When Are Opposition’s Lips Sealed?
Comparative Political Corruption in Democracies

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Abstract

Within a simple game-theoretic model, I study the monitoring relationship between incumbent politicians, who have access to corrupt rents, and opposition politicians, who have political incentives to monitor and expose corruption of the incumbents. The incumbent politicians have an opportunity to "seal the lips" of the opposition by offering them silencing bribes; the condition under which they will find beneficial to do so determines whether a high- or low-rent-extraction equilibrium prevails. I extend this framework to the possibility of multiple challengers and multiple levels of contestation. From the comparative statics results, I generate hypotheses about the levels of corruption in different institutional settings and test them empirically on a cross-section of democracies. I find that PR, federal, and presidential systems that impose term limits on chief executive are significantly more corrupt, controlling for the background political and economic factors.

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1 Introduction

Political corruption is a ubiquitous issue in democratic politics. It occurs despite the multitude of formal and informal regulations intended to prevent it. Moreover, it can involve high-level politicians who risk very high stakes if they are exposed. Recent grand corruption scandals feature young underdeveloped democracies such as Zambia, politically unstable ones such as Colombia, but also established and developed political systems of France, Germany, and the United States.

Does democratic political competition constrain corruption? If so, what are the political institutions that would provide constraints on corruption? Surprisingly, there exist few rigorous theoretical arguments in the literature that address this puzzle. A notable exception is Myerson (1993), who presents a model of the effect of electoral rules on corruption control. His argument is that under PR, entry barriers are low so that multiple parties are common. On the other hand, under plurality rule, when Duverger’s law holds, only two major candidates or parties will compete in each district, which leads to higher entry barriers. Assuming that the politics is multidimensional, voters find it more difficult to vote out corrupt incumbents if honest candidates, whom the voters might like on other issues as well, find it difficult to compete for public office. Hence, voters are more likely to re-elect a corrupt politician in a plurality system, where there is a single challenger. Conversely, the less expensive it is for a challenger to take on the incumbent, the more likely one is to appear in response to voter dissatisfaction. Thus, the hypotheses derived from this model are that PR systems should be less corrupt, or that corruption should fall with an increasing district magnitude. However, these hypotheses do not seem to hold water empirically: Persson, Tabellini, and Trebbi (2001) in their attempt to test the predictions of Myerson’s model do not find any empirical support for these predictions.

In another vein, Persson and Tabellini (2000, Ch. 9) extend a “career-concern model” of Holmstrom (1982) to rents and corruption. Voters prefer honest politicians to corrupt ones because of the costs that corruption imposes on citizens in terms of inflated budgets, low value public projects, etc. Hence, if voters can identify corrupt politicians, they will punish them by voting against them in the next election. Persson and Tabellini argue that voting over individual candidates, as in a PLURALITY rule system, creates a direct link between individual performance and re-election. This, in turn, gives incentives to incumbents to avoid corruption (Persson, Tabellini, and Trebbi 2001). However, this argument does not distinguish well between voting systems. In PR systems, the leadership is also known to the voters. As Kunicova and Rose-Ackerman (2002) argue, it is precisely the leadership that has access to corrupt rent and needs to be monitored in PR, so in fact voters can identify those politicians most subject to corrupt incentives in both PLURALITY and PR systems. However, it is not sufficient to identify those who might be corrupt. In addition, voters must be able to assess whether the politicians actually are engaging in malfeasance, which is what accountability models do not explain well.
In part to address this deficiency, Kunicova and Rose-Ackerman (2002) present a comprehensive theoretical framework in which different electoral rules create different conditions for monitoring of the incumbents by voters and by opposition. Their claim is that plurality systems create smaller districts where voters face less severe collective action problems to monitor potentially corrupt incumbents. In addition, they argue that plurality systems usually generate only one party in opposition that has stronger incentives to expose the corrupt incumbent than multiple opposition parties in PR systems that may face free-rider problems.

Building in part on the theoretical framework in Kunicova & Rose-Ackerman (2002), as well as on the stylized facts established in Kunicova (2001), this paper is an attempt to delve analytically deeper into the monitoring relationship between the incumbent politicians, who have access to corrupt rents, and opposition politicians, who have political incentives to monitor and expose corruption of the incumbents. Note that voters are not strategic players in this model; however, a more general model would include different incentives and constraints that political institutions give for grass-root monitoring of incumbents by voters.

In what follows, I develop a simple game-theoretic model of political corruption where with some exogenously given probability, the political opposition learns about incumbent’s corrupt dealings. The incumbents then have an opportunity to attempt to silence the opposition by offering them ”mouth-sealing” bribes. I show that they will do so only if a certain condition on parameters of the model holds. I also show that if incumbents do offer silencing bribes to the opposition, opposition’s lips are indeed ”sealed”, and high-rent-extraction equilibria prevail. In contrast, when incumbents do not find it worthwhile to offer mouth-sealing bribes, the threat of being possibly revealed by opposition induces incumbents into the low-rent-extraction equilibria. I then analyze the comparative statics of the model to determine which institutional features of democratic polities will make mouth-sealing condition more likely to hold or to be violated. I find that those features that increase the value of winning office for the challengers and those that decrease challenger’s a priori certainty about his victory make the low-corruption equilibria more likely. I then relate these concepts to real-world democratic institutions and derive empirical predictions about democratic institutions and political corruption. Specifically, since PR systems produce coalition governments in which the challenger expects to share power, the value of winning office in these systems is lower than in winner-take-all Plurality systems where the value of winning office is high. In addition, I argue that the fixed term in office periodically and systematically decrease challenger’s uncertainty about winning, since they eliminate incumbent as the strongest competitor. I also extend this framework to multiple levels of contestation to include federal and Presidential systems. From this reasoning, I derive hypotheses and test them on a comprehensive cross-section of democracies, controlling for the size of rent base in the system and additional political and economic background factors. I find that PR systems, as well as presidential systems with term limits and federal systems, are associated with higher
corruption.

The rest of the paper is organized as follows. Section 2 introduces the model and presents equilibrium results. Section 3 describes extensions to the multiple levels of contestation and multiple challengers. Section 4 derives comparative statics results and empirical implications, followed by hypotheses for empirical testing stated in Section 5. Section 6 discusses the data and operationalization issues, as well as econometric methods. Section 7 presents empirical results, and Section 8 concludes. Most technical issues are relegated to the Appendix in Section 9.

2 The Model

2.1 Setup and Notation

Let $P$ be the incumbent politicians (the legislators, cabinet members, or the President) and $C$ the potential challengers of political offices.\footnote{Note that the number of players and the interplay among them will depend on electoral rules, number of parties, presidential/parliamentary system, and other institutional rules. To simplify discussion of the model, we use singular for $P$ and $C$ in this section; however, we return to the possibility of multiple challengers and multiple levels of contestation in the next section.} \footnote{Thus, $l$ is the proportion of rents accessible to the incumbent that he will choose to appropriate.} $P$ cares about private rents $r$ and the probability $\rho$ with which she will be re-elected and enjoy exogenous benefits from office, $\Omega_P$, tomorrow. She chooses to appropriate a certain level $l \in [0, 1]$ of rents $r$.\footnote{Thus, $l$ is the proportion of rents accessible to the incumbent that he will choose to appropriate.} If $P$ is exposed in her rent-extracting behavior, she pays a legal cost $k(l)$, as well as an electoral cost that is manifested in the decreased probability of re-election of the incumbent. Let $\rho_0$ be the probability of re-election before the corruption of incumbent was exposed and $\rho_w < \rho_0$ be the probability of re-election after the whistle was blown. Assume that this probability decreases with the proportion of the appropriated rents, so $\frac{\partial \rho_w(l)}{\partial l} < 0$.\footnote{Thus, $l$ is the proportion of rents accessible to the incumbent that he will choose to appropriate.}

Similar to $P$, challengers $C$ care about monetary benefits $b$ and the probability $\epsilon$ with which they will enjoy exogenous office benefits, $\Omega_C$, tomorrow. If a challenger $C$ managed to expose rent-extracting behavior of $P$, then $C$'s probability of winning office increases to $\epsilon_w > \epsilon_0$. Assume that the larger scandal $C$ uncovered, the higher the electoral benefit she enjoys: $\frac{\partial \epsilon_w(l)}{\partial l} > 0$. However, if $C$ is implicated in having taken bribes $b$ from the incumbents to remain silent, her probability of winning office decreases to $\epsilon_{ww} < \epsilon_0 < \epsilon$ and she must pay a legal cost $k_C$.

The sequence of moves is as follows:

1. Incumbent politician $P$ chooses the level of corruption $l \in [0, 1]$.
2. With probability $q(l)$, a challenger $C$ discovers evidence about $l$.
3. $P$, not knowing if $C$ has evidence to blow a whistle, decides whether to offer $C$ a bribe $b \geq 0$ in order not to be publicly exposed.
4. $C$ chooses whether to accept or reject $b$, and subsequently, whether or not to blow a whistle.

5. $P$ also has an option to blow a whistle on $C$ if $C$ took the bribe and blew the whistle on $P$ nonetheless.

2.2 Game Tree and Outcomes

Figure 1 depicts the game tree for this model. The utilities of the players under all possible outcomes of this game are as follows:

**Outcome 1:**
\[ u_P(O1) = lr + \rho \Omega_P \]
\[ u_C(O1) = \epsilon_0 \Omega_C \]
Substantively, there are two paths to this outcome:
1. If $C$ was offered $b$ without possessing any evidence to implicate $P$. In this case, $C$ will never blow a whistle. This is an assumption, although in reality there probably would be cases when $C$ could accuse $P$ on pure surmise. For now, suppose that blowing a whistle without evidence is quite costly to $C$—if she cannot prove that $P$ really is corrupt, she loses credibility in the eyes of the public, so her chances of winning office in the next election actually go down. So, we assume that $C$ will not blow a whistle if she does not possess any hard evidence, which happens with probability $1 - q(l)$.

2. If $C$ was offered $b$ while possessing evidence to implicate $P$. Note that rejecting $b$ and not blowing a whistle will clearly be a dominated strategy here.

**Outcome 2:**

\[ u_P(O_2) = lr - b + \rho_0 \Omega_P \]
\[ u_C(O_2) = b + \epsilon_0 \Omega_C \]

Again, there are two ways in which this outcome can be reached:

1. When $C$ has no evidence and is offered a silencing bribe. Again, since she does not possess hard evidence, $C$ will not blow a whistle by assumption.

2. When $C$ possesses evidence, accepts a silencing bribe, and decides not to blow a whistle.

**Outcome 3:**

\[ u_P(O_3) = (lr) - k_p + \rho (l) \Omega_p \]
\[ u_C(O_3) = \epsilon_w(l) \Omega_C \]

**Outcome 4:**

\[ u_P(O_4) = (lr) - b - k_p + \rho (l) \Omega_p \]
\[ u_C(O_4) = b + \epsilon_w(l) \Omega_C \]

**Outcome 5:**

\[ u_P(O_5) = (lr) - b - k_p + \rho (l) \Omega_p \]
\[ u_C(O_5) = b - k_c + \epsilon_w(l) \Omega_C \]

### 2.3 Analysis and Equilibrium Results

The solution concept for the game described above is the Subgame-Perfect Nash Equilibrium. First note that $C$ will always accept a silencing bribe if she does not have evidence of $P$’s wrong-doing ($u_C(O_2) > u_C(O_1)$), so Accept dominates Reject. However, if $C$ has the evidence, accepts the bribe, and exposes $P$ anyway, it is a dominant strategy for $P$ to play $W'''$ and expose $C$’s taking the silencing bribes ($u_P(O_4) > u_P(O_5)$, so $W'''$ dominates NW$'''$). Of course, these strategies are off the equilibrium path, because anticipating $O_4$, $C$ would never blow the whistle on $P$ after accepting $b$. On the other hand, if $C$ rejects $b$ while possessing some evidence of $P$’s wrong-doing, she will certainly blow a whistle ($u_C(O_3) > u_C(O_1)$, so $W$ dominates NW). Thus, the first decision of importance for $C$ on the equilibrium path is to choose Accept$'$ or Reject$'$ when she has some information about $P$’s wrong-doing.

$C$ chooses Accept$'$ if $b + \epsilon_0 \Omega_C \geq \epsilon_w(l) \Omega_C$. Thus, from $P$’s standpoint, an optimal bribe $b^*$ that will ensure that $C$ accepts it and does not blow a whistle...
is \( b^* = (\epsilon_w(l) - \epsilon_0)\Omega_C \). Intuitively, an optimal bribe is a compensation for electoral benefit that \( C \) would receive if she exposed a corrupt incumbent.

However, note that since there is an information set in this game, it may not always be optimal for \( P \) to offer \( b^* \). She will offer \( b = 0 \) if \( EU_P(b = 0) \geq EU_P(b = b^*) \), which reduces to \( (\epsilon_w(l) - \epsilon_0)\Omega_C \geq q(l)(k_P + (\rho_0 - \rho_w(l))\Omega_P) \).

Intuitively, if the electoral benefit for \( C \) from blowing a whistle is too high relative to the expected value of the legal and electoral costs that \( P \) would have to pay if discovered, it will be optimal for \( P \) to take a risk, not offer any bribes (offering anything between 0 and \( b^* \) is strictly dominated), and be exposed with probability \( q(l) \). Conversely, \( P \) will offer an optimal bribe \( b = b^* \) to \( C \) who will accept it and remain silent about \( P \)'s corrupt activities if the following condition holds:

\[
q(l)(k_P + (\rho_0 - \rho_w(l))\Omega_P) - (\epsilon_w(l) - \epsilon_0)\Omega_C > 0
\]

Henceforth, we refer to this inequality as a Mouth-Sealing Condition. Depending on whether it is fulfilled, \( P \) maximizes either her expected utility from giving a zero mouth-sealing bribe and taking the risk of being exposed, or her expected utility from giving an optimal bribe. In other words, \( P \) solves one of the following two problems:

(i) If Mouth-Sealing Condition holds, then \( P \) solves:

\[
\max_l \left\{ lr - (\epsilon_w(l) - \epsilon_0)\Omega_C + \rho_0\Omega_P \right\}
\]

subject to the following constraints:

\[
l \geq 0
\]

\[
l \leq 1
\]

\[
(\epsilon_w(l) - \epsilon_0)\Omega_C < q(l)(k_P + (\rho_0 - \rho_w(l))\Omega_P)
\]

(ii) If Mouth-Sealing Condition does not hold, then \( P \) solves:

\[
\max_l \left\{ (1 - q(l))(lr + \rho_0\Omega_P) + q(l)(lr - k_P(l) + \rho_w(l)\Omega_P) \right\}
\]

subject to the following constraints:

\[
l \geq 0
\]

\[
l \leq 1
\]

\[
(\epsilon_w(l) - \epsilon_0)\Omega_C \geq q(l)(k_P + (\rho_0 - \rho_w(l))\Omega_P)
\]

To make these problems analytically tractable, we choose simple functional forms for \( q(l), k_P, \rho_w(l), \) and \( \epsilon_w(l) \). In the Appendix, we show that the maxima exist even given the discontinuity of the objective function. We then derive the following equilibrium results:

**Result 1** In the mouth-sealing case, a high rent-extraction equilibrium prevails, in which incumbent \( P \) chooses \( l = 1 \). In the no-mouth-sealing case, a low-rent-extraction equilibrium prevails, in which \( P \) chooses \( l = 0 \). In addition, an interior high-rent-extraction equilibrium in the mouth-sealing case and an interior low-rent-extraction equilibrium in the no-mouth-sealing case are possible in the rare class of cases under very restrictive conditions on parameters.

**Proof.** In the Appendix.
Thus, Result 1 shows that in those political environments where the Mouth-Sealing Condition holds, we should expect higher proportion of political rents extracted; conversely, lower proportion of rents will be extracted in the environments that do not allow Mouth-Sealing. Therefore, the rest of the analysis focuses on deriving conditions that either explicitly allow Mouth-Sealing or make it more likely to occur.

2.4 When is it worth to offer mouth-sealing bribes?

The simple functional forms that we have chosen allow us to write the Mouth-Sealing Condition in the following form:

\[ MS = l^2[(1 - \rho_0)\Omega_P + K - \Omega_C(1 - \epsilon_0)] > 0 \]

So, the Mouth-Sealing Condition is a function of the level of corruption \( l \) that can be written as a square term multiplied by a linear function of \( l \). Denote \( l_{ms=0} \) the cut-point of \( l \) where incumbents where incumbents are indifferent between offering \( b = 0 \) and \( b = b^* \). At \( l_{ms=0} \), it must hold that either \( l = 0 \) or \( l(1 - \rho_0)\Omega_P + K - \Omega_C(1 - \epsilon_0) = 0 \). Thus, we can write

\[ l_{ms=0} = \frac{\Omega_C(1 - \epsilon_0) - K}{(1 - \rho_0)\Omega_P} \]

Note also that \( l_{ms=0} \in [0, 1] \) by definition of \( l \). Since we wrote the Mouth-Sealing Condition as a linear function of \( l \) with a positive slope (we can assume \( \rho_0 \neq 1 \)), there are 3 cases depending on the signs and values of the \( x \) and \( y \) intercepts of the mouth-sealing line: the MS line may take both positive and negative values, only negative values, or only positive values. Graphically, the mouth-sealing lines in these 3 cases look as follows:

3 Note that \( l_{ms=0} \in [0, 1] \) if:

(i) \[ \frac{\Omega_C(1 - \epsilon_0) - K}{(1 - \rho_0)\Omega_P} \geq 0 \iff \Omega_C(1 - \epsilon_0) \geq K \]

(ii) \[ \frac{\Omega_C(1 - \epsilon_0) - K}{(1 - \rho_0)\Omega_P} \leq 1 \iff \Omega_C(1 - \epsilon_0) - K \leq (1 - \rho_0)\Omega_P \]

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The reasoning above yields the following result:

**RESULT 2**

(i) If \( K - \Omega_C(1 - \epsilon_0) \leq 0 \) and \( 0 \leq \frac{\Omega_C(1-\epsilon_0)-K}{(1-\rho_0)M_p} \leq 1 \), incumbents offer no mouth-sealing bribes when \( l \leq \frac{\Omega_C(1-\epsilon_0)-K}{(1-\rho_0)M_p} \) and offer \( b^* \) when \( l > \frac{\Omega_C(1-\epsilon_0)-K}{(1-\rho_0)M_p} \) for \( \forall l \in [0,1] \).

(ii) If \( K - \Omega_C(1 - \epsilon_0) \leq 0 \) and \( \frac{\Omega_C(1-\epsilon_0)-K}{(1-\rho_0)M_p} > 1 \), then \( MS(l) < 0 \) for \( \forall l \in [0,1] \). This means that it will not be worth it to offer any mouth-sealing bribes regardless of \( l \).

(iii) If \( K - \Omega_C(1 - \epsilon_0) > 0 \) and \( \frac{\Omega_C(1-\epsilon_0)-K}{(1-\rho_0)M_p} < 0 \), then \( MS(l) > 0 \) for \( \forall l \in [0,1] \) which means that incumbents will offer mouth-sealing bribes \( b = b^* \) at \( \forall l \in [0,1] \).

While in case (i) both mouth-sealing and no-mouth-sealing situations are possible, cases (ii) and (iii) define conditions for pure cases in which either no mouth-sealing will ever occur (ii) or mouth-sealing will always take place (iii).

### 3 Extensions

While making few structural assumptions, the equilibrium results of the simple model presented in the previous section shows that if the Mouth-Sealing Condition holds, then in equilibrium politicians extract high proportion of rents available to them. Conversely, if the Mouth-Sealing Condition does not hold, we should expect incumbent politicians to extract low proportion of rents. In addition, Result 2(iii) derives restrictions on parameters under which the Mouth-Sealing Condition will always hold. Thus, these conditions provide the basis for comparison among different political systems. However, before empirical implications of the model can be derived, some additional assumptions need to be made explicit. I will consider two basic extensions: the possibility that there are multiple challengers in the system and that the political contestation takes place on multiple levels.

#### 3.1 Multiple Challengers

Political systems differ according to the number of potential challengers. For example, by Duverger’s law, plurality electoral systems produce two parties that alternate in power, while proportional representation systems produce multiple parties and imply coalition governments. While the simple model presented in the previous section is easily applied to a situation with a single challenger in

\footnote{Note that in the case of indifference, we assume that \( b = 0 \).}
a plurality system, some additional assumptions are necessary for the model to carry over to the proportional representation systems.

The most important modeling choice to be made in this case is an assumption about who can learn about incumbent’s corrupt activities. At first glance, it would seem that each of the multiple challengers has equal incentives to expose a corrupt incumbent; then, the incumbent would need to buy off all challengers who have learned about her malfeasance. This is the basis for the ”barriers of entry” arguments (Myerson 1993) that claim that political competition is higher in the systems with lower barriers to entry. However, Persson, Tabellini, and Trebbi (2002) find no empirical support for this argument. In addition, Kunicova and Rose-Ackerman (2002) argue forcefully that corruption scandals are public goods for opposition parties, so multiple challengers face free-rider problems in their attempts to expose incumbents. The idea is that smaller and less popular parties will not find it worthwhile to engage in costly attempts to reveal the corruption of incumbents, as the largest benefit from the decrease in probability of incumbent’s re-election will be reaped by the largest and most popular opposition party. The authors also find some empirical support for these claims on a large cross-section of democracies. Hence, for the purposes of this model, it seems much more plausible to assume that only the challenger with the highest probability of winning office will attempt to find out about the incumbents corrupt activities.

This assumption means that the sequence of play is exactly the same for the systems with multiple challengers as it is for the systems with a single challenger. So, after the incumbent has chosen the level of rents, the challenger who has the highest probability of winning office learns with probability $q$ about incumbent’s corrupt activities. Thus, $q$ does not depend on the number of challengers and is exogenously given. Also note that then all the parameters in the model $(\Omega, c_0, c_v, k_c)$ refer to the value of holding office, election probabilities, and legal costs of this particular incumbent.

Most importantly, however, note that the value of holding political office $\Omega$ will be affected by the political system. If the challenger expects to share office with other parties, then her future value of holding office $\Omega_C$ will certainly be lower than if she expects to be able to form a single-party government herself. Thus, in the multiparty systems where coalition governments are common, the value of holding office is lower than in plurality systems with alternating single-party governments.

### 3.2 Multiple Levels of Contestation

Equilibrium results of the model concern the level $l$ of corrupt rents $r$ that the incumbents will attempt to appropriate. In this sense, the equilibrium results are about the relative level of corruption as a proportion $l$ of the potential maximum rents from the given political office. However, the private benefit to the politician, or the standard definition of corruption as misuse of public
office for private gain, is better proxied by the product $lr$, or the absolute level of rents appropriated by a given politician.\(^5\)

Political systems vary both in the type of political offices among which each comes with a different potential amount of potential corrupt rents and in their number. The game described in the previous section can be played between the incumbents and the challengers on multiple levels, from the office of the President, to the legislators in the Upper and the Lower chamber of the legislature, to the local governments. Each of these political offices is associated with a certain level of potential maximum rents $r$ that its holder may appropriate. I make two straightforward assumptions:

1. The higher and the more influential the political office, the higher the potential maximum rents $r$ associated with it. Thus, an office of the President is associated with higher potential rents than an office of a Governor or a Mayor.

2. Perception of political corruption in the system will be some linear combination of the perception of rents across multiple levels of contestation. In other words, potential rents are higher in federal systems where there are more elected offices associated with potential rents than in the unitary states.\(^6\) Note that this does not imply that federal systems are in fact more corrupt, only that there are potentially more tiers on which rents can be extracted. Of course, the actual level of corruption will depend on how the game is played and whether a low-corruption or a high-corruption equilibrium prevails. In a similar vein, presidential systems also imply higher potential rents than parliamentary systems, since there is an additional level of contestation of a high-rent-yielding political office.\(^7\)

Slightly more formally, the aggregate political corruption will be $C = \sum_{i=1}^{n} l_i r_i$, where $i = \{1, 2, ..., n\}$ are the levels of contestation, $r_i$ are maximum potential rents associated with political offices on each of these levels, and $l_i$ is the equilibrium level of rents in the game played on each of the levels of political contestation. Thus, to restate the point, I do not \textit{a priori} assume that the systems with multiple levels of contestation are more corrupt: even a federal presidential system can in principle be absolutely clean if $\sum_{i=1}^{n} l_i = 0$, i.e. when low-rent-extraction equilibria prevail on all levels of political contestation. The question to be explored in the following section is whether and under what conditions such scenario may be possible.

\(^5\)Intuitively, the perception of the absolute, rather than the relative, level of appropriated rents is also what is likely to be driving the data on perception of corruption.

\(^6\)This is related to arguments made in the literature that imply that federal systems should be more corrupt. For example, Shleifer and Vishny (1993) argue that a relatively balanced power of subnational and national officials over tax or "bribe" base leads to over-extraction. Others have argued that in federal systems, there is a need to exchange favors to overcome decentralized authority (Wilson 1970, p. 304).

\(^7\)Kunicova (2000), Andrews and Montinola (2001), and Gerring and Thacker (2002) all make somewhat different arguments about why presidentialism should lead to higher political corruption. All three papers show on different datasets that presidential systems are in fact associated with higher corruption, controlling for a multitude of background factors.
In the following section, I first examine the comparative statics to determine what are the conditions for the low- or high-rent-extraction equilibria in individual games played on each of the levels of contestation. In other words, my concern in the first subsection of the next section will be $l_i$ while keeping $r_i$ constant. Having done so, I will return to the the multiple levels of contestation and derive empirical implications for the aggregate political corruption $C$ across different political systems.

4 Comparative Statics and Empirical Implications

4.1 The Level of Equilibrium Rents $l$

To determine which political systems allow politicians to appropriate higher proportion of rents available to them on each level of contestation, let us first examine Result 2(iii). It states that Mouth-Sealing always occurs if $K - \Omega_C(1 - \epsilon_0) > 0$.\footnote{Although Result 2(iii) requires $\Omega_C(1 - \epsilon_0) - K(1 - \rho_0)\Omega_C < 0$ to hold as well, note that this condition is superfluous, since it is always true that $(1 - \rho_0)\Omega_C > 0$. Thus, we only need to ensure that $K - \Omega_C(1 - \epsilon_0) > 0$.} Denote $F_{2iii} = K - \Omega_C(1 - \epsilon_0)$ and observe that this function is strictly increasing in the maximum legal cost $K$ and in the baseline probability that the challenger wins office $\epsilon_0$. More interestingly, it is decreasing in the value of holding office for challengers $\Omega_C$ since $\frac{\partial F_{2iii}}{\partial \Omega_C} = -(1 - \epsilon_0) \leq 0$.

Note that the derivative depends on $\epsilon_0$, so the rate at which $F_{2iii}$ is decreasing in $\Omega_C$ depends on the baseline probability of challenger’s winning office. In the limiting case where the challenger is absolutely certain to win, i.e., when $\epsilon_0 = 1$, $\Omega_C$ does not matter for the mouth-sealing at all and condition always holds since $K > 0$ by assumption.\footnote{Although our concern is democratic politics, an additional implication of this expression is that the incumbents who expect to be ousted by military coups will be increasingly corrupt.} However, in regular democratic politics, institutions can affect systematic variation in $\Omega_C$ and $\epsilon_0$.

Given that $\frac{\partial F_{2iii}}{\partial \Omega_C} < 0$ in democracies, it will be easier to satisfy Condition 2(iii) in the systems where the value of holding office for the challenger $\Omega_C$ is lower. For example, as noted in the previous section, if the challenger expects to share office with other parties, $\Omega_C$ will certainly be lower than if she expects to be able to form a single-party government herself. Therefore, proportional representation systems that allow for multiparty coalition governments and hence lower $\Omega_C$ are more likely to find themselves in the high-rent-extraction equilibria relative to majoritarian systems that produce single-party governments and higher $\Omega_C$.\footnote{A possible additional implication is that the more parties the challenger expects to share an office with, the more likely the high-corruption equilibrium. In other words, an expectation of a large coalition should be associated with higher corruption.} To see an intuitive reason for this, recall that an optimal silencing bribe that the incumbent needs to offer the challenger is essentially a
compensation for challenger’s electoral benefit from exposing a corrupt incumbent: \((\epsilon_w(l) - \epsilon_0)\Omega_C\). This bribe will clearly be easier for the incumbent to afford if \(\Omega_C\) is relatively low, so the Mouth-Sealing Condition is more likely to hold in such situations. Thus, incumbent politicians are more likely to convince the challenger to remain silent about \(P’\)'s malfeasance if the challenger expects to share office with someone else.

Also note that \(\frac{\partial F_{2\text{iii}}}{\partial \epsilon_0} > 0\), so the higher \(\epsilon_0\), the easier it is to satisfy the Mouth-Sealing Condition. What would be institutional or structural conditions that would make \(\epsilon_0\) systematically higher? High \(\epsilon_0\) implies that the challenger is very likely to win, regardless of whether the incumbent’s corruption is exposed or not. One situation under which all challengers have systematically higher probability of winning is when an incumbent is a “lame duck,” or almost certain not to be re-elected. Although the challengers have to face each other, they certainly have no competition from the incumbent, which in turn raises the baseline probability of winning for the strongest challenger \(\epsilon_0\). This happens when the incumbent has is a fixed term in office, or a term limit which does not allow immediate re-election. Hence, systems with fixed term in office and term limits should be associated with higher proportion of rent-extraction.

Now, what is the interaction between the value of holding office to the challenger and her baseline probability of winning office? Observe that the rate at which \(\Omega_C\) affects \(F_{2\text{iii}}\) and hence the Mouth-Sealing Condition is \(-\Omega_C\). What interests us now is the absolute value of this slope. When \(\epsilon_0\) is low, only a large \(\Omega_C\) can cause Condition 2(iii) be violated; hence, if opposition has little chance of winning, the value of holding office for the challenger is decisive for whether the Mouth-Sealing Condition holds. Yet as \(\epsilon_0\) grows large, a threshold value of \(\Omega_C\) that violates Condition 2(iii) is much lower. In other words, when \(\epsilon_0\) is high, \(\Omega_C\) needs to be only a little bit higher than \(K\) for Condition 2(iii) to be violated (as opposed to an entire order of magnitude higher when \(\epsilon_0\) is low). Thus, the coalition governments versus single-party governments do not ”make or break” Condition 2(iii) when \(\epsilon_0\) is high. By the reasoning above, term limits make a high \(\Omega_C\) a less relevant constraint for rent-extraction.

### 4.2 Aggregate Level of Corruption \(C\)

So far, we have been concerned only with the conditions that make the equilibrium results in the model hold. However, recall that these equilibrium results only address the relative level of rent extraction \(l\), while the perception of corruption in a country is likely to be a function of the total quantity of rents extracted. In other words, even relatively low \(l\) can imply billions in embezzled funds if a potential ”rent base” is large. As noted in the previous section, the potential total rents increase with the number of levels of contestation as
they proliferate access to political rents. However, the realized corruption will depend on how the game is played on each of these levels.

In the previous section, we derived the comparative statics for equilibrium level of rent-extraction for a single level of contestation. This is a real-world equivalent of unitary parliamentary systems. However, note that the background level of maximum available rents was kept constant. Yet the potential levels of rents associated with political office in these systems will depend on the wealth of the country, freedom of press, judicial system, and similar background characteristics that determine how well the background constraints on rent-extraction work. Thus, the aggregate level of corruption will be a function of all these factors and the equilibrium result for the level of rent extraction.

Now consider presidential systems. The chief executive is directly elected, so an additional level of contestation is added in comparison to parliamentary systems. This will only increase the level of corruption if the high-rent-extraction equilibrium prevails in the Presidential game. Note that the President is customarily elected in a single-person nation-wide district and of course, the future value of holding this office $\Omega_C$ is very high. However, a stylized fact about presidential systems is that all Presidents serve a fixed term in office and all but four presidential systems bar immediate re-election (Mainwaring 1995). By the argument in the previous subsection, the presence of term limits makes the high value of holding office a less relevant constraint on rent-extraction, while the term limits themselves increase rent-extraction. Hence, all else equal, presidential systems with term limits should be associated with higher total level of corruption. On the other hand, presidential systems without term limits should not be more corrupt than parliamentary systems with the same characteristics.

The predictions about federal systems are more complicated. They certainly add additional level of contestation, but it is difficult to determine how the mouth-sealing game will be played there. It is plausible that some of these games will have relatively high $\Omega_C$ and no term limits, which will increase the chance of a low-rent-extraction equilibrium. However, others may either have term limits and/or low $\Omega_C$’s and hence a high-rent-extraction equilibrium will prevail. If there is at least one level of contestation on which this happens, then the total level of corruption will be higher in federal systems than in unitary ones with the same characteristics.

### 5 Hypotheses

From the arguments in the previous section, the following two hypotheses can be derived:

**H1. MULTIPLE LEVELS OF CONTESTATION AND TERM LIMITS.**
Controlling for rent base and background constraints, Presidential systems with term limits lead to higher political corruption. Federal systems are also likely to be more corrupt than unitary systems.
H2. VALUE OF WINNING POLITICAL OFFICE. Controlling for rent base, background constraints, and multiple levels of contestation, political corruption should be higher when challengers expect to share office with others (PR) than when they expect to form single-party governments (PLURALITY).

6 Data and Methods

6.1 Measuring Corruption

Corruption is difficult to define, systematically observe, and measure. The most comprehensive cross-country data on corruption are based on perceptions, not concrete measures of payoffs. This raises the possibility that corruption may be perceived to be high because people take the trouble to uncover it. In the extreme, there could be an inverse relationship between the underlying amount of corruption and perceptions of its prevalence. For example, the underlying level of corruption may have been higher in Italy before the Clean Hands investigations than after it, but public perceptions of its level could have increased as a result of the investigations. However, although this can occur in an individual country as policy changes over time, it is unlikely to represent a stable result. I assume that politicians act strategically. If they predict that their corruption is likely to be uncovered, they will engage in less of it. Then perceptions and reality would converge. Political systems that encourage corruption would be more corrupt, and those who deal with the state at high levels would also perceive corruption to be high.

The surveys that I use are mostly based on the perceptions of such well-placed observers. In recent years, several indices have been developed that attempt to capture the abuse of political and bureaucratic power across countries. I rely on two indices that both measure perceptions of corruption, but use different aggregation methodologies: the Corruption Perception Index (CPI), compiled by Transparency International (Lambsdorff 1998), and the Control of Corruption Index (CORRWB), also known as GRAFT, compiled by the World Bank (Kaufmann, Kraay, and Zoido-Lobaton 1999). I prefer the CORRWB measure, but to check the robustness of the results, I run all models on CPI as well.

Transparency International (TI) has published its annual CPI ranking of countries since 1995. TI aggregates surveys of perceived corruption across countries based on the views of business people, risk analysts, investigative journalists, and the general public. Notice that many of the respondents are likely to have first hand knowledge of state operations not available to ordinary voters. The index aggregates corruption scores from up to 17 different polls for every country, including Wall Street Journal, Gallup International, Economist Intelligence Unit, World Bank, World Economic Forum, and others. These polls ask questions based on the concept of corruption as the misuse of public power for
private benefit; specifically, the focus is on kickbacks in public procurement, the
embezzlement of public funds, and the bribery of public officials.

The CPI is computed as an average of a number of surveys assessing each
country’s performance, ranging between 0 (highly corrupt) and 10 (perfectly
clean). Country coverage varies from year to year (from 38 countries in 1995
to 85 countries in 1999). This occurs because the surveys that make up the
index also vary from year to year. This poses a problem of inter-temporal
comparability of the rankings: if a country moves from score 6.4 in one year to
7.2 in another, it does not necessarily mean that it became “cleaner”; TI may
have simply used different surveys conducted by different institutions in these
years. Thus the CPI cannot be used to measure changes over time. Despite
its methodological deficiencies, the CPI is the best compilation available and is
widely used among researches conducting cross-country analysis of corruption
(Wei 1997a, 1997b; Fisman and Gatti 1999; Treisman 2000; Sandholtz and

Our second measure of corruption, CORRWB, is similar to the CPI in that
it also uses polls of experts and cross-country surveys of residents, resulting in
an index of perceptions of corruption. Most of its component parts are also
part of the CPI. However, CORRWB is a “second-generation index” in terms of
aggregation methodology. In contrast to TI’s average of surveys, CORRWB uses
an unobserved components model to aggregate up to 30 surveys in 1997-98. This
model expresses the observed data as a linear function of unobserved corruption
plus a disturbance term capturing perception errors and sampling variation in
the indicator. The model allows one to compute the variance of this disturbance
term, which is a measure of how informative the index is. The point estimate of
control of corruption is the mean of the conditional distribution of CORRWB
given the observed data and ranges between —2.5 (most corrupt) and 2.5 (least
corrupt). Similarly, the variance of this conditional distribution provides an
estimate of the precision of the CORRWB indicator for each country.

Being newer than CPI, CORRWB has been used in fewer studies, mostly by
the researchers at the World Bank and the Inter-American Development Bank
(Kaufmann and Wei 1999, Mehrez and Kaufmann 2000, Hellman, Kaufmann,
and Shankerman 2000, Adsera, Boix, and Paine 2000). However, it has obvious
advantages over the TI index in its more precise aggregation methodology and
country coverage (124 countries). The latter allows me to use a larger battery
of controls and gives me more confidence in the regression results. Therefore,
I use CORRWB as the main dependent variable and check the robustness of
my results by re-running the models on CRTIA. All my dependent variables are
highly correlated (0.94-0.99). This is hardly surprising since the World Bank
index relies on the same underlying surveys used by Transparency International,
and the annual TI indices include data from previous years. I report only the
results using the World Bank’s version of the index.

These indices measure the overall level of public sector corruption in a coun-
try, but my interest here is only in political corruption. Ideally, one would pre-
fer a more precise measure of political, as opposed to bureaucratic, corruption,
given that the relevant actors in my model are politicians, not bureaucrats.
Unfortunately, only one of the component surveys, the Gallup International, distinguishes between political and administrative corruption. However, as reported in the TI CPI Framework Document (Lambsdorff 1998), the correlation between the assessments of political and bureaucratic corruption is 0.88. TI considers this a justification for “blending political and bureaucratic corruption, since there is no strong evidence that countries differ in prevalence of one type of corruption over another” (Lambsdorff 1998:7). Therefore, the TI Framework Document claims that “the extent of political corruption is well represented by this data” (ibid: 8). The same argument can be made for CORRWB, since it shares the same substantive characteristics as the CPI. Furthermore, as noted above, the survey respondents are mostly people who would be particularly familiar with high level corruption, all of which is likely to involve top political actors. Thus, I use these indices as proxies because they appear to focus on high level corruption where I expect that political and bureaucratic malfeasance are highly correlated and because both indices omit purely private sector fraud that is outside the scope of this analysis.

6.2 Proxies for Rent Base and for Background Constraints

The model implies that the rent base and background constraints on rent-extraction are held constant. However, countries in my dataset differ in their "rent base" and the extent to which institutions other than constitutional structures induce or constrain corruption. As far as the rent base is concerned, some rents are “natural” rather than artificially created, but still induce corrupt competition over their distribution. Ades & DiTella (1996; 1999) and Treisman (2000) suggest that in the countries with large endowments of valuable raw materials – fuels, minerals, and metals – corruption may offer greater potential gain to officials who allocate rights to exploit such resources. As for background constraints on corruption, the basic one is the wealth of the country: given that uncovering corrupt behavior is costly, economically more developed countries are likely to be better at exposing corruption (Ades & DiTella 1996, Adsera, Boix, & Payne 2000, Treisman 2000; Mauro 1998). In addition, the freedom of press, civic traditions, and independent judiciary are most common constraints on corruption other than the constraints that follow from political competition (see Treisman 2000 for a comprehensive survey).

My goal is a parsimonious set of controls that would account for these background characteristics. To control for the size of the rent base, I follow Treisman (2000) and use the share of fuels, minerals, and metals in country’s exports (FU-ELMIN, from WDI 2001). To control for level of economic development, I use log of averaged GDP per capita, 1995-97 (WDI 2001). Finally, I also need to control for other aspects of the political system, above and beyond constitutional structure, that may influence the level of corruption – such as political rights and liberties including freedom of the press, and free and fair elections.
Freedom House Annual Surveys provide a measure of these factors. The Freedom House index is a composite of several aspects of personal and economic freedom including freedom of the press, an aspect of public life that is particularly relevant to the control of corruption. I average the years 1992/93 through 2000/01 to create variable FREEDH; the index takes values from 1 (free) to 7 (least free). Because I am only interested in democracies, I exclude from my sample those countries that score 5.5 or higher on this index even if some of these countries have formal electoral institutions.

I have also experimented with a larger set of economic, cultural, and social variables that were shown to influence corruption by other studies. These variables are: ethno-linguistic fractionalization (ELF; La Porta 1999); percent Protestant (PROT; Treisman 2000), British colonial heritage (BRITCOL; Treisman 2000); democracy for the last 50 years (STABDEMO; Treisman 2000); openness to trade (OPEN; WDI 2000); and regional dummies for Africa, East Asia, Latin America, OECD, and post-Communist countries (AFRICA, ASIAE, LAAM, OECD, and POSTCOM). However, I prefer the Freedom House index and GDP per capita to this large set of controls, because many of the other controls ought to influence the choice of electoral systems and constitutional structures. I am not trying to explain that choice. Rather, given that choice, I seek to discover if it has implications for the level of corruption. Thus, I do not want to include explanatory variables that are themselves part of the reason for the choice of one or another political system. Rather, I want general measures of aspects of the political/economic system that hold constant background levels of economic development and personal and economic freedom. Neither GDP per capita nor the Freedom House index is correlated with the measures of voting rules. Both, however, are fairly highly correlated with the presidentialism dummy.

### 6.3 Proxies for Multiple Levels of Contestation and Value of Winning Office

To test for the effects of multiple levels of contestation and term limits, I employ an interaction between the presidential dummy (PRES) and finite term in office (FINTERN). Both dummies are taken from the World Bank’s Database on Political Institutions (henceforth DPI 2a) as described in Beck, Clarke, Groff, Keefer, and Walsh (1999). The resulting interaction term, PRESFINT, takes the value 1 if the system has a directly elected president independent of the legislature who faces a term limit, and 0 otherwise. Furthermore, I use the federalism dummy (FEDERAL), also from DPI 2a. FEDERAL=1 indicates that the country has autonomous regions with extensive taxing, spending, and regulatory authority.

As a proxy for the value of winning office, I employ two variables. First, I take the benchmark indicator variable for PR and PLURALITY from DPI 2a. I
also check the robustness of my results by using a measure of candidate- versus party-centrism compiled by Seddon, Gaviria, Panizza, and Stein (2001).

The original dummy variables PR and PLURALITY, taken from DPI 2a for a cross-section of countries in 1997, have a non-empty intersection. In most cases, this reflects the fact that some bicameral systems use PR for one house and plurality for another, or that there are mixed electoral rules in a unicameral legislature. For methodological convenience, I create mutually exclusive categories PR and PLURALITY, by considering which electoral rule elects the majority of representatives in the Lower House. To see if the group of “hybrid” electoral systems is different from the “pure” ones, I construct two dummy variables, PRMIX and PLUMIX. The former takes the value 1 when a system that I have characterized as PR also has plurality elements. The latter takes the value 1 whenever a system labeled as PLURALITY has some PR features. There are 14 countries in each of these categories.

An alternative measure is the index of candidate-versus-party centrism (CAND). In the more candidate-centered systems, we would expect a higher ego-value of winning office for the challenger, while in a more party-centered system, this value should be lower. The index is based on the seminal work by Carey and Shugart (1995), although the authors have not always accepted the logic of Carey and Shugart’s scheme especially with respect to plurality rule systems. The index includes three components: ballot, pool, and vote. The summary index is an average of these three components, taking the value between 0 (most party-centered) to 2 (most candidate-centered). On balance, CAND aggregates several subtle features of electoral systems that crisscross the boundaries between PR and plurality. Thus, it provides a different way of operationalizing the value of winning office. The creators of the index also recommend a control variable CCAND for use whenever CAND is employed. CCAND measures the proportion of the legislators considered in creating CAND.

### 6.4 Econometric Methods

Each country’s corruption control index has a different conditional variance, which makes my cross-sectional dataset heteroscedastic by definition. Because standard errors are reported for each country estimate, I employ Weighted Least Squares (WLS) to correct for this problem, using the inverse of the standard error of corruption control index as analytic weights. To check the robustness of my results, I also run all models using OLS with White-corrected standard errors.

Although least squares assumptions require that the dependent variable varies freely, CORRWB is bounded between −2.5 and 2.5. However, the index does not display any particular clustering at very low or very high values, which suggests that truncation is not a major problem and maximum likelihood methods like Tobit are not necessary. I experimented with monotonic transformations of CORRWB that would allow it to vary from minus infinity
to infinity with no apparent change in results. TI CPI corruption indices are bounded between 0 and 10, but similarly to CORRWB, they display no particular clustering. The ordinality of the TI index was limited by averaging it over 1995-2001, so ordered probit was not necessary.

7 Empirical Results

I test my hypotheses by estimating the following four equations:

Equation 1 estimates the baseline background conditions that determine the size of rents and the ability of political institutions to function as constraints on rent-extraction.

\[
CORCONTROL_i = \alpha + \beta_1 GDPLN_i + \beta_2 FREEDOM_i + \beta_3 FUELMIN_i + \mu_i
\]

Equation 2, while controlling for the background conditions that enter Equation 1, examines the effect of the multiple levels of contestation and term limits in interaction with presidentialism:

\[
CORCONTROL_i = \alpha + (\beta_1 GDPLN_i + \beta_2 FREEDOM_i + \beta_3 FUELMIN_i) + (\beta_4 PRESFIN_{i} + \beta_5 FEDERAL_{i}) + \mu_i
\]

Equation 3 estimates the effect of the value of winning office, as operationalized by PR, on corruption control, while controlling for multiple levels of contestation, the separate effects of presidentialism with term limits, and background conditions:

\[
CORCONTROL_i = \alpha + (\beta_1 GDPLN_i + \beta_2 FREEDOM_i + \beta_3 FUELMIN_i) + (\beta_4 PRESFIN_{i} + \beta_5 FEDERAL_{i}) + (\beta_6 PR_{i} + \beta_7 PRMIX_{i} + \beta_8 PLMIX_{i}) + \mu_i
\]

Equation 4 is substantively identical to Equation 3, while using a different proxy for the value of winning office, namely the measure of candidate- versus party-centrism:

\[
CORCONTROL_i = \alpha + (\beta_1 GDPLN_i + \beta_2 FREEDOM_i + \beta_3 FUELMIN_i) + (\beta_4 PRESFIN_{i} + \beta_5 FEDERAL_{i}) + (\beta_6 CAND_{i} + \beta_7 CCAND_{i}) + \mu_i
\]

The results are reported in Tables 1–4. Each table contains the results of estimating the set of equations described above, but they differ in the dependent variables and methods to check their robustness. Tables 1 and 2 report the results of the regressions that used the World Bank measure of corruption control (CORRWB) as a dependent variable, while the averaged Transparency International Corruption Perception Index (CRTIA) was used to produce results in Tables 3 and 4. In addition, Tables 1 and 3 report the results of the
Weighted Least Squares estimation, while Tables 2 and 4 contain the OLS with robust standard errors.

The regression results strongly support predictions of the model. Starting with the baseline Equation 1, note that economic development as expressed in GDP per capita, political and civil liberties measured by the Freedomhouse index, and the share of fuels and minerals in country’s exports already explain 73-76% of the variation in the data. All of these variables are highly significant in the expected direction: wealthier countries have more resources to battle corruption; better political and civil liberties broadly indicate that political institutions, free press, and judiciary can function more effectively in constraining corruption; and, finally, the countries that have extractive economies tend to have higher systemic rents.

Equation 2 tests H1. The results suggest that multiple levels of contestation seem to pose a significant problem for corruption control. As expected, presidentialism in conjunction with term limits decreases corruption control, and so does federalism. Both variables are highly significant across different specifications. Adding presidential systems with term limits and federalism increases the explained variation to 75-82%. Interestingly, including these two variables causes FUELMIN loose significance.

H2 is tested by Equations 3 and 4. As hypothesized, PR systems seem to be significantly more corrupt than PLURALITY systems, while more candidate-centered systems are better for corruption control. Both PR and CAND are significant under all specifications, and the models add 1-3% to the explained variation in comparison to Equation 2.

8 Conclusions

This paper explored political corruption across different institutional settings. I developed a simple game-theoretic model, within which I studied the interplay between incumbents and challengers. The equilibrium results of the model suggest that there are two classes of possible equilibria in the monitoring game between challengers and incumbents. If the incumbents can afford to ”seal the lips” of the challengers by offering them silencing bribes, they are free to extract maximum rents. On the other hand, if the incumbents do not find it possible to offer mouth-sealing bribes, the low-rent-extraction equilibria are induced. Thus, the main findings of the model concerns the conditions under which the incumbents will find it possible to offer silencing bribes to the opposition. The comparative statics results reveal that the systems in which the value of winning office for the challengers is relatively high will be more successful in corruption control. In addition, systems in which challengers are more uncertain about their victory irrespective of whether they expose the incumbent, should also provide better constraints on rent-extraction. The reason for this is that the optimal silencing bribe that incumbents would have to offer challengers is essentially a compensation for the electoral benefit that the challenger would enjoy if
she succeeded in uncovering incumbent’s corrupt activities. This compensation grows with the value that the office has for the challenger and falls with the probability of winning in the absence of the revelation of incumbent’s corruption. Thus, it is easier for incumbents to buy off challengers for whom the value of winning office is relatively low or who have a relatively high baseline probability of winning office.

To derive empirical implications from this abstract theoretical model, I looked for institutional settings that would systematically affect the value of winning office for the challengers or their baseline probability of winning. I argued that PR systems with coalition governments should be associated with a lower value of winning office for the challenger, since she expects to share it with other parties. In contrast, winner-take-all plurality systems carry higher value of winning office. In addition, systems that impose term limits and thus periodically bar incumbents from political competition systematically increase the baseline probability of winning of the challenger.

I have also considered extensions to multiple levels of contestation. In those cases where there are multiple tiers with separate elections (such as in Presidential or federal systems), the game is played out on multiple levels. The aggregate level of corruption is defined as a linear combination of rents associated with each of these offices and the equilibrium level of rent-extraction on each of these levels. The model implies that presidential systems with a fixed term in office for the chief executive should be associated with higher political corruption because the high-corruption equilibrium is likely to result in the presidential game with term limits. The prediction for federal systems is not so straightforward, but they are also likely to be associated with higher aggregate level of corruption, if only because there exist multiple potential loci of rents on each level of government.

I have tested these basic implications of the model on a cross-section of democracies, controlling for political and economic background factors. I found that the predictions of the model hold up under different empirical specifications and different measures of corruption and causal variables. For example, I used not only dummies for electoral systems, but also an interval measure of candidate- versus party-centrism that is another proxy for value of winning office. The results are also robust to sensitivity analysis and removing influential observations.

The work presented here can be extended both theoretically and empirically. On the theoretical side, a simple single-shot game could be developed into a dynamic game. In addition, the case with multiple levels of contestation could be modeled more explicitly to allow for interaction between the levels. Furthermore, incorporating voters as strategic actors could make this a ”general equilibrium” model of political corruption. Plenty of extensions and refinements are also possible on the empirical side, since the model yields additional testable implications not explored here. For example, with a panel dataset, one could explore the effects of multiple parties in government, multiple parties in opposition, the level of corruption in president’s last year in office, and so on. In addition, the effects of bicameralism should be given a more thorough treat-
ment. Finally, the model does not generate implications solely for institutions, so the non-institutional effects on corruption that follow from the model should be further explored.

9 Tables

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Adj. R-sq. 0.75 0.79 0.81 0.81
Obs. 67 67 67 67

TABLE 1. RELATIONSHIP BETWEEN POLITICAL INSTITUTIONS AND CORRUPTION
Dependent Variable: CORRWB. Estimation Method: Weighted Least Squares (weights=1/corrwbse). Standard Errors in square brackets. Significance (2-tailed tests): * for 0.1>p≥0.05; ** for 0.05>p≥0.01 ; *** for p<0.01.
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TABLE 2. RELATIONSHIP BETWEEN POLITICAL INSTITUTIONS AND CORRUPTION II
Dependent Variable: CORRWB. Estimation Method: GLS with White-Corrected Standard Errors. Standard Errors in square brackets. Significance (2-tailed tests): * for 0.1>p≥0.05; ** for 0.05>p≥0.01; *** for p<0.01.
TABLE 3. RELATIONSHIP BETWEEN POLITICAL INSTITUTIONS AND CORRUPTION III
Dependent Variable: CRTIA. Estimation Method: Weighted Least Squares (weights=1/ctiasd). Standard Errors in square brackets. Significance (2-tailed tests): * for 0.1>p≥0.05; ** for 0.05>p≥0.01 ; *** for p<0.01.

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### TABLE 4. RELATIONSHIP BETWEEN POLITICAL INSTITUTIONS AND CORRUPTION IV
Dependent Variable: CRTIA. Estimation Method: OLS with White-Corrected Standard Errors. Standard Errors in square brackets. Significance (2-tailed tests): * for 0.1>p ≥ 0.05; ** for 0.05>p ≥ 0.01; *** for p<0.01.

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10 References


Ames, B. 2001. The Deadlock of Democracy in Brazil [complete citation]


11 Appendix

11.1 Assume functional forms

Let
\[ q = l, \text{ since } l \in [0, 1] \]
\[ k_P = lK \text{ where } K \text{ is a constant} \]
(think about it as a maximum legal cost if you steal everything; depends on
the legal system, size of \( r \), etc.)
\[ \rho_w(l) = \rho_0 - (1 - \rho_0)l^2 \]
\[ c_w(l) = c_0 + (1 - c_0)l^2 \]
We need the convex type of curvature here in order to:
(a) have the first derivative dependent on \( l \)
(b) get a maximum instead of the minimum (see 2nd order conditions).

Now, our objective functions and the mouth-sealing condition look as follows:
\[ F_{MS} = lr - (1 - c_0)\Omega_Cl^2 + \rho_0\Omega_P \]
\[ F_{NMS} = lr + \rho_0\Omega_P - Kl^2 - t^3\Omega_P + t^3\rho_0\Omega_P \]
\[ MS = l^2[(1 - \rho_0)\Omega_P + K - \Omega_C(1 - c_0)] > 0 \]

11.2 Discontinuity of the objective function and existence
of maxima

We have a discontinuity of objective functions at \( l_{ms}=0 \). We must both make
sure that the maxima exist on \([0, l_{ms}=0]\) and on \((l_{ms}=0, 1]\) and check if the
incumbents are in fact indifferent between offering bribes and offering none at
\( l_{ms}=0 \). This would imply that \( F_{MS}(l_{ms}=0) = F_{NMS}(l_{ms}=0) \).
\[ F_{MS} = lr - (1 - c_0)\Omega_Cl^2 + \rho_0\Omega_P \]
\[ F_{MS} = -(1 - c_0)\Omega_C\left(\frac{\Omega_C(1-c_0)-K}{(1-\rho_0)\Omega_P}\right)^2 + \frac{\Omega_C(1-c_0)-K}{(1-\rho_0)\Omega_P}r + \rho_0\Omega_P \]
\[ F_{NMS} = lr + \rho_0\Omega_P - Kl^2 - t^3\Omega_P + t^3\rho_0\Omega_P \]
\[ F_{NMS} = t^3\Omega_P(-1 + \rho_0) - Kl^2 + lr + \rho_0\Omega_P \]
\[ F_{NMS} = -\Omega_P(1 - \rho_0)\left(\frac{\Omega_C(1-c_0)-K}{(1-\rho_0)\Omega_P}\right)^3 - K\left(\frac{\Omega_C(1-c_0)-K}{(1-\rho_0)\Omega_P}\right)^2 + \frac{\Omega_C(1-c_0)-K}{(1-\rho_0)\Omega_P}r + \rho_0\Omega_P \]
\[ F_{MS}(l_{ms}=0) \geq F_{NMS}(l_{ms}=0) \]
\[-(1-\epsilon_0)\Omega_C(\frac{\Omega_C(1-\epsilon_0) - K}{(1-\rho_0)\Omega_P})^2 \leq -\Omega_P(1-\rho_0)(\frac{\Omega_C(1-\epsilon_0) - K}{(1-\rho_0)\Omega_P})^3 - K(\frac{\Omega_C(1-\epsilon_0) - K}{(1-\rho_0)\Omega_P})^2\]

\[[K - (1-\epsilon_0)\Omega_C] \left( \frac{\Omega_C(1-\epsilon_0) - K}{(1-\rho_0)\Omega_P} \right)^2 \leq -\Omega_P(1-\rho_0) \left( \frac{\Omega_C(1-\epsilon_0) - K}{(1-\rho_0)\Omega_P} \right)^3\]

\[l^2_{ms=0} \geq \Omega_P(1-\rho_0)\]

Hence, the maxima exist, either in the interior or in the corners (recall that we assume that when \(l_{ms}=0\), there is no mouth-sealing). So, there is a cusp at \(l_{ms=0}\) where the values of the two objective functions are equal.

The picture looks something like this:

\[F_{ obj}(l)\]

Discontinuous Objective Function \(F_{ obj}(l)\)

11.3 Proof of Result 1.

We are back to choosing an optimal level of \(l\) given the above functional forms. There are two possible optimization problems that the incumbents may need to solve, depending on whether the mouth-sealing condition holds or not.

11.3.1 Level of Corruption When Mouth-Sealing Condition Holds

The optimization problem looks as follows:

\[\max_{l} \{lr - (1-\epsilon_0)\Omega_C l^2 + \rho_0 \Omega_P\}\]

subject to

\[(1) \quad l - 1 \leq 0\]
\[(2) \quad -l^2[l(1-\rho_0)\Omega_P + K - \Omega_C(1-\epsilon_0)] < 0\]

which holds iff \(l(1-\rho_0)\Omega_P + K - \Omega_C(1-\epsilon_0) < 0\) and \(l \neq 0\)

and a non-negativity constraint:

\[(3) \quad l \geq 0\]
Now, we can write out a Kuhn-Tucker Lagrangian:

\[
\tilde{L}_{MS} = lr - (1 - \epsilon_0)\Omega_C l^2 + \rho_0 \Omega_P - \lambda_1 (l - 1) + \lambda_2 [l(1 - \rho_0)\Omega_P + K - \Omega_C (1 - \epsilon_0)]
\]

The Kuhn-Tucker conditions are:

\[
\frac{\partial \tilde{L}_{MS}}{\partial l} \leq 0
\]

\[
l \frac{\partial \tilde{L}_{MS}}{\partial l} = 0
\]

\[
\frac{\partial \tilde{L}_{MS}}{\partial \lambda_{1,2}} \geq 0
\]

\[
\lambda_{1,2} \frac{\partial \tilde{L}_{MS}}{\partial \lambda_{1,2}} = 0
\]

Breaking this down into six cases, we obtain:

(i) if \( l > 0 \), then \( \frac{\partial \tilde{L}_{MS}}{\partial l} = 0 \)

\[
\frac{\partial \tilde{L}_{MS}}{\partial l} = 0 = \frac{r - 2l(1 - \epsilon_0)\Omega_C - \lambda_1 + \lambda_2(1 - \rho_0)\Omega_P}{2l(1 - \epsilon_0)\Omega_C}
\]

\[
l^* = \frac{r - \lambda_1 + \lambda_2(1 - \rho_0)\Omega_P}{2(1 - \epsilon_0)\Omega_C}
\]

(ii) \( l \neq 0 \), so \( \frac{\partial \tilde{L}_{MS}}{\partial l} = 0 \)

(iii) if \( \lambda_1 > 0 \), then \( \frac{\partial \tilde{L}_{MS}}{\partial \lambda_1} = 0 \)

\[
\lambda_1 = 0
\]

(iv) if \( \lambda_1 = 0 \), then \( \frac{\partial \tilde{L}_{MS}}{\partial \lambda_1} > 0 \)

\[
l(1 - \rho_0)\Omega_P + K - \Omega_C (1 - \epsilon_0) > 0 \]

(v) if \( \lambda_2 > 0 \), then \( \frac{\partial \tilde{L}_{MS}}{\partial \lambda_2} = 0 \), but this is inadmissible

\[
l(1 - \rho_0)\Omega_P + K - \Omega_C (1 - \epsilon_0) \neq 0 \]

Checking the above 6 conditions:

First, begin by observing that (ii) will never hold since we rule out \( l = 0 \). Similarly, (v) will never hold because we assume that at \( l_{MS} = 0 \) there will be a different objective function. So, \( l = l^* \), \( \lambda_2 = 0 \); so we can write \( l^* = \frac{r - \lambda_1}{2(1 - \epsilon_0)\Omega_C} \).

Now we only need to examine two cases: when (iii) holds (corner) and when (iv) holds (interior):

1. When (iii) holds, \( l = 1 \) = \( l^* = \frac{r - \lambda_1}{2(1 - \epsilon_0)\Omega_C} \). Since \( \lambda_1 > 0 \) \( \Rightarrow \) \( r - 2(1 - \epsilon_0)\Omega_C > 0 \). We also need to check if the mouth-sealing (vi) holds: it must be true that \( (1 - \rho_0)\Omega_P + K - \Omega_C (1 - \epsilon_0) > 0 \), or \( (1 - \rho_0)\Omega_P + K > \Omega_C (1 - \epsilon_0) \) which is a non-restrictive condition on parameters.
The optimization problem looks as follows:

\[
\text{max} \{ lr + \rho_0 \Omega_P - K l^2 - l^3 \Omega_P + l^3 \rho_0 \Omega_P \}
\]
subject to

1. \( l - 1 \leq 0 \)
2. \( l^2[(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0)] \leq 0 \)

which holds if

(a) \( l(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0) \leq 0 \) for all \( l \in [0, 1] \)

or (b) \( l = 0 \)

and a non-negativity constraint:

3. \( l \geq 0 \)

Now, we can write out a Kuhn-Tucker Lagrangian:

\[
L_{NMS} = lr + \rho_0 \Omega_P - K l^2 - l^3 \Omega_P + l^3 \rho_0 \Omega_P - \lambda_1(l - 1) - \lambda_2[l(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0)]
\]

The Kuhn-Tucker conditions are:

\[
\frac{\partial L_{NMS}}{\partial l} \leq 0
\]

11.3.2 Level of Corruption When Mouth-Sealing Condition Does Not Hold

The optimization problem looks as follows:

\[
\text{max} \{ lr + \rho_0 \Omega_P - K l^2 - l^3 \Omega_P + l^3 \rho_0 \Omega_P \}
\]
subject to

1. \( l - 1 \leq 0 \)
2. \( l^2[(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0)] \leq 0 \)

which holds if

(a) \( l(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0) \leq 0 \) for all \( l \in [0, 1] \)

or (b) \( l = 0 \)

and a non-negativity constraint:

3. \( l \geq 0 \)

Now, we can write out a Kuhn-Tucker Lagrangian:

\[
L_{NMS} = lr + \rho_0 \Omega_P - K l^2 - l^3 \Omega_P + l^3 \rho_0 \Omega_P - \lambda_1(l - 1) - \lambda_2[l(1 - \rho_0) \Omega_P + K - \Omega_C(1 - \epsilon_0)]
\]

The Kuhn-Tucker conditions are:

\[
\frac{\partial L_{NMS}}{\partial l} \leq 0
\]
\[ \frac{\partial L_{NMS}}{\partial l} = 0 \]

\[ \frac{\partial L_{NMS}}{\partial \lambda_1, 2} \geq 0 \]

\[ \lambda_1, 2 \frac{\partial L_{NMS}}{\partial \lambda_1, 2} = 0 \]

Breaking this down into six cases, we obtain:

(i) if \( l > 0 \), then \( \frac{\partial L_{NMS}}{\partial l} = 0 \)

\[ \frac{\partial L_{NMS}}{\partial l} = \frac{\partial}{\partial l} \left[ lr + \rho_0 \Omega_P - K l^2 - l^3 \Omega_P + l^3 \rho_0 \Omega_P - \lambda_1 (l - 1) - \lambda_2 (l - \rho_0) \Omega_P + K - \Omega_C (1 - \epsilon_0) \right] \]

\[ = r - 2 K l - 3 l^2 \Omega_P + 3 l^3 \rho_0 \Omega_P - \lambda_1 - \lambda_2 (1 - \rho_0) \Omega_P \]

\[ = -3 \Omega_P r (1 - \rho_0) l^2 - 2 K l - (\lambda_1 + \lambda_2 (1 - \rho_0) \Omega_P) \]

(ii) \( l = 0 \), so \( \frac{\partial L_{NMS}}{\partial l} \leq 0 \)

\[ - (\lambda_1 + \lambda_2 (1 - \rho_0) \Omega_P) \leq 0 \]

\( \lambda_1 + \lambda_2 (1 - \rho_0) \Omega_P \geq 0 \) (always holds)

(iii) if \( \lambda_1 > 0 \), then \( \frac{\partial L_{NMS}}{\partial \lambda_1} = 0 \)

(iv) if \( \lambda_1 = 0 \), then \( \frac{\partial L_{NMS}}{\partial \lambda_1} \geq 0 \)

\[ \frac{\partial L_{NMS}}{\partial \lambda_1} \geq 0 \Leftrightarrow -(l - 1) \geq 0 \Leftrightarrow l \leq 1 \]

(v) if \( \lambda_2 > 0 \), then \( \frac{\partial L_{NMS}}{\partial \lambda_2} = 0 \)

\[ l (1 - \rho_0) \Omega_P + K - \Omega_C (1 - \epsilon_0) = 0 \] (MS holds with equality)

(vi) if \( \lambda_2 = 0 \), then \( \frac{\partial L_{NMS}}{\partial \lambda_2} \geq 0 \)

\[ l (1 - \rho_0) \Omega_P + K - \Omega_C (1 - \epsilon_0) \leq 0 \]

Checking the above 6 conditions:

1. Suppose that (ii) holds, ie \( l = 0 \). Then, (iii) cannot hold, so we have (iv): \( \lambda_1 = 0 \). Note that checking cases (iv) and (v) is superfluous, since the MS condition will always hold if \( l = 0 \), so it need not enter the Lagrangian in this special case.

Result 4a. Choosing \( l = 0 \) with \( b = 0 \) is always optimal in the NMS case.

2. Suppose (iii) holds, ie \( l = 1, \lambda_1 > 0 \). Then (ii) cannot hold, so (i) must hold:

\[ -3 \Omega_P r (1 - \rho_0) - 2 K - (\lambda_1 + \lambda_2 (1 - \rho_0) \Omega_P) = 0 \]

\[ -(\lambda_1 + \lambda_2 (1 - \rho_0) \Omega_P) = \Omega_P r (1 - \rho_0) + 2 K \]

\[ < 0 \]

\[ > 0 \]

\[ \therefore \text{contradiction} \]

So, there is no corner solution at \( l = 1 \) in the no-mouth-sealing case, so \( 0 \leq l_{NMS} < 1 \).
3. Finally, we have to check for maxima where $0 < l_{NMS} < 1$. So, suppose (i) holds. We then have:

$$-3\Omega_p r (1 - \rho_0)^2 - 2K l - (\lambda_1 + \lambda_2 (1 - \rho_0) \Omega_p) = 0$$

We already know that $\lambda_1 = 0$, so we omit it in the expressions below:

$$l_{1,2}^{*} = \frac{2K \pm \sqrt{4K^2 - 12\Omega_p r (1 - \rho_0) (\lambda_2 (1 - \rho_0) \Omega_p)}}{-6\Omega_p r (1 - \rho_0)}$$

$$l_{1,2}^{*} = \frac{K \pm \sqrt{K^2 - 3\Omega_p r (1 - \rho_0) \lambda_2 (1 - \rho_0) \Omega_p}}{-3\Omega_p r (1 - \rho_0)}$$

where $K^2 - 3\Omega_p r (1 - \rho_0) \lambda_2 (1 - \rho_0) \Omega_p \geq 0$. We need a nonpositive numerator (as the denominator is always negative), so we have

$$l_{NMS}^{*} = \frac{K - \sqrt{K^2 - 3\Omega_p (1 - \rho_0)^2 r \lambda_2}}{-3\Omega_p r (1 - \rho_0)}$$

Now we are checking two cases (vi) and (v):

If (vi) holds, $\lambda_2 = 0$. This yields $l_{NMS}^{*} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p}$.

For (v) never holds at the maximum, which is to say $l_{NMS}^{*} = l_{MS=0}^{*} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p}$. In other words, $F_{NMS}(l)$ does not have an interior maximum: incumbents will always be choosing the highest $l$ that makes them indifferent between offering $b = 0$ and $b = b^*$.

We need to stipulate the following conditions for the solution candidate $l_{NMS}^{*} = l_{MS=0}^{*} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p}$ to be a maximum:

From (iv), $\frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p} \leq 1$; and we also need to check (v) that at the solution

$\lambda_2 > 0$ holds:

1. First, $K^2 - 3\Omega_p^2 (1 - \rho_0)^2 r \lambda_2 > 0$
2. $K^2 > 3\Omega_p^2 (1 - \rho_0)^2 r \lambda_2$
3. $\frac{K^2}{3\Omega_p^2 (1 - \rho_0)^2} > \lambda_2$, i.e $\lambda_2 \in (0; \frac{K^2}{3\Omega_p^2 (1 - \rho_0)^2})$ which is a technical condition on $\lambda_2$.

Now, we need a condition on parameters so that $\lambda_2 > 0$

$$\frac{K - \sqrt{K^2 - 3\Omega_p^2 (1 - \rho_0)^2 r \lambda_2}}{-3\Omega_p r (1 - \rho_0)} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p}$$

Recall that $\lambda_2$ is bounded: $\lambda_2 \in (0; \frac{K^2}{3\Omega_p^2 (1 - \rho_0)^2})$

So, if $\lambda_2 = 0$, then $1 = \frac{3r - 1}{3r \Omega \epsilon (1 - \epsilon_0)}$

If $\lambda_2 = \frac{K^2}{3\Omega_p^2 (1 - \rho_0)^2}$, then $\frac{1}{K} = \frac{3r - 1}{3r \Omega \epsilon (1 - \epsilon_0)}$

Hence, $\lambda_2 \in (0; \frac{K^2}{3\Omega_p^2 (1 - \rho_0)^2})$ if $\frac{3r - 1}{3r \Omega \epsilon (1 - \epsilon_0)} \in (\frac{1}{K}; 1)$.

Need to show that this is consistent with $l_{NMS}^{*} = l_{MS=0}^{*} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p} \in [0, 1]$

**Result 4b.** In the small class of cases where $\frac{3r - 1}{3r \Omega \epsilon (1 - \epsilon_0)} \in (\frac{1}{K}; 1)$ and $K - \Omega C (1 - \epsilon_0) \leq 0$, the optimal level of corruption in the no-mouth-sealing case is $l_{NMS}^{*} = l_{MS=0}^{*} = \frac{\Omega C (1 - \epsilon_0) - K}{(1 - \rho_0) \Omega_p}$. ■