled out.

The election between the incumbent and the challenger⁶ takes place with the majoritarian voting system. Thus, the candidate who receives more than a half of the total votes cast wins. For the sake of simplicity, we also assume that in case of tie, the incumbent wins. Voters' behavior is straightforward and is discussed below. Figure 1 presents the extensive form of our signaling game.

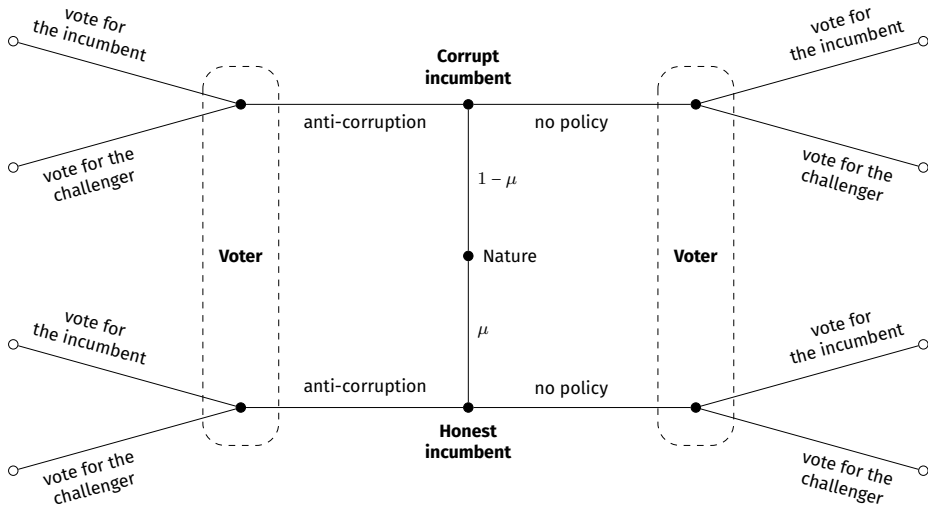


Figure 1. The Signaling Honesty Game in Extensive Form.

2.1 Voters

There are two groups of voters. The first one is formed by people who care about honesty and thus prefer to vote for the honest candidate. The preferences of a representative voter of this group are represented by the following utility function

$$u^v(v, T) = \bar{u}[1 - (T - v)^2], \tag{1}$$

where $\bar{u} > 0$ is a parameter, and $v \in \{0, 1\}$ is her strategy, with $v = 1$ if she votes for the incumbent and $v = 0$ when the challenge is the chosen candidate. One can notice that $u^v(1, 1) = u^v(0, 0) = \bar{u} > 0 = u^v(0, 1) = u^v(1, 0)$. In other words, those

⁶Because we consider the race between two candidates, it clearly applies to second-round elections. However, it may also be suitable for modeling multi-candidate scenarios in which only two have chances of winning, as long as one of them is the incumbent. Instead, if the competition is among several politicians, the model has to be adapted because now voters need more information to differentiate the different challengers.

voters prefers to vote for the incumbent if and only if he is honest.⁷ This implies that they see honesty as an incumbent's valence, in the sense that was coined by Stokes (1963) and is widely used in Political Sciences: it refers to issues that all voters agree to value positively, in contrast with "positional" issues, where voters may disagree depending on their ideologies.

As the incumbent's type is private information, voters decide whom to vote for according to the posterior probability of the incumbent being honest. In fact, they compare it with μ , which is the probability of the challenger being honest. Let $\rho_i^t \equiv \text{Prob}(i | t)$ be the voters' prior beliefs that the incumbent of type t will choose to implement the policy $i = \{A, SQ\}$, where A denotes the anti-corruption policy and SQ denotes keeping the status quo. As usual, the probability of the incumbent being type t once voters observed that action i has been chosen can be obtained through the Bayes rule. For the honest type, for example, we have

$$\text{Prob}(H | i) \equiv \tilde{\rho}_i^H = \text{Prob}(H | i) = \frac{\rho_i^H \mu}{\rho_i^H \mu + \rho_i^C (1 - \mu)} \quad (2)$$

As a notational remark, notice that $\text{Prob}(t | i) \equiv \tilde{\rho}_i^t$ for $t \in \{H, C\}$ and $i = \{A, SQ\}$.

The other group of voters is formed by people who vote for the incumbent regardless of the policy chosen in the first period. The idea is that there is incumbency advantage, such that part of the population is attached to the politician in office and does not care about his honesty. We can think of such an advantage as coming from the name recognition due to his previous work in the office. Incumbents also have easier access to campaign finance, as well as government resources (such as the franking privilege) that can be indirectly used to boost a campaign. Those factors may help to create a loyalty in part of the electorate.

Let $\chi \in [0, 1]$ be the share of voters who care about honesty. Notice that if $\chi \leq 1/2$, then the incumbent wins whatever the policy he implements. We assume that χ is a random variable with probability distribution function $F(\cdot)$, which is common knowledge. Therefore politicians do not observe the true share of voters in both groups, they know only its distribution. Observe that $F(1/2)$ measures the probability of winning the election without the support of the voters who care about corruption. Throughout the paper, we also interpret it as the degree of incumbency advantage. As we will see below, the higher $F(1/2)$ the lower the difference between

⁷An alternative way to model voters is by assuming that each voter k is characterized by $\omega_k \in (0, 1)$, a parameter that measures her level of worry about corruption. Let ω be uniformly distributed. Suppose, for instance, the voter's utility were given by $u_k^v(v, T) = \omega_k \bar{u} [1 - (T - v)^2] + \delta v$, where $0 < \delta < \bar{u}$ is a random variable measuring the welfare from voting for the incumbent (independent on his type)—e.g. due to the incumbency advantage—and let $H(\cdot)$ be its probability distribution. We have that the share of voters who vote for the incumbent is δ/\bar{u} if $t = C$. Moreover, everyone votes for the incumbent if $t = H$. The probability of winning without the support of the voters who (sufficiently) care about corruption is, therefore, $\text{Prob}(\delta/\bar{u} \geq 1/2) = 1 - H(\bar{u}/2)$. Observe that $1 - H(\bar{u}/2) = F(1/2)$ in our model.

the payoff of getting those voters' support and the one of receiving zero votes from them—in fact, when $F(1/2) = 1$ the two payoffs are equal. Because this second group is not strategic, henceforth whenever we use “voters”, we are referring to the first group (those who care about corruption).

2.2 The honest incumbent

Suppose that the politician in office is the honest one. His total utility is the sum of the two periods and depends on whether he adopts anti-corruption policies and whether he wins the election. His preferences can be expressed by⁸

$$U^H(\mathbb{I}^H, v) = R \left\{ 1 + \beta \left[v + F\left(\frac{1}{2}\right)(1 - v) \right] \right\} - \mathbb{I}^H \gamma, \tag{3}$$

where $\mathbb{I}^H = 1$ if he chooses to adopt anti-corruption measures and $\mathbb{I}^H = 0$ otherwise. The above functional form shows that the honest incumbent's utility is decreasing in implementing anti-corruption policies: $U^H(0, 1) = R(1 + \beta) > R(1 + \beta) - \gamma = U^H(1, 1)$ and $U^H(0, 0) = R[1 + \beta F(1/2)] > R[1 + \beta F(1/2)] - \gamma = U^H(1, 0)$. In fact, given that such a policy is costly, it will be optimal to implement it only if there is an improvement in the electoral prospects of the incumbent.

One can also see that the honest incumbent's payoff increases when he receives the votes from those voters who care about honesty. In fact, $U^H(0, 1) = R(1 + \beta) > R[1 + \beta F(1/2)] = U^H(0, 0)$ and $U^H(1, 1) = R(1 + \beta) - \gamma > R[1 + \beta F(1/2)] - \gamma = U^H(1, 0)$. This result is intuitive, given that, keeping his choice (anti-corruption policies or status quo) constant, receiving the support of the voters will guarantee the victory. Finally, the comparison between $U^H(0, 0)$ and $U^H(1, 1)$ depends on the parameters' values. In particular, it depends on $F(1/2)$. For future reference, let

$$F_*^H \equiv 1 - \frac{\gamma}{\beta R} \tag{4}$$

be the value of $F(1/2)$ that makes $U^H(0, 0) = U^H(1, 1)$. As $U^H(0, 0)$ is increasing in $F(1/2)$, one can see that $U^H(0, 0) < U^H(1, 1)$ if and only if $F(1/2) < F_*^H$. This means that the benefit from signaling honesty surpasses the cost associated with the anti-corruption policy if and only if there is a low probability that less than half of the electorate cares about honesty. Alternatively, anti-corruption policies are more beneficial for the politician in power when his incumbency advantage is low.

⁸One can see that both (3) and (5) are particular cases of the general utility of the incumbent of type t :

$$U^t(\mathbb{I}^t, v) = [R + B(1 - T)] \left\{ 1 + \beta \left[v + F\left(\frac{1}{2}\right)(1 - v) \right] \right\} - \mathbb{I}^t [\gamma + \beta q C(1 - T)].$$

For the ease of presentation, we choose to present the two cases separately.

2.3 The corrupt incumbent

The corrupt incumbent's choice involves the bribe he gets and the probability of being caught and punished in case of being investigated. We assume that corruption is not a choice for the corrupt candidate, given that it is implicit in our definition that a politician of this type will always commit corruption.⁹ His utility is given by

$$U^C(\mathbb{I}^C, v) = (R + B) \left\{ 1 + \beta \left[v + F\left(\frac{1}{2}\right)(1 - v) \right] \right\} - \mathbb{I}^C(\gamma + \beta qC), \quad (5)$$

where $\mathbb{I}^C = 1$ if he chooses to adopt anti-corruption measures and $\mathbb{I}^C = 0$ otherwise. Observe that, compared to the previous case, whenever $\mathbb{I}^C = 1$, the associated cost is higher, given that it includes the expected punishment $qC > 0$. Similar to the case of the honest politician, however, $U^C(\cdot)$ is decreasing in implementing anti-corruption policies: $U^C(0, 1) = (R + B)(1 + \beta) > (R + B)(1 + \beta) - \gamma - \beta qC = U^C(1, 1)$. Given the voters' choice, whether the incumbent or challenger, it is optimal for the incumbent not to spend γ signaling honesty.

The corrupt incumbent's payoff is also increasing in his chance of winning (voters' support). In particular, keeping his choice constant, he gets a higher utility when the voters who care about honesty vote for him: $U^C(0, 0) = (R + B) \left[1 + \beta F(1/2) \right] > (R + B) \left[1 + \beta F(1/2) \right] - \gamma - \beta qC = U^C(1, 0)$. The above statement also implies that his utility is increasing in $F(1/2)$. Similar to the previous case, we can define

$$F_*^C \equiv 1 - \frac{\gamma}{\beta(R + B)} - \frac{qC}{R + B} \quad (6)$$

as the value of $F(1/2)$ that makes $U^C(0, 0) = U^C(1, 1)$. Thus, $U^C(0, 0) < U^C(1, 1)$ if and only if $F(1/2) < F_*^C$. In other words, implementing an anti-corruption policy pays off when the chance of winning without it is low, which happens when there is a high probability that $\chi > 1/2$.

Similar to the standard models of Economics of Crime, the incentives the corrupt incumbent faces to promote anti-corruption policies become stronger as the probability of getting caught and punished q , and the size of the sanction suffered as punishment C decrease. In fact, the expected punishment may be so high that the government never implements anti-corruption policies—when $qC \geq R + B - (\gamma/\beta)$ we have $F_*^C < 0$. A higher bribe is also an important incentive to be reelected, given that in case of winning there will be another opportunity to extract such an illegal rent. This is also reflected in F_*^C , since $\lim_{B \rightarrow \infty} F_*^C = 1$.

⁹Our model can be seen as a reduced form of a moral hazard one, in which a politician in power has to choose the level of corruption he will engage in—or even whether engage in it at all—before deciding whether implement anti-corruption policies. Such corruption is not perfectly observed by voters, who can only rely on the signal they receive from the policies adopted by the incumbent.

2.4 Equilibria

The solution concept for our signaling game is the Perfect Bayesian Equilibrium (PBE). A pure-strategy PBE is a pair of strategies \mathbb{I}^H and \mathbb{I}^C and a set of beliefs $\tilde{\rho}_i^t$ for $i = A, SQ$ and $t = H, C$. We start by looking for a pooling equilibrium in which both types of incumbent choose to keep the status quo ($\mathbb{I}^H = \mathbb{I}^C = 0$)—and, therefore, not to signal honesty. For, observe that in this case $\tilde{\rho}_{SQ}^H = \mu$ and $\tilde{\rho}_{SQ}^C = 1 - \mu$, given that incumbents' actions are not informative. Thus, voters who care about corruption vote for the incumbent if and only if $\mu\bar{u} > (1 - \mu)\bar{u}$, that is, $\mu > 1/2$.

Let us first consider the above case, in which the majority of politicians are honest, such that voters vote for the incumbent. The honest incumbent payoff's in this case is $U^H(0, 1) = R(1 + \beta)$, which is his highest possible payoff. Thus, if his choice was $\mathbb{I}^H = 1$ instead, there would be a welfare loss. For the corrupt one, similar reasoning can be applied to: he gets his maximum utility, namely $U^C(0, 1) = (R + B)(1 + \beta)$, such that any deviation from $\mathbb{I}^C = 0$ makes him worse off. This implies that both the honest and the corrupt incumbents do not deviate from keeping the status quo whenever $\tilde{\rho}_{SQ}^H = \mu > 1/2$.

When $\tilde{\rho}_{SQ}^H = \mu < 1/2$, the incumbent does not receives the votes from voters who value honesty. Moreover, recall that, if they observe that an anti-corruption policy has been implemented, they assign the probability $\tilde{\rho}_A^t$ to the incumbent being type $t = H, C$. This implies that, after observing $i = A$, voters vote for the incumbent if and only if $\tilde{\rho}_A^H\bar{u} > (1 - \tilde{\rho}_A^H)\bar{u}$, that is, $\tilde{\rho}_A^H > 1/2$. Now, by choosing to keep the status quo, the honest politician's payoff is $U^H(0, 0) = R[1 + \beta F(1/2)]$. Instead, if he adopts an anti-corruption policy, his payoff is $U^H(1, 0) = R[1 + \beta F(1/2)] - \gamma$ if $\tilde{\rho}_A^H < 1/2$ and $U^H(1, 1) = R(1 + \beta) - \gamma$ if $\tilde{\rho}_A^H > 1/2$. Because $U^H(0, 0) > U^H(1, 0)$, there is no incentive for deviation when $\tilde{\rho}_A^H < 1/2$. However, if $\tilde{\rho}_A^H > 1/2$, it is straightforward to see that $U^H(0, 0) > U^H(1, 1)$ if and only if $F(1/2) > F_*^H$.

Once again, similar reasoning can be applied to the corrupt politician's choice. By following the same steps we conclude that, if $\tilde{\rho}_A^H < 1/2$, then there is no incentive for him to deviate from the choice of keeping the status quo. Moreover, if $\tilde{\rho}_A^H > 1/2$, then deviating is the best choice if and only if $F(1/2) > F_*^C$. This analysis allows us to establish our first result.

Proposition 1. *Suppose that $\mu > 1/2$. Then there exists a pooling equilibrium in which both honest and corrupt incumbents choose to keep the status quo (not to signal honesty). Moreover, if $\mu < 1/2$, there exists such a equilibrium if and only if either $\tilde{\rho}_A^H < 1/2$ or $\tilde{\rho}_A^H > 1/2$ and $F(1/2) > \max \{F_*^H, F_*^C\}$.*

The first thing to notice in the above proposition is that a sufficient condition for the existence of an equilibrium in which both politicians do not send any signal of honesty is that most of the politicians must be honest. Clearly, if incumbents' actions are not informative, voters' priors are decisive for the result. In this case,

with $\mu > 1/2$, after observing that the status quo has been kept, voters believe that the probability of the incumbent being honest is sufficiently high. Similar reasoning applies to the case in which $\mu < 1/2$ and $\tilde{\rho}_A^H < 1/2$. Second, even when most of the politicians are corrupt, an equilibrium without anti-corruption policies exists as long as two necessary and sufficient conditions hold. The first one is that, after observing $i = A$, voters must assign a high probability of the incumbent being honest ($\tilde{\rho}_A^H > 1/2$). This gives incentives for the incumbents to deviate from $\mathbb{I}^t = 0$ unless that they both believe that the share of voters who care about corruption is sufficient low ($F(1/2) > \max \{F_*^H, F_*^C\}$). Clearly, signaling honesty does not pay off when people do not value it.

We turn now to a pooling equilibrium with $\mathbb{I}^H = \mathbb{I}^C = 1$. Given that incumbents' actions are not informative in this case as well, we have $\tilde{\rho}_A^H = \mu$ and $\tilde{\rho}_A^C = 1 - \mu$. This implies that, after observing that an anti-corruption policy has been implemented, voters vote for the incumbent if and only if $\mu > 1/2$. In addition, one can see that, after observing that the status quo has been kept, they vote for the incumbent if and only if $\tilde{\rho}_{SQ}^H > 1/2$. We must consider each case separately.

Suppose initially that $\mu > 1/2$ (more than half of the politicians are honest). By choosing to implement an anti-corruption policy, the honest incumbent obtains $U^H(1, 1) = R(1 + \beta) - \gamma$. If $\tilde{\rho}_{SQ}^H > 1/2$, then his payoff when $\mathbb{I}^H = 0$ is $U^H(0, 1) = R(1 + \beta) > U^H(1, 1)$, such that he deviates to keeping the status quo. When $\tilde{\rho}_{SQ}^H < 1/2$, however, $U^H(1, 1) > U^H(0, 0)$ if and only if $F(1/2) < F_*^H$. The same analysis can be performed for the corrupt incumbent, which yields similar conclusions: when $\mu > 1/2$, if $\tilde{\rho}_{SQ}^H > 1/2$, there is incentives to deviate; instead, if $\tilde{\rho}_{SQ}^H < 1/2$, he does not deviate if and only if $F(1/2) < F_*^C$. Finally, when $\mu < 1/2$ both politicians receive $U^t(1, 0)$ by maintaining $\mathbb{I}^t = 1$, which is lower than both $U^t(0, 0)$ and $U^t(1, 1)$ for $t = H, C$. This implies that both politicians deviate in this case.

Proposition 2. *Suppose that $\mu > 1/2$. If $\tilde{\rho}_{SQ}^H > 1/2$, then there does not exist a pooling equilibrium in which both honest and corrupt incumbents choose to implement an anti-corruption policy (signal honesty). If $\tilde{\rho}_{SQ}^H < 1/2$, then there exists such a equilibrium if and only if $F(1/2) < \min \{F_*^H, F_*^C\}$. Moreover, if $\mu < 1/2$, there does not exist a pooling equilibrium in which both politicians signal honesty.*

Now, when most of the politicians are corrupt, in equilibrium both types of incumbent never choose to implement anti-corruption policies jointly. In fact, by observing such policies, voters assign a high probability that the incumbent is corrupt, such that it is always optimal to deviate to keeping the status quo. By doing so, both politicians can increase their payoffs, given that the cost associated to $i = SQ$ is lower—it is zero, indeed. On the other hand, when $\mu > 1/2$, an equilibrium in which both the honest and the corrupt send signals of honesty is possible when voters believe, after observing a deviation ($i = SQ$), that type $t = C$ is the most likely ($\tilde{\rho}_{SQ}^H < 1/2$). In this case, they do not deviate if there is a high probability that more

than half of the voters care about corruption and honesty. Clearly, signaling honesty in this context is worthwhile. If $\tilde{\rho}_{SQ}^H > 1/2$ instead, the incumbent wins the election with either policy, such that it is not rational to incur the cost γ . This makes him deviate.

We must now analyze separating equilibria. Let us start by considering the one in which the honest type chooses to keep the status quo while the corrupt one adopts anti-corruption policies. The voters' beliefs must therefore satisfy $\tilde{\rho}_{SQ}^H = 1$ and $\tilde{\rho}_A^C = 1$. While by choosing $\mathbb{I}^H = 0$ the honest incumbent obtains $U^H(0, 1) = R(1 + \beta)$, his utility is $U^H(1, 0) = R[1 + \beta F(1/2)] - \gamma < U^H(0, 1)$ when an anti-corruption policy is chosen. This implies that there is no incentives for him to deviate from keeping the status quo. The corrupt type, on the other hand, deviates from $\mathbb{I}^C = 1$ because $U^C(1, 0) = (R + B)[1 + \beta F(1/2)] - \gamma - \beta F(1/2)qC < U^C(0, 1) = (R + B)[1 + \beta F(1/2)]$. The conclusion is summarized in the next proposition.

Proposition 3. *There does not exist a separating equilibrium in which the honest incumbent keeps the status quo while the corrupt one implements anti-corruption policies.*

Given the voters' beliefs ($\tilde{\rho}_{SQ}^H = 1$ and $\tilde{\rho}_A^C = 1$), the incentives for the corrupt type to deviate from adopting anti-corruption policies are straightforward. He can improve his payoff in two ways: keeping the status quo is "cheaper" than signaling honesty and makes his reelection more likely. This is an important result because is independent of the parameters of the model. We conjecture that a society where such a pooling equilibrium is a possibility must be subject to serious institutional failures.

Perhaps the most interesting equilibrium to consider is a separating one with $\mathbb{I}^H = 1$ and $\mathbb{I}^C = 0$, which implies that $\tilde{\rho}_A^H = 1$ and $\tilde{\rho}_{SQ}^C = 1$. Observe that the honest incumbent's payoff in this case is $U^H(1, 1)$. In addition, by deviating he obtains $U^H(0, 0)$. It is straightforward to show that $U^H(1, 1) > U^H(0, 0)$ if and only if $F(1/2) < F_*^H$. In other words, the latter conditions guarantees that he does not deviate from the anti-corruption policy. Similarly, for the corrupt politician does not deviate from keeping the status quo it is necessary that $U^C(1, 1) < U^C(0, 0)$. This occurs if and only if $F(1/2) > F_*^C$.

Proposition 4. *There exists a separating equilibrium in which the honest incumbent implements anti-corruption policies while the corrupt one keeps the status quo if and only if $F(1/2) < F_*^H$ and $F(1/2) > F_*^C$.*

The condition that guarantees the existence of the equilibrium in which the honest politician signals that he is honest while the corrupt one does not is related to the public concern about corruption: the probability that more than half of the electorate cares about honesty must assume an intermediate value. This gives incentives only for the honest to adopt policies that fight corruption. One can notice

that the two necessary and sufficient conditions of Proposition 4 are jointly satisfied only when $F_*^H > F_*^C$. We analyze when such a condition holds and explore the intuitive implications of it in the next section.

2.5 Discussion

We must now discuss the role of the strength of institutions and voters' concern about corruption in the existence of the equilibria described in the previous section. For, let us first define what we mean by strong and weak institutions. Our paper highlight two main aspects of the institutional framework of a given society: the share of honest politicians in the total pool of potential candidates (μ) and the expected punishment for those who engage in corruption (qC). Thus, a society with strong institutions is the one in which honest politicians are the majority and the expected penalty for corruption is sufficiently high. Societies with weak institutions, instead, are characterized by the high prevalence of corrupt politicians and these are hardly punished for their misconduct.

The “quality” of the pool of politicians, in terms of competence and honesty, has been considered in the literature as a signal or result of a poor institutional framework. The seminal paper by Caselli and Morelli (2004), for example, shows how politicians in power can modify incentives to attract only “bad” politicians to elections. This is possible only when political and economic institutions are fragile and easy to be changed or captured by those in office. Intuitively, strong institutions are supposed to provide incentives for those with a suitable profile (e.g. honest and competent) to enter into politics. Accordingly, we interpret the share of honest (“good”) politicians in society as a measure of the institutional strength. Clearly, the higher μ the stronger the institutions.

Solid institutions are also supposed to punish criminals, in particular those in power who engage in dishonest or fraudulent conduct. This means that societies whose institutions are strong have effective police and justice systems. Moreover, the penalty for such crimes must be severe. In our model, the expected punishment for being caught practicing corruption is qC . The effectiveness of the police and justice system is measured by the probability of a corrupt incumbent being caught and punished q while the severity of the penalty is represented by C . Thus, we can conclude that the higher qC the stronger the institutions of a given society.

The importance of strong institutions for equilibria in which anti-corruption policies are implemented is highlighted in the next result.

Corollary 1. *In any equilibrium in which at least one type of incumbent signals honesty, more than half of the politicians are honest or the expected punishment for corruption is sufficiently large. Formally, in such equilibria we have $\mu > 1/2$ or $qC > \frac{\gamma B}{\beta R}$.*

The presence of weak institutions, namely a small share of honest candidates in the pool of politicians jointly with low expected punishment—e.g. due to ineffective

police and justice systems—, rules out the possibility of an equilibrium in which anti-corruption policies are adopted. In fact, societies where signaling honesty may be the incumbent's best strategy must present strong institutions in at least one of their dimensions. Proposition 2, for example, shows that $\mu > 1/2$ is a necessary condition for the existence of a pooling equilibrium in which both types of politician signal honesty. In addition, even when corrupts are the majority in society, a separating equilibrium in which both the honest and the corrupt ones reveal their types is possible as long as the punishment for corruption is sufficiently large. When $qC > (\gamma B)/(\beta R)$, we have $F_*^C < F_*^H$, which implies that the equilibrium described in Proposition 4 might be obtained.

We must now investigate how the strength of institutions and the share of voters who cares about honesty and corruption interact to allow the existence of equilibria in the signaling game. Recall that $F(1/2)$ measures the probability of the share of those voters being lower than half of the total electorate. We can, therefore, interpret it as a measure of the inverse of voters' concern about corruption in society, such that the higher $F(1/2)$ the less voters care about public misconduct. To see an example of that interaction, consider again Proposition 4. Besides strong institutions, for the existence of an equilibrium in which the honest incumbent signals honesty while the corrupt one does not it is necessary that the voters' concern about corruption be moderate: $F_*^C < F(1/2) < F_*^H$ provides incentives for the honest to adopt anti-corruption policies but not for the corrupt type. Observe that the cost of anti-corruption policies is sufficiently high for the corrupt politician when there is a combination of large punishment and high probability of being caught. Furthermore, he faces a moderate chance of being reelected without implementing them. An honest incumbent, on the other hand, has a lower cost to implement such policies and faces a low chance of being reelected without resorting to them.

As final examples of the interaction between the strength of institutions and the share of voters who cares about corruption, consider the two pooling equilibria. First, let us analyze the one in which both politicians keep the status quo. As Proposition 1 shows, when there is some weakness in the institutional framework due to the large share of corrupt politicians in society, for the existence of such equilibrium $F(1/2)$ must be sufficiently high. This means that the voters' concern about corruption must be low enough. The combination of weak institutions and low voters' concern about corruption might, therefore, drive the society to an equilibrium in which anti-corruption policies are never implemented. Finally, as we have seen, Proposition 2 shows that, besides strong institutions, it is also necessary that the share of voters who care about corruption in the total electorate must be high for the existence of an equilibrium in which both send signals of honesty.

Recall that $F(1/2)$ may be understood as the degree of incumbency advantage. Therefore, the above discussion can be adapted to conclude that there is an interaction between the strength of institutions and incumbency advantage. In fact, as we

have seen, the separating equilibrium in which only the honest politician sends signals of honesty requires a moderate degree of incumbency advantage, such that anti-corruption policies pay off only for the type with lower cost. Similarly, in an equilibrium in which both choose $I^t = 0$ ($I^t = 1$), the degree of incumbency advantage must be high (low, respectively). This shows that a high incumbency advantage may discourage anti-corruption policies.

3. An application to recent Brazilian political scenario

In this section, we apply our model to the Brazilian political scenario. We show that its main predictions are supported by data and anecdotal evidence. In particular, one can see that (i) as politicians started to perceive that voters had become more sensitive to the honesty of their representatives, and (ii) as the competition for presidential office became fiercer, the incumbent candidate started to adopt anti-corruption policies, and speeches and debate during campaign started to discuss issues related to public misconduct.

The first statement above is corroborated by data on corruption perception index, Google Trend's search (for words associated with corruption) volume and number of speeches regarding corruption and ethics in the Brazilian House of Representatives, among others. Given the short period analyzed and the availability of data, our sample is small and thus we cannot perform any econometric exercise. In fact, we only provide correlations and thus are not able to infer causality. However, we believe that it is reasonable to make the assumption that the manifestations were an exogenous phenomenon.¹⁰ Moreover, the set of evidence we present is broad and from different sources, which strengthens our reasoning. The second statement, on the other hand, is corroborated mainly by the analysis of some implemented policies and the speeches of the presidential candidates during campaign period.

3.1 Period pre-2013

For long the average Brazilian voter had been seen as someone who does not care about corruption in public administration (Winters & Weitz-Shapiro, 2013). In fact, there is plenty of anecdotal evidence suggesting that Brazilians had been tolerating high levels of corruption over time. One of the most noted examples is the following saying used originally to characterize Ademar de Barros, a former governor of the state of São Paulo (1948–1951 and 1963–1966), mayor of the state's capital (1957–1961), and serial runner-up to the presidency: “He steals but get things done”.¹¹ More recently, the same saying was used to characterize Paulo Maluf,

¹⁰In this context, exogeneity means that manifestations were not caused or anticipated by politicians when they changed their behavior and speeches.

¹¹In Portuguese, “Ele rouba mas faz!”.

another former state governor of São Paulo (1979–1982), mayor of the city of São Paulo (1969–1971 and 1993–1997), congressman and presidential candidate. The successful political careers of Barros and Maluf are strong evidence that voters do think that politicians' achievements while in office may offset the acts of corruption committed. As discussed in the introduction, there is also empirical evidence (Pereira & Melo, 2015) showing that indeed Brazilians do not punish corrupt politicians in elections.

Based on the above discussion, the model we develop in section 2 suggests that Brazilian incumbent politicians had fewer incentives to adopt anti-corruption policies, that is, to send signals that they are committed to fighting dishonesty. In fact, the recent history of Brazilian politics shows that this was the case until the middle of 2013. The perception that Brazilian voters are indifferent to corruption had been so widespread among politicians that most of the political campaigns used not to bring the subject up. As examples, let us focus on the presidential campaigns of 1998, 2006 and 2014, the only elections in which there was an incumbent seeking reappointment.

Although both Fernando Henrique Cardoso (FHC) and Luis Inácio Lula da Silva, incumbent presidents in 1998 and 2006, respectively, had their governments associated with corruption scandals,¹² their campaigns and speeches virtually excluded references to words such as “honesty” and “corruption”. Machado (2009) analyzes the candidates' speeches in details and shows that, even with the large media coverage about those scandals—which would make the public more aware about the illegal acts—, FHC and Lula's campaigns focused on economic issues and continuity of government. Moreover, the opposition candidates did not adopt strategies exploiting corruption either, which also suggests that voters were considered indifferent to issues related to honesty.

The conclusion we can draw from incumbents' speeches is strengthened by their actions and policies regarding corruption while in office. Despite the fact that both FHC and Lula have sent bills to create anti-corruption agencies and establish other measures with the same aim—only in their second term in office, therefore when they were not trying to be reelected—, some of them were never voted by the Congress and others would be part of the anti-corruption measures proposed and implemented by the president Dilma Rousseff only some years later. As one can see, both incumbents FHC and Lula opted by not implementing strong and effective

¹²FHC administration was suspected of having bought votes for the approval of the Reelection Bill in 1997. Opposition political parties accused the government of having bribed congressmen to vote for passing the bill, which would allow FHC to be the first democratically reelected president in Brazil. Lula administration, in turn, was involved in the corruption scandal known as “Mensalão”, a neologism in Portuguese which means “monthly payment”. Many leaders of Lula's political group, the Worker's Party (PT), were charged and later convicted of building a bribery scheme, in which many congressmen were paid—in general in monthly basis—to vote for bills which were of the interest of government.

measures against corruption while in office. Given the Brazilian voters had been seen as indifferent to public misconduct (see [Figure 3](#) at page 298), our model predicts exactly this observed behavior. Because implementing anti-corruption policies is costly for both types of incumbents (honest and corrupt), there is no incentive to send signals of honesty when most voters do not care about it.

Another characteristic common to both politicians, namely the high degree of incumbency advantage, also made them less prone to implementing anti-corruption policies. As a proxy of their advantage, let us consider their performance in the first round of the presidential elections. While FHC won in the first round in 1998, with 53.06% of the valid votes (the second candidate obtained 31.71%), Lula won only in the second round in 2006, but he had already been voted by 48.61% of the voters in the first round. Once again, as our model predicts, a high incumbency advantage gives the incumbent the power of spending his resources in policies other than anti-corruption ones and still win the election.

3.2 The inflection point

Between June and July 2013, Brazil witnessed a series of manifestations triggered by protests against the increase in the bus and metro fares in the city of São Paulo. Those manifestations, mobilized mostly through social media, soon proliferated throughout the country, and a series of other demands was added to the problem of urban public transportation. According to surveys conducted by the National Confederation of Transport and MDA (CNT/MDA) in July 2013, the main reasons for the nationwide protests were dissatisfaction with corruption (reported by 55% of the surveys participants), quality of health services (47.2%), World Cup spending (43.7%), price and quality of the urban public transportation (30.8%), public education (30.5%) and public security (20.5%) ([Pujol, Rocha, & Sampaio, 2014](#); [Singer, 2013](#)).

The range of protesters' requirements was wide indeed, including some that had a direct impact on the politicians' lives and activities, such as improvement in the functioning of the state apparatus. Those specific demands also included: better harmony between legislative proposals and collective interests; greater efficiency of the judiciary in punishing cases of corruption and misconduct of politicians and public agents; greater transparency in public spending; public investments in some key sectors—education, health, security—should take priority over the constructions works for the 2014 Football World Cup and the Olympic Games of 2016 and; trials of politicians and former ministers of state for corruption.

One way to see that the manifestations of June 2013 caused a huge change in the average Brazilian voter's behavior towards corruption is through the Google Trend's search volume index. [Figure 2](#) presents the index for three words associated with public misconduct, namely corruption, anti-corruption, and *roubalheira*¹³, a

¹³All three words were searched in Portuguese, *corrupção* (corruption), *anticorrupção* (anti-corruption) and *roubalheira*. While there are straightforward translations for the two first, there is no good

Portuguese word that means huge theft, often associated with corruption. One can easily notice that there is a break in the three series in June 2013, the month in which the manifestations achieved the highest number of participants and the broadest press coverage. Table A-1 in Appendix reinforces the intuition from Figure 2 by presenting a t-test for the average index, comparing the search volume before and after June 2013. As we can see, the average of each one of the three words is very higher after the manifestations, which is proven by the p-value of the t-test.

Another possibility to observe the change in voters' behavior is to analyze the Corruption Perception Index (CPI), from Transparency International. As shown in Figure 3, the public perception of corruption in Brazil, measured by CPI started a solid increase in 2006 and reached its peak between 2012 and 2014, during the period of protests. In fact, the large scale of the manifestations made the popular demands reach Brazilian politicians. As a response, in June 21st, 2013, president Dilma Rousseff made a famous speech broadcast on radio, TV and other media, in which she promised an improvement in the provision of public goods as well as fighting corruption in public administration. This would be the first of a series of actions the president would take with the objective of sending signals that the government was intolerant to corruption.

Unlike her predecessor, some of the promises of president Rousseff were promptly implemented, especially those related to fighting corruption. In this context, the most significant measure adopted by the government was the approval of a bill that changed the classification of the crime of corruption in public administration (PLS 204/2011¹⁴). Such felony started to be considered heinous and therefore be subject to more severe punishment. The national congress also tried to meet popular demands by bringing back to voting a group of measures known as "Positive Agenda", which included proposals about public health, transportation, security, and education. Many of the measures voted on and implemented in this period had already existed and had been proposed by former presidents FHC and Lula. However, because of the reasons discussed in the previous section, only in the Dilma's administration they were implemented.

The contrast of her actions with her predecessors' is even more apparent when one compares Dilma's campaign for reelection in 2014 to the previous ones, namely 1998 and 2006. Both her speeches and the campaign advertising started to mention words such as "corruption", "honesty", among others related to public misconduct. In addition, her campaign jingle, whose slogan was "Dilma, brave heart", was intended to position Dilma as a candidate, but also as equal to other Brazilians that had been protesting on the streets. This political image was created to distance the president

translation for *roubalheira* in our opinion. The period analyzed is January 2009 to December 2017, and the region is only Brazil.

¹⁴As the number of this bill (204/2011) suggests, its first version dates from the second Lula's administration, as we mentioned before.

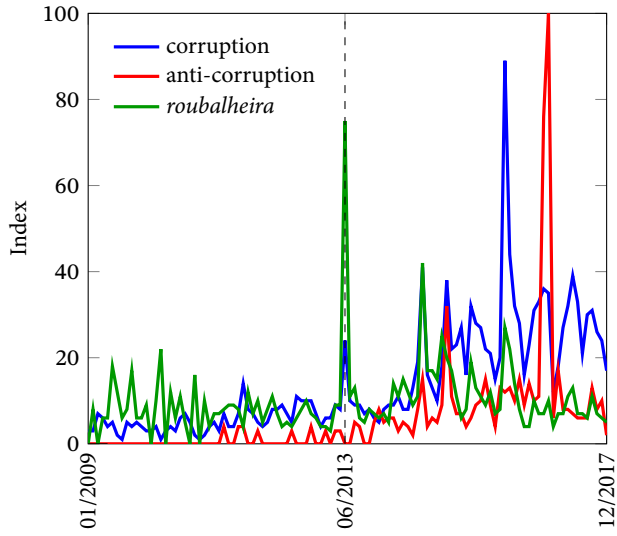


Figure 2. Google Trends's search volume index.

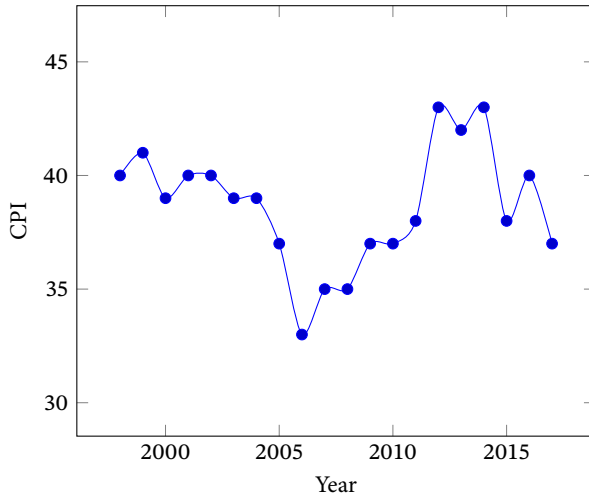


Figure 3. Corruption Perception Index (CPI).

from the corruption scandals that were affecting her party's reputation. In fact, the underlying idea of her campaign was that "there may be corruption in the political system, but the president is not aware of and does not agree with it."

Similar to her predecessors, president Rousseff faced corruption scandals during her first term in office. In particular, the so-called Petrolão was a corruption scheme in which funds of Petrobras, the state-owned Brazilian oil company, were used to bribe politicians of different parties, such as Progressist Party (PP), Brazilian Democratic Movement Party (PMDB) and mostly PT, the president's party. However, unlike FHC and Lula, Rousseff could not avoid topics related to public misconduct in her speeches and in presidential debates (Parzianello, 2016). The following statement, made on October 9th, 2014 in candidate's free campaign time, is an example of her concern about corruption:

We must create more efficient mechanisms to curb corruption and impunity. I am the first to advocate a restless fighting against corruption. Today we have a government committed to solving all kinds of problems. Exactly because of that, my deepest commitment in the second term in office is expressed by the phrase: "new government, new ideas".¹⁵

One can observe that once again Rousseff tries to distance herself from the "old PT's government", the one involved in corruption. The challenger candidate, Aécio Neves, also brought up the topic during the presidential debates, which made the incumbent reply to one of his questions by stating the following:

Candidate, my indignation at everything that has been happening, including the Petrobras case, is the same as the one of all Brazilians, my determination to punish all those investigated, who are guilty, both corruptors and corruptees, is total. I want to remind you that two laws approved in my government last year have been serving as the basis for this process of Petrobras investigation. The first is the law 12,830, which gives police chiefs the autonomy to investigate. (...) The other, which regulated plea bargaining, was law 12,850.¹⁶

¹⁵The original in Portuguese is:

Temos que criar mecanismos mais eficientes para frear a corrupção e a impunidade. Sou a primeira a defender o combate sem tréguas a corrupção. Hoje temos um governo empenhado a resolver todo o tipo de problema. Exatamente por isso, meu compromisso mais profundo para o segundo mandato, se expressa na frase: "governo novo, ideias novas".

¹⁶The original in Portuguese is:

Candidato, a minha indignação em relação a tudo o que acontece, inclusive no caso da Petrobras, é a mesma de todos os brasileiros, a minha determinação candidato, de punir todos os investigados que sejam culpados, os corruptos e os corruptores, é total. Quero

The approval of the bill that changed the classification of the crime of corruption in public administration (PLS 204/2011) as well as the recurring appearance of terms associated with honesty in the presidential campaign shows that the behavior—in terms of anti-corruption policies—of the incumbent Rousseff was very different from her predecessors'. The government's huge concern about corruption is explained, according to our model, by the widespread perception that Brazilian voters had become more concerned about public misconduct. As we have seen, this perception is particularly strong among politicians (see also Figure 4). Moreover, our model provides another potential explanation for Rousseff's behavior, namely her low degree of incumbency advantage. In fact, by using the candidate's performance in the first round as a proxy, her share of votes in the 2014 election was 41.59%, while her main opponent, Aécio Neves, obtained 33.55%. When one compares this dispute with those of FHC and Lula, one concludes that competition in 2014 was much fiercer than in 1998 and 2006 and that the incumbent's power was lower as well. Once again, our model predicts that, under those circumstances, there is more incentive for Rousseff to implement anti-corruption policies than her predecessors.

The assumption that politicians were aware of the change in Brazilian voters' behavior—and therefore that they faced incentives to adapt their actions—is reinforced by data on the congressmen's speeches in the Brazilian House of Representatives. Although our model is more suitable for studying the behavior of a politician holding an executive office, it can also be applied to legislators. By using data from the

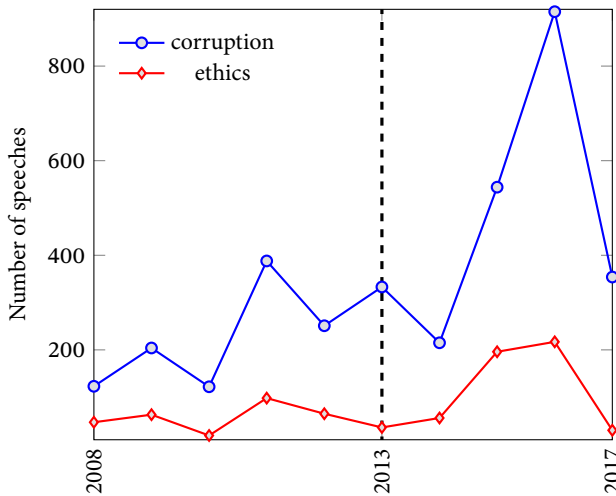


Figure 4. Number of speeches in the Brazilian House of Representatives.

lembrar que duas leis aprovadas no meu governo, ano passado, dão base para esse processo de investigação da Petrobras. A primeira a Lei 12.830 que garante a independência do delegado (...). A outra, que regulamentou justamente a delação premiada, a 12.850.

Brazilian House of Representatives,¹⁷ we can observe that there was an increase in the number speeches whose main theme was corruption over time. Figure 4 shows how the number of speeches regarding corruption and ethics evolved from 2008 to 2018. Notice that the number of speeches whose main theme was ethics does seem to present an increase. Table A-1 in Appendix corroborates the visual analysis¹⁸ by showing that the average number of speeches before and after the manifestations is statistically different at the 0.12 confidence level when the theme is corruption and only at the 0.32 when the theme is ethics. We attribute this result to the different appeal that the words “corruption” and “ethics” have in people’s view: while “corruption” is often associated with public misconduct and it is easy to be criticize in a speech, “ethics” is applied to a broader set of environments and its meaning is not always understood by the general public.

4. Concluding remarks

When voters do care about the honesty of their political leaders, office-seeker politicians—whether corrupt or not—have strong incentives to behave as if they were actually honest. The recent empirical literature on Political Economy has shown that incumbent candidates have implemented the strategy of signaling honesty mainly through anti-corruption policies adopted during campaign (the last year of their terms). In this paper, we provide a theoretical base for those recent findings. Through a simple signaling game, we find conditions under which an incumbent chooses to adopt policies that signal honesty. In particular, we find out that politicians’ perception of how much voters care about corruption as well as the degree of incumbency advantage is critical for their choices. Perhaps the most novel feature of our model, the interaction between institutions, which can vary according to its strength (the share of honest politicians in society and the power to arrest, prosecute and punish corrupts), and the voters’ concern about corruption, explains the existence of different equilibria. Our model’s main predictions are supported by data and anecdotal evidence from the Brazilian political scenario.

There are several promising extensions for the model developed here. One we find particularly interesting is to assume that the challenger is a strategic player. Before the incumbent chooses whether to implement anti-corruption policies, the challenger would choose between bringing up and discuss subjects such as corruption and honesty during the campaign, or doing nothing. Therefore, we would have a dynamic game, with the challenger being the first to play. Observe that, if it is

¹⁷Data available at <https://www2.camara.leg.br/atividade-legislativa/discursos-e-notas-taquigraficas>

¹⁸Once again, the small number of observations (in this case, 10) decreases the power of our analysis. Given this constraint, a p-value equal to 0.11 seems to be high enough to suggest that there is a difference between the averages.

common knowledge that voters do not care about those issues, there may not be incentives for the challenger to talk about honesty. In fact, in this case, he would not be able to instigate the incumbent to implement anti-corruption policies, especially if the latter has large incumbency advantage. One can notice that both voters' concern about corruption and incumbency advantage would continue to play an important role in the model. Such an extension might explain the behavior of incumbent's opponents during political debates, for example.

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Appendix. Tables

In this section, we present two tables that help to understand the change in the behavior of both voters and politicians after the public revolts of June 2013.

Table A-1. Average of Google Trends's search volume index by word.

	corruption	anti-corruption	<i>roubalheira</i>
average 01/2009–12/2017	14.05	5.79	9.86
average 01/2009–05/2013 (μ_1)	5.43	0.58	7.34
average 06/2013–12/2017 (μ_2)	22.35	10.80	12.30
p-value of t-test $\mu_1 = \mu_2$	3.73855E-14	1.27066E-05	0.002847297

Table A-2. Average number of speeches in the Brazilian House of Representatives by theme.

	corruption	ethics
average 2008–2018	344.9	82.7
average 2008–2012 (μ_1)	217.6	58.4
average 2013–2018 (μ_2)	472.2	107
p-value of t-test $\mu_1 = \mu_2$	0.11	0.31