Electoral Accountability and Corruption in Local Governments: Evidence from Audit Reports[*]

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Abstract

Political corruption is a concern of many modern democracies. It weakens democratic institutions, restricts public services, and lowers productivity undermining economic development. Yet despite its importance, our understanding of what determines corruption is limited. This paper uses a novel dataset of political corruption in local governments, constructed from reports of an anti-corruption program in Brazil, to test whether the possibility of re-election affects the level of rents extracted by incumbent politicians. Exploiting variation induced by the existence of a term limit, we find that in municipalities where mayors are in their final term, there is significantly more corruption compared to similar municipalities where mayors can still be re-elected. In particular, the share of resources misappropriated is, on average, 57 percent larger in municipalities with lame-duck mayors. The findings suggest that electoral rules that enhance political accountability play a crucial role in constraining politician's corrupt behavior.

Key words: Accountability, Corruption, Local Governments, Re-election.

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1 Introduction

The abuse of entrusted power by politicians through rent-seeking and corruption is a threat to many modern democracies. Developing countries, in particular, provide seemingly endless examples of political elites diverting funds intended for basic public services such as health, schools, and roads for private gains.[1] While the pervasive effects of corruption on economic development have been well documented,[2] the root causes are poorly understood.

Variation in electoral systems is believed to explain a significant portion of the differences in corruption practices across countries. Because voters can oust corrupt politicians from office, electoral rules that enhance political accountability should constrain the behavior of corrupt politicians[3]. However, while there are convincing theoretical arguments for why political institutions affect corruption (see for example Myerson (1993) and Persson, Roland, and Tabellini (1997)), the empirical evidence identifying the specific electoral structures that discipline politicians' behavior suffers from at least two important shortcomings. First, most of these studies are based on indices that measure perceptions rather than actual political corruption. Second, many have relied primarily on cross-country analysis, where the inability to account for the full set of institutional arrangements that determine corruption has made results difficult to interpret. In this paper, we overcome these limitations by constructing a novel database on political corruption and using within country variation to identify the effects of a single mechanism of electoral accountability.

We examine the extent to which re-election incentives induced by term-limits affect the level of corruption in Brazil's local governments. We advance the previous literature by constructing new objective measures of political corruption using information from audit reports of a recent anti-corruption program. Our approach estimates the share of total resources audited that is associated with frauds in procurements, diversion of funds, and over-invoicing for goods and services. Thus, our measure not only captures various forms of corruption, but allows us to quantify it at the local level. Based on our estimates, corruption is responsible for losses of approximately R$1.5 Billion

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[1] See for example Di Tella and Schargrodsky (2003), Olken (2007), Reinikka and Svensson (2004)

[2] See Knack and Keefer (1995), Mauro (1995), Bertrand et al. (2006) for studies examining the impacts of corruption.

[3] Adsera, Boix, and Payne (2003), Kunicová and Rose-Ackerman (2005), Lederman, Loayza, and Soares (2005), Persson, Tabellini, and Trebbi (2003) provide cross-country evidence of the association between electoral rules and perceptions of corruption.

in local governments.[4]

With estimates for corruption at the municipal level, we compare mayors serving in first term to mayors in their second (and final) term to identify the effects of re-election incentives. To account for any potential differences in political ability between first and second term mayors, we employ several strategies. First, we compare second-term mayors with the set of first-term mayors who are re-elected in the subsequent election, and are thus potentially as political able as second-term mayors. Second, we exploit the fact that some second-term mayors still have career concerns and seek other political offices. Although in their second-term, these mayors should, as theory suggest, behave similarly to mayors who still have re-election incentives. Finally, we identify the effects of re-election incentives using only variation from municipalities audited at the same time and in the same state, while controlling for a full set of mayor and municipal characteristics.

Local governments in Brazil provide an ideal institutional setting to test our hypothesis for several reasons. First, in many countries the most corrupt governments seem to be at the local level, where governments are under the control of narrow elites that use the apparatus for personal gain (Rose-Ackerman 1999). Brazil, as one of the most decentralized countries in the world, is no exception. Its 5,565 municipalities are responsible for a substantial share of the provision of public services, including education, health, and sanitation. With the large influx of federal funds and the potential for local capture, it is not surprising that corruption at the municipal level is now an overarching concern (Veja 2004). Second, the importance of elections as an accountability mechanism is particularly relevant in a local context, where the proximity between citizens and government is close. Re-election incentives, which were only introduced in Brazil after a 1997 constitutional amendment that allowed mayors to run for a second consecutive term, are likely to have a significant influence in a mayor's decisions. Finally, by estimating the effects of re-election incentives on political corruption at a sub-national level, we keep constant the macro-level institutions, both formal and informal, whose differences plague most cross-country analysis.

Consistent with a simple political agency model, we find that mayors with re-election incentives are significantly less corrupt than mayors without re-election incentives. In municipalities where mayors are in their second term, the share of resources misappropriated is, on average, 57 percent larger than in municipalities with first-term mayors. The results are robust to not

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[4]We infer this number by using our estimate of misappropriation of 6 percent and applying it to R\$24.8 Billion transferred to 5118 municipalities with population less than 450,000 persons in 2002.

only various specifications, but also alternative measures of corruption. Considering that municipalities receive, on average, R$5,459,209 of federal transfers, lame-duck mayors misappropriate approximately R$205,075 more than first-term mayors. Assuming that in the absence of reelection incentives, first-term mayors would behave as second-term mayors, reelection incentives are responsible for inducing a reduction in resources misappropriated in the order of R$600 million (US$205 million). This is more than half of what the federal government spent in the Bolsa Escola conditional cash transfer program for all municipalities in Brazil during 2002.

We also find that the effects of re-election incentives vary considerably across differences in the local institutional settings that govern either the provision of information or the costs of being corrupt. For instance, among municipalities with local media or a local judge, we find little differential effect between first and second-term mayors. Conversely, for the municipalities without local media, re-election incentives reduce political corruption by 9 percentage points, which is almost double the average effect. The effects of re-election incentives are also more pronounced in municipalities where the elections were competitive suggesting that first term mayors with an electoral advantage can afford to be more corrupt.

Although our findings are consistent with a simple political agency model, the association between second-term mayors and higher corruption might reflect other underlying mechanisms. The possibility of re-election implies that voters are more likely to retain better politicians for a second-term. Hence, our regression estimates might simply be capturing differences in the ability of being corrupt between first and second term mayors or even a learning-by-doing effect, and not necessarily re-election incentives. However, we provide substantive evidence suggesting that this is not the case. First, our estimates are extremely robust to controlling for a mayor's previous political experience. Second, our results remain unchanged when we compare second-term mayors to first-term mayors who are later re-elected.

The comparison between second-term mayors and the group of first-term mayors that later become second-term mayors has a nice interpretation in the context of the model. The possibility of re-election induces two effects. It encourages corrupt incumbents to act less corrupt (discipline effect) and it allows voters to re-elect politicians that are less corrupt on average (selection effect). That our point estimate is positive and remains unchanged suggests that the disciplining effect of re-election incentives dominates the selection effect.

The importance of elections as a disciplining device is well recognized in the literature. Our findings relate to a growing literature suggesting that electoral accountability is a powerful mechanism to align politicians' actions with voters' preferences. Political economy agency models, such as Barro (1970), Ferejohn (1986) and Banks and Sundaram (1993), predict that incumbent politicians will refrain from maximum rent-extraction in their first electoral term in order to get re-elected and enjoy future rents.[5] Besley and Case (1995) show that re-election incentives affect the implementation of fiscal policy by governors in the U.S. and List and Sturm (2006) provide evidence that even secondary policies, such as environmental policy, are differently implemented depending on whether governors can run for re-election. This paper complements these other studies, and is the first to test if electoral accountability constrains opportunistic behavior of incumbents using an objective measure of political corruption.

The remainder of the paper is organized as follows. Section 2 presents a theoretical framework that links corruption to re-election incentives. It is within this context that we interpret our empirical results. Our empirical strategy is discussed in section 3 and, section 4 provides some basic background information on corruption in Brazil and describes the data. The results follow in section 6 and section 7 concludes the paper.

2   Theoretical Framework

In this section, we present a simple model to help interpret our empirical findings. We utilize the political agency framework of Besley (2006), whereby voters decide whether to re-elect an incumbent, but are unable to observe either his type or actions.[6] In a world of corrupt and non-corrupt politicians, a corrupt mayor who faces the possibility of re-election can exploit this information asymmetry to increase re-election chances by refraining from rent-seeking and behaving as a non-corrupt mayor. Given these re-election incentives, the model predicts that mayors who face re-election incentives will on average be less corrupt than mayors who do not.[7]

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[5]See Persson and Tabellini (2000) and Besley (2006) for excellent reviews of political agency models.

[6]Besley (2006) is an adaptation the political agency model of Besley and Smart (2007) and Banks and Sundaram (1993), which extended the earlier work of Barro (1970), Ferejohn (1986), Persson, Roland, and Tabellini (1997).

[7]Campante, Chor, and Do (2006) presents an alternative model where corruption depends on politician's stability. Politicians facing more uncertainty about re-election (a shorter horizon) will extract more rents from power.

Basic Model

Consider a two-period model with two types of politicians: a non-corrupt politician nc and a corrupt politician c. Let π denote the proportion of non-corrupt politicians in the pool of potential candidates. In each period, the elected politician sets a state-dependent policy $e_t(s_t, i)$, where $i \in \{c, nc\}$ is the type of politician and $s_t \in \{0, 1\}$ is the state of the world at time t. Each state occurs with equal probability and is only observed by the incumbent politician.

Given the choice of policy, voters receive a payoff of V if $e_t = s_t$ and zero otherwise.[8] Non-corrupt politicians set policy to maximize voters' objectives, whereas corrupt politicians receive a private benefit r_t for setting $e_t \neq s_t$. The private benefit is randomly drawn each period from a distribution $G(r)$ with mean μ and finite support $[0, R]$. The model assumes that $R > \beta(\mu + E)$ where β is a common discount factor less than one and E denotes ego-rents that politicians enjoy from holding office.

The timing of this game is as follows. A politician is elected at the beginning of each period, after which nature reveals to the incumbent the state of the world. If newly elected, nature also reveals his type. Corrupt incumbents then receive a random draw from the distribution $G(r)$ of private benefits. After policy is set, voters observe their payoffs and then decide whether or not to re-elect the incumbent or select a challenger who has been drawn at random from the pool of potential politicians. After elections are held, the corrupt politicians receive another independent draw r_2 from the distribution $G(r)$. Period 2 actions then follow and payoffs are realized.

The perfect Bayesian Nash equilibrium of this game requires that each politician behaves optimally in each period, given the decision rule of the voters. Because the game ends in period 2, absent re-election incentives, each politician sets his preferred policy. Non-corrupt incumbents will set $e_2(s, nc) = s_2$, and corrupt incumbents will set $e_2(s, c) = 1 - s_2$ to receive r_2. Since voters are better off with non-corrupt incumbents in period 2, they maximize the likelihood that a non-corrupt politician is elected to the second period.

The equilibrium in period 1 is much more intriguing. While non-corrupt incumbents will still behave in accordance with voters' objectives, corrupt politicians face a tradeoff. A corrupt politician can extract rents r_1 in period 1 and forgo re-election, or alternatively behave as a non-corrupt politician to guarantee re-election and reap the benefits of a second term.[9] Given this tradeoff,

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[8]The payoffs could be related instead to the levels of public good provision.

[9]Voters observing V will re-elect the incumbent politicians. To see this, note that the probability that a politician

the probability that a corrupt politician provide voters with a positive payoff in period 1 is simply $Pr(r_1 \leq \beta(\mu+E))$: the probability that r_1 is less than the present value of expected future benefits from holding office in period 2. Based on the distributional assumptions of r_1, this probability, which we denote as λ, is equal to $G(\beta(\mu + E))$.

Besley (2006) shows that in equilibrium non-corrupt politicians always set $e_t = s_t$. Corrupt politicians choose $e_2 = (1 - s_2)$ in period 2, and $e_1 = s_1$ in period 1, provided they earn sufficiently small rents. All politicians who choose $e_1 = s_1$ will get re-elected. In equilibrium, if the ratio of disciplined politicians to non-disciplined politicians is larger than the share of non-corrupt types, i.e. $\frac{\lambda}{1-\lambda} \geq \pi$, then rent extraction will on average be higher in the second period than in the first period, that is,[10]

$$(1-\pi)(1-\lambda) \int_{r_1 \geq \beta(\mu+E)}^{R} r dG(r) \leq (1-\pi)\lambda \int_{0}^{R} r dG(r) + (1-\pi)(1-\lambda)(1-\pi) \int_{0}^{R} r dG(r).$$

The intuition for this result is simple. When faced with the possibility of re-election, corrupt politicians have the incentive to reduce rent extraction and provide more public goods. Assuming the disciplining effect λ is large enough, rents will on average be higher in the second period, relative to the first period. This is the main testable prediction that we take to the data.

Before proceeding to the next section, it is useful to consider three natural extensions to this simple model that will shed light on some of the paper's empirical results. Besley (2006) provides a formal discussion of these issues, as well.

Access to Information Because the asymmetry of information between voters and politicians lies at the heart of political agency models, factors that influence access to information may affect the extent to which re-election incentives affect corruption. To allow for information

is non-corrupt conditional on observing V is:

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\begin{aligned}
Pr(i = NC|V) &= \frac{Pr(V|i = NC)Pr(i = NC)}{Pr(V)} \\
&= \frac{Pr(V|i = NC)Pr(i = NC)}{Pr(i = NC) + Pr(i = C)Pr(r_1 \leq \beta(\mu + E))} \\
&= \frac{\pi}{\pi + (1 - \pi)Pr(r_1 \leq \beta(\mu + E))} \geq \pi
\end{aligned}
$$

[10]The condition that $\frac{\lambda}{1-\lambda} \geq \pi$ is sufficient but necessary for rents to be higher in the second period. Rents are higher in the second period if the following inequality holds: $\pi \int_{r_1 \geq \beta(\mu+E)}^{R} r dG(r) < \frac{\lambda}{1-\lambda} \int_{r_1 \geq \beta(\mu+E)}^{R} r dG(r) + (\lambda + (1 - \lambda)(1 - \pi)) \int_{0}^{r_1 \leq \beta(\mu+E)} r dG(r)$.

to have a differential effect, the model can presuppose that voters observe their politician's type with some probability τ after the politician has chosen his action e. The likelihood that a corrupt politician will pool with non-corrupt politicians will then depend negatively on τ; as the likelihood that voters will observe the politician's type increases, politicians will be less disciplined, i.e. $\frac{d\lambda}{d\tau} < 0$. As corrupt politicians become less disciplined and more likely to be revealed, the selection effect increases thus reducing corruption in the second period, and potentially increasing corruption in the first. Empirically, one would expect that the difference in corruption between first and second-term mayors to be smaller in municipalities where there is more access to information.

Costs of Corruption Another possible source of heterogeneity stems from differences across municipalities in the costs of engaging in corruption. For instance, the probability of being punished or prosecuted for corruption charges is likely to be higher in municipalities where the judiciary has a formal prescience, thus increasing the cost of engaging in corrupt activities. To capture this feature in our framework, one could assume that corrupt mayors receive a private benefit θr_t, where $\theta \leq 1$ represents the costs of being corrupt. Corrupt mayors in deciding to accept the private benefits trade off the rents in the first period r_1 to the prospects of future benefits $\frac{1}{\theta}\beta(\theta\mu + E)$. The intuition is thus similar to the information case; as corruption costs increase, politicians become less disciplined and the selection effect increases. Therefore, we would expect that in municipalities where the costs of engaging in corruption is higher, the differential between first and second-term mayors will be lower.

Electoral Support and Advantage Incumbency advantage may also determine how re-election incentives affect corruption. An increase in electoral advantage will reduce the disciplining effect, as the probability of being re-elected increases, even if the corrupt mayor does not pretend to be non-corrupt. Thus, the difference between first and second-term mayors is expectedly less in municipalities where the elections are less competitive.

Career Concerns A mayor's political career does not necessarily end after his second term in office. In some cases, mayors choose to run for other political offices, such as state and federal legislature. Mayors who have political career concerns may refrain from rent-seeking, even if they are in their second-term, in which case we might expect the difference between first and

second-term mayors to be less.

3 Empirical Strategy

Our main objective is to test whether re-election incentives affect the level of political corruption in a municipality. The theory predicts that first-term mayors who still face re-election incentives should, on average, be less corrupt than second-term mayors who are no longer eligible for re-election. Here, we present the empirical specification used to test this hypothesis and discuss how our estimates can be interpreted in the context of the model.

We estimate the effects of re-election incentives using the following econometric specification,

$$r_{ij} = \beta I_{ij} + X_{ij}\delta + Z_{ij}\gamma + \eta_j + \varepsilon_{ij}, \tag{1}$$

where r_{ij} is the level of corruption for municipality i in state j, and I_{ij} indicates whether the mayor is in his second and final term. The vector X_{ij} is a set of municipal characteristics and the vector Z_{ij} is a set of mayor characteristics that determine the municipality's level of corruption. The term η_j represents state intercepts, and ε_{ij} denotes unobserved (to the econometrician) municipal and mayor characteristics thought to determine corruption. Assuming that $E[I_{ij}\varepsilon_{ij}] = 0$, the coefficient β measures the effect of facing a binding term limit on corruption levels.

The interpretation of β in the context of the model can be understood by examining the composition of mayors that is observed in the data. As depicted in Figure 1, the proportion of second-term mayors that are observed after the elections of 2000 is a combination of non-corrupt types π and corrupt types that were disciplined during their first term, i.e. $(1-\pi)\lambda$.[11] Whereas, first-term mayors represent the proportion of corrupt mayors in office from 1996-2000 that was not disciplined, and hence voted out of office. This group of first-term mayors can be divided further between non-corrupt types $(1 - \pi)(1 - \lambda)\pi$ and corrupt types $(1 - \pi)(1 - \lambda)(1 - \pi)$. Assuming this is the composition of types among first and second-term mayors, the coefficient β can be expressed as follows:

$$\beta = (1 - \pi)\lambda\bar{r} - (1 - \pi)(1 - \lambda)(1 - \pi)E_\lambda r \tag{2}$$

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[11]Recall that the possibility of re-election was only introduced in 1997. From 1996-2000 we only have first-term mayors.

where $\bar{r}$ is equilibrium rent for mayors who are in their final term and $E_\lambda r$ is the expected rents from first-term mayors.[12] Adding and subtracting $\bar{r}$, Equation 2 can be rewritten as the difference in corruption between second and first-term mayors net of the corruption that would have existed in absence of re-election possibilities:

$$\beta = [(1-\pi)\lambda\bar{r} - (1-\pi)\bar{r}] - [(1-\pi)(1-\lambda)(1-\pi)E_\lambda r - (1-\pi)\bar{r}] \tag{3}$$

Equation 3 has a nice interpretation. The first difference, which captures the selection effect, represents the fact that only a fraction of corrupt mayors survived the previous election. The second difference in brackets is the expected rents of first-term mayors from equilibrium rents in the absence of re-election possibilities. This second difference incorporates both the fraction of first-term mayors that will forgo re-election, $(1-\pi)(1-\lambda)(1-\pi)(1-\lambda)$, and the fraction of mayors that will be disciplined $(1-\pi)(1-\lambda)(1-\pi)\lambda$, the discipline effect. Hence, Equation 3 can be expanded to:

$$\beta = [(1-\pi)\lambda\bar{r} - (1-\pi)\bar{r}] - [(1-\pi)(1-\lambda)(1-\pi)[(1-\lambda)\bar{r} + \lambda\underline{r}] - (1-\pi)\bar{r}]$$

where $\underline{r}$ is the minimum level of rent extraction, which in the model was assumed to be zero.

As Equation 3 makes explicit, our measure of β captures both the selection and discipline effect induced by re-election possibilities. Even though it is difficult to identify each effect separately, we attempt to disentangle the two effects by re-estimating the model in Equation 1 for only the subset of mayors that get re-elected in the 2004 elections. By restricting the sample in this manner, we in effect eliminate the mayors that forgo re-election, i.e. $(1-\pi)(1-\lambda)(1-\pi)(1-\lambda)$. How this affects our estimates of β will provide insights into the relative importance of the selection effect in determining corruption.

4   Institutional Background

Several institutional features of Brazil facilitate the test of whether political incentives affect corruption levels. First, re-election incentives were introduced in 1997 through a constitutional amendment that enabled mayors to run for a second consecutive term. This amendment allow us to compare the corruption levels between municipalities where mayors are in their first term to those where mayors

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[12]In terms of the model this would simply be an r drawn from the distribution $G(r)$.

are in their second term. Second, in 2003 the Controladoria Geral da União (CGU) introduced an ambitious anti-corruption program that audits municipalities for their use of federal funds. These audit reports provide objective measures of corruption at the municipal level.

Moveover, municipal corruption has become an overarching concern for Brazil.[13] After the constitution of 1988, municipal governments became responsible for a substantial share of the provision of public goods and services, particularly in the areas of education and health. With the devolution of public service delivery to local governments, the federal government transferred large amounts of resources to municipalities. Currently, the 5,560 Brazilian municipalities receive on average $35 billion per year from the federal government, which represents approximately 15 percent of federal government's revenue.[14] This influx of federal funds has substantially increased the potential for local capture.

4.1 Corruption Schemes in Brazil's Municipalities

With a series of well-publicized federal corruption scandals, including the one that lead to the impeachment of ex-President Collor de Mello and the recent Congress voting-buying scandal of 2004, much of our understanding of corruption and its institutional sources in Brazil has been limited to the national scale (see for example Ames (1987), Fleischer (2002); Geddes and Neto (1992)). Corruption at the municipal level, although potentially increasing due to Brazil's decentralization, has received much less attention. However, in many countries the most corrupt governments seem to be at the local level, where governments are often under the control of narrow elites that use it for personal gain (Rose-Ackerman 1999).

In Brazil, municipal corruption assumes a variety of forms. Frauds in procurement processes, diversion of funds, and over-invoicing for goods and services are among the most common ways local politicians find to appropriate resources.[15] Other common irregularities include incomplete public works (paid for but unfinished); the use of fake receipts ("notas frias") and phantom firms (a firm that only exists on paper).

Some examples are useful to illustrate corruption technologies. A common scheme used to

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[13]For a detailed article on municipal corruption see VEJA (2004).

[14]For comparison, fiscal decentralization in the world is on average 6 percent, while in other similar developing countries such as Mexico, for example, it is only 3 percent.

[15]For a description of municipal corruption schemes in Brazil see Trevisan et al. (2004).

deviate public resources in the municipalities of El Dorado dos Carajés and Porto Seguro, for example, include the creation of phantom firms, simulation of procurement processes and payments made in the form of kickbacks to government officials.[16] In other contracts, although existing firms did win the bid, none of them were even aware that they had participated in the bidding process. The local administration used these firm's names in fake receipts to appropriate resources for public goods that were never provided.

Another irregular practice, common in several municipalities, is a non-competitive procurement process. While the Brazilian law requires a competitive bidding process with at least three participants for any project in excess of R$80,000 per year, the municipality of Itapetinga in the state of Bahia, for example, highlights one of the many ways local politicians have manipulated the public procurement process. In 2002 and 2003, the federal government transferred to Itapetinga R$ 389,000 (US$110,000) for the purchase of school lunches. In 12 out of the 16 calls for bids, only one bid was ever supplied. It was later discovered that each call for bids was posted only one hour prior to its deadline, and not surprisingly only a firm owned by the mayor's brother posted within the time limit. This same scheme was uncovered for other social programs in the areas of education and health.

In other procurement bids, irregularities appear because friendly or family firms have either benefitted from insider information on the value of the project, or certain restrictions have been imposed to limit the number of potential bidders. An example from Cacule, Bahia, illustrates this. The call for bids on the construction of a sports complex specified as a minimum requirement for participation that all firms needed to have at least R$100,000 in capital and a specific quality control certification. Only one firm called Geo-Technik Ltda., which was discovered to have provided kickbacks to the mayor, met these qualifications.

Another common form of corruption is for mayors to divert funds intended for education and health projects towards the purchase of cars, fuel, apartments, or payment of their friends' salaries. In some cases, the mayor himself is a direct beneficiary. For example, in *Paranhos*, Mato Grosso do Sul, R$189,000 was paid to implement a rural electrification project. As it turns out, one of the farms benefitted by the project was owned by the mayor.

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[16]These descriptions are based on several CGU reports and press releases available at: www.presidencia.gov.br/cgu.

4.2 Brazil's Anti-Corruption Program: an Overview

In May 2003 the government of Luiz Inácio Lula da Silva started an unprecedented anti-corruption program based on the random auditing of municipal government's expenditures.[17] The program, which is implemented through the Controladoria Geral da União (CGU), aims at discouraging misuse of public funds among public administrators and fostering civil society participation in the control of public expenditures. One of the main mechanisms to meet these objectives is the release of the audit findings on the internet and to media sources. The following quote from President Lula, extracted from the program inaugural speech, emphasizes this: "I think the Brazilian society needs to understand once and for all, that we are only going to be able to truly fight corruption when the civil society, with the instruments made available, can act as a watch dog."[18]

The program started with the audit of 26 randomly selected municipalities, one in each state of Brazil. It has since expanded to auditing 50 and later 60 municipalities per lottery, from a sample of all Brazilian municipalities with less than 450,000 inhabitants.[19] The lotteries, which are held on a monthly basis at the Caixa Econômica Federal in Brasilia, are drawn in conjunction with the national lotteries. To assure a fair and transparent process, representatives of the press, political parties, and members of the civil society are all invited witness the lottery.

Once a municipality is chosen, the CGU gathers information on all federal funds transfers to the municipal government from 2001 onwards. Approximately 10 to 15 CGU auditors are then sent to the municipality to examine accounts and documents, to inspect for the existence and quality of public work construction, and delivery of public services. Auditors also meet members of the local community, as well as municipal councils in order to get direct complaints about any malfeasance.[20] After approximately one week of inspections, a detailed report describing all the irregularities found is submitted to the central CGU office in Brasilia. The reports are then sent to the Tribunal de Contas da União (TCU), to public prosecutors and to the legislative branch of the municipality. For each municipality audited, a summary of the main findings is posted on the internet and disclosed to media sources. It is from these reports that we construct an objective measure of corruption.

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[17] In Portuguese the program is called *Programa de Fiscalização a partir de Sorteios Públicos.*

[18] The translation is ours. The speech is available at www.cgu.gov.br

[19] This excludes approximately 8 percent of Brazil's 5500 municipalities, comprising mostly of the state capitals and coastal cities.

[20] These auditors are hired based on a public examination, and prior to visiting the municipality receive extensive training on the specificities of the sampled municipality. Also, there is a supervisor for each team of auditors.

5 Measuring Corruption

This section summarizes different approaches to measuring corruption used in the literature and then describes the methodology we use in this paper to quantify political corruption. We finish by providing summary statistics of the corruption measures and municipal characteristics used in the empirical analysis.

5.1 Related Literature on Corruption

In a recent volume that focuses on the history of corruption in the United States, Glaeser and Goldin (2006) define corruption to have three central elements: (1) payments to public officials beyond their salaries; (2) an action associated with these payments that violates either explicit laws or implicit social norms; and (3) losses to the public either from that action or from a system that renders it necessary for actions to arise only from such payment.

As with any illegal activity, obtaining data on corruption is a difficult task. Several empirical studies that focus on illegal behavior have used indirect evidence to analyze its determinants and consequences (see for example Duggan and Levitt (2002); Fisman (2002); Fisman and Wei (2004), Bandeira, Prat, and Valletti (2007)). However, a small, but growing body of literature has tried to assess corruption more directly focusing on two forms: bribery of public officials and the theft of public resources.

Svensson (2003) uses a dataset of Ugandan firms to explain which firms pay bribes and why the payments vary across firms. He finds that firms typically have to pay bribes when dealing with public officials whose actions directly affect the firms business operations. Moreover, the amount paid to depend's on the firms' bargaining power which is mainly determined by the alternative return to their capital. In a related paper, Henderson and Kuncoro (2004) uses data from a survey of firms that pay bribes in Indonesia to analyze how fiscal capacity of local jurisdictions relates to corruption.

A second strand of the literature estimates corruption focusing on the theft of public resources. Di Tella and Schargrodsky (2003), using data from hospital audits in the city of Buenos Aires, compare prices paid by public hospitals for basic supplies such as ethyl alcohol and hydrogen peroxide. They argue that corruption is reflected in the price differences of these homogeneous inputs. Reinikka and Svensson (2004) analyze rent capture in a large educational transfer program

in Uganda. They collect data on grants received by schools using an expenditure tracking survey and measure rent capture as the proportion of the grants received by schools with respect to the total amount of resources transferred from the center. Olken (2007) conducts a randomized field experiment in 608 Indonesian villages. He measures corruption in road construction using a team of engineers and surveyors who estimate the quantity and prices of materials and interviewed villagers to determine the wages paid. Stolen funds are estimated by comparing the amount each project cost with the village's reported expenditures. An alternative measure is used by Engerman and Sokoloff (2006), who study the building of the Erie canal and other canals in New York during the antebellum period. They use the ratio of actual expenditures of public works relative to the original projected cost as a proxy for corruption.

5.2 Measuring Corruption using Audit Reports

Our approach, although related to the studies cited above, uses a new methodology made possible by the availability of audit reports from Brazil's anti-corruption program. Contained in each report is the total amount of federal funds audited for the current administration, as well as, an itemized list describing each irregularity and in most cases the amount of funds involved. Audit reports are available in the beginning of 2004 for the 486 municipalities randomly selected across the first 10 lotteries of the anti-corruption program.[21] We read each report classifying the irregularities found by auditors into corruption indicators and estimate the amount of public resources deviated for each irregularity.

Based on our readings of the reports, we codified the irregularities listed into several categories; some indicating corruption while others simply exposing poor administration.[22] For the purpose of coding irregularities, we define political corruption to be any irregularity associated with fraud in procurements, diversion of public funds, and over-invoicing. Specifically, we define a *procurement to be irregular* if: i) a required procurement was not executed; ii) the minimum number of bids was not attained; iii) there was evidence of fraud in the procurement process (e.g. use of bids from non-existing firms). We categorize *diversion of public funds* as any expenditure without proof of purchase or provision and/or direct evidence of diversion provided by the CGU. Finally, we define

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[21]Only 26 municipalities were selected in the first lottery. In May of 2004, starting with the tenth lottery, the CGU increased the number of municipalities sampled to 60.

[22]We also used two independent research assistants to code the reports in order to provide a check on our coding.

over-invoicing as any evidence that public goods and services were bought for a value above the market price.

These practices have not only been shown to be the most common ways in which local politicians appropriate resources, but in many instances they are not necessarily mutually exclusive (see Trevisan et al. (2004)). In effect, over-invoicing and illegal procurement practices often serve as complementary vehicles for funds diversion. To give a better sense of the irregularities found and the procedure used to code corruption, we present in the appendix some specific examples from the audit reports.

Based on the coding of the reports, we define as our principal measure of corruption the total amount of resources related to corrupt activities, expressed as a share of the total amount of resources audited. While this is our preferred measure, we also report two additional indicators of corruption: the number of irregularities related to corruption and the share of service items associated with corruption, which simply divides the number of irregularities related to corruption by the number of service items audited.

There are at least two reasons why we calculate these additional measures. First, although highly correlated with our main measure, these other indicators helps to distinguish whether second-term mayors also engage in more corrupt transactions. Second, in coding the amount of resource deviated or involved in an illegal procurement, a dollar amount was not available in all of the irregularities reported.[23] While coding these cases as zero underestimates the amount of corruption, this could create a bias for testing re-election incentives if the cases occurred disproportionately for first-term mayors.[24] By using additional measures we include these irregularities and thus avoid the potential bias.

5.3 Summary Statistics on Corruption and Government Irregularities

Summary statistics for each one of the three corruption categories and the overall corruption indicator are displayed in Table 1. As seen in row 1, 60 percent of the municipalities have performed an illegal procurement practice, and 49 percent of the municipalities have diverted some type of

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[23]Approximately 89 percent of the incidences of illegal procurement practices and funds diversion have a value.

[24]If anything we are underestimating the effect of re-election incentives on the share of total resources associated with corruption, because the proportion of these irregularities is 4 percentage points higher for second-term mayors, although not statistically significant.

funds. Over-invoicing is found much less frequently, occurring in only 5 percent of our sample. After combining these indicators, we see that 78 percent of the municipalities have had at least one incidence of corruption. Moreover, those administrations that commit an act of corruption average around 2.36 corrupt violations, which is 7 percent of the service items audited. The average amount of resources diverted is R\$118,486 per violation which represents 9.5 percent of the total amount audited.[25]

To get a sense for how re-election incentive may affect these various irregularities, Table 2 compares these indicators between municipalities with mayors in their first-term to those with mayors in their second-term. In panel A, the share of audited resources found to be associated with corruption is 3.6 percentage points higher for second-term mayor, and significant at 95 percent level of confidence. Second-term mayors are also more corrupt in each of the 3 categories of corruption (diversion of funds, illegal procurement practices, and over-invoicing), but it is the difference in illegal procurement that accounts for much of the difference in the aggregate measure. On average, the share of resources that are diverted illegally in the procurement of public works is 2.9 percentage points higher among second-term mayors than first-term mayors (standard error is 0.012).

When corruption is measured as either the incidence of irregularities or the share of service items, Panel B and C of Table 3 provide further evidence in support of the theoretical predictions. Compared to first-term mayors, second-term mayors commit 0.19 and 0.30 more irregularities in the diversion of funds and illegal procurement practices respectively, which represent 0.7 and 1.1 percentage points differences in the share of services items audited.

5.4   Data on Municipal Characteristics

Three other data sources, obtained from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* (IBGE)) and the *Tribunal Superior Eleitoral* (TSE), complement our political corruption variables. The richness of these data allows us to control for a large number of municipal characteristics, whose absence might otherwise confound our estimates.

The 2000 population census provides socio-economic and demographic characteristics of municipalities. Some of the principal variables include population size, income per capita, measures of

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[25]In general, we see that over 74 percent of these irregularities occur in the areas of education and health: sectors that were decentralized during of the late 1980s.

inequality, percentage of urban households, and education levels. These variables serve as important controls as shown by Treisman (2000) and Glaeser and Saks (2006).

Our second complementary data source from IBGE is a municipality survey, *Perfil dos Municípios Brasileiros: Gestão Pública*, conducted in 1999 and 2001. These data characterize various aspects of the municipality and its public administration, including the existence of laws which govern its budgetary and planning procedures and characterizing judiciary districts. The survey also provides structural features such as the existence of local daily newspaper, radio, or a municipal police force.

Finally, results from 2000 and 2004 mayor elections are available from the *Tribunal Superior Eleitoral* (TSE). These data contain vote totals for each candidate by municipality, along with various individual characteristics such as the candidate's gender, education, occupation, and party affiliation. We use this information to construct measures of electoral performance, and to control for individual mayor characteristics that might affect corruption.

Table 3 compares differences in mean characteristics of municipalities with a first-term mayor to municipalities with a second-term mayor. Because of our lack of experimental design and need to assume selection on observable characteristics, it is useful to understand if the determinants of corruption are significantly different across the municipalities with first-term and second-term mayors. As the table demonstrates, there are few differences in observable characteristics between these municipalities. Out of 43 variables, only 4 are significantly different at a 95 percent level of confidence.[26] There is a significant difference between first and second-term mayors in our measures of electoral performance for the 2000 municipal elections. This is not too surprising given that incumbents tend to have an advantage in elections. The other significant differences are the proportion of the population with at least a secondary school education and the share of the population that lives in urban areas; characteristics that are fairly correlated. In fact, the differences in the share of the urban population loses statistical significant once we account for the differences in secondary school attainment.

To get a sense for how some of these characteristics of the municipality relate with our measure of corruption, Figure 2a, 2b, and 2c present a series of graphs, based on nonparametric estimates, depicting the relationship between various municipal characteristics and the share of audited re-

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[26]Only the 14 most important variables are reported.

sources associated with corruption.[27] As consistent with the cross-country evidence, Figure 2a and 2b demonstrate that corruption is negatively associated with both GDP per capita and literacy rate. Figure 2c plots a negative yet weaker relationship between corruption and the proportion of population with at least a secondary school education.

6   Empirical Results

This section provides evidence that mayors who face a binding term limit are associated with higher levels of corruption, as measured by the share of resources appropriated. These findings are robust to alternative definitions of corruption, as well as various specifications and estimation techniques. We also explore how re-election incentives vary with local characteristics and find that they are larger among municipalities where the cost of rent extraction is lower and where the electoral advantage is lower. All these results are consistent with the theoretical predictions. We conclude this section with additional results that address several potential threats to our identification assumptions.

Basic Results on Corruption

Table 4 presents regression results from estimating several variants to equation 1, where the dependent variable is the share of resources that were indicated as corruption. Column 1 reports the unadjusted relationship between whether the mayor is in his second-term and the share of funds appropriated. The remaining columns correspond to specifications that include additional sets of controls. The specifications presented in columns 2 and 3 account for variation in the mayors and demographic characteristics of the municipality, whereas the specifications in columns 4 and 5 also control for local institutions that might constrain the practice of corruption. The final two specifications (columns 6 and 7) include, in addition the other controls, indicators for when the municipality was selected for audit (lottery intercepts) and state intercepts. The last specification, where re-election incentives are identified from only within state and lottery variation, accounts for any state-specific or lottery-specific unobservable that might have affected political corruption. It also controls for any differences across states (and in effect across time) for how the municipalities

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[27]The conditional means are estimated by taking the mean of corruption within a bandwidth of 0.8. The figure is robust to perturbations to the bandwidth size. Using the other measures of corruption produces similar graphs. See Ferraz and Finan (2007) for a detailed discussion of the correlates of municipal corruption.

may have been audited.

From the bivariate relationship in column 1, we see that second-term mayors are associated with a 3.6 percentage point increase in corruption. At an average corruption level of 0.062, this estimate represents an effect of 57.1 percent. Alternatively if we consider that on average R$5,502,054 were transferred to these municipalities, lame-duck mayors appropriate approximately R$190,074 (US $90,000) more than first-term mayors. As seen in the other columns, the inclusion of additional controls has virtually no effect on the point estimate. For example in column 7, which controls for state and lottery intercepts and various mayor and municipal characteristics, the estimated effect is slightly smaller, but statistically indistinguishable from the estimate of the unadjusted regression.

Table 5 reports for the various specifications presented in Table 4, the estimated effect of re-election incentives on alternative measures of corruption. Panel A compares the number of irregularities associated with corruption between first and second-term mayors, whereas Panel B estimate the relationship for share of service items related to corruption. The estimates reported in both panels are consistent with those reported in Table 4. In panel A, under our full specification, second-term mayors are associated with 0.531 (column 7; panel A) more corrupt irregularities than first-term mayors, which represents a 28 percent increase from the average across all municipalities.

In Panel B, we estimate the relationship using as a dependent variable the share of service items that were related to corruption, which simply normalizes the number of corrupt irregularities by the number of services items audited. These regressions address the concern that municipalities with second-term mayors may have had more items audited.[28] Again, a similar pattern emerges. Second-term mayors are significantly more corruption, as the share of services items that are considered corruption is 28 percent higher when compared to first-term mayors. As in Table 4, the estimated effects in panels A and B remain statistically indistinguishable and significant at a 95 percent level of confidence across all specifications.

For a simple robustness test of our estimates, Table 6 presents the estimated effect of re-election incentives based on specifications with different functional form assumptions. In the first set of rows, we display the estimated effects for each of the corruption measures using a bias-adjusted matching estimator (Abadie and Imbens 2006). Although compared to the regression analysis the identification assumptions are similar, the matching estimator has the advantage that it neither

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[28]To control for the number of service items audited in the specifications presented in panel A does not affect the estimates in the slightest.

assumes a functional form nor extrapolates over areas of uncommon support in the observable characteristics. In addition, to the matching estimator, we also estimate a Tobit model to account for the left censoring of municipalities with zero share of corruption (displayed in the second set of rows), and a Poisson model when our dependent variable is simply the number of corruption-related irregularities (see the last set of rows).

As we see in Table 6, independent of either the measure of corruption or type of estimator, the point estimates are similar to the OLS estimates presented in tables 4 and 5. For instance, with the full set of controls, the estimated effect with the matching estimator is 0.042 (standard error = 0.10) compared to 0.033 (standard error = 0.015) in the OLS regression.

Corruption and Future Career Concerns

Up to now, we have interpreted the positive coefficient on the second-term indicator as evidence that mayors who lack re-election incentives extract, on average, more rents from power. However, lame duck mayors may have aspirations for other political offices. Politicians who perform well and acquire political capital are able to run for higher political positions. In fact, most successful mayors in Brazil who aim to continue a political career run as state level legislators or federal deputies.[29]

In this section we investigate whether future political goals affect the level of rents extracted by politicians. If career concerns affect current rent extraction, then we expect to find that second-term mayors who later run for a higher level office position are less corrupt than their counterparts who do not run. In order to test this, we gather data from the 2006 governor and legislative elections and match the names of candidates to those mayors that were in power from 2001-2004. Out of the 485 mayors in power during the 2001-2004 term, 9 percent run for office in 2006.

We test for the effect of future career concerns on corruption by running the following regression:

$$r_{ij} = \beta_1 I_{ij} + \beta_2 \text{Candidate}_{ij} + \beta_3 I_{ij} \times \text{Candidate}_{ij} + X_{ij}\delta + Z_{ij}\gamma + \eta_j + \varepsilon_{ij}, \qquad (4)$$

where Candidate_{ij} is an indicator for whether the mayor ran as a candidate in the 2006 governor and legislative elections. The coefficient β_3 tells us whether there is a differential amount of corruption in municipalities governed by second-term mayors with future career concerns.

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[29]In the 2006 election, for example, out of the 246 newly elected deputies, 13 percent were ex-mayors (BBC Brazil).

The results from estimating Equation 4 are shown in column 1 of Table 7. The coefficient on the interaction between second-term and candidate is -0.08 and it is highly significant. This estimate, along with the estimate of β_1, suggest that second-term mayors that had future career concerns are significantly less corrupt than those mayors that face a binding term-limit, but that did not run for a higher level political position later. While these estimates are consistent with the effects of re-election incentives, one potential problem with this test is if the disclosure of the audit findings discouraged the highly corrupt politicians from running for a higher office.[30] To control for this possibility, column 2 re-estimates Equation 4 replacing the indicator Candidate$_{ij}$ with a predicted indicator, which was estimated from a logit regression.[31] This predicted indicator, which is constructed only from observable characteristics of the mayor and municipality, in effect purges the indicator from the effects of the audit. As we see in column 2, the interaction term is also negative, thus reinforcing our interpretation that the differences in corruption among first and second-term mayors is driven by variation in re-election incentives. A longer political horizon induces politicians to restrict their extraction of rents from power.

Corruption, Learning, and Political Networks

Thus far, our results demonstrate that there is more corruption in municipalities where mayors are in their second and final term. Although this is consistent with re-election incentives, there are alternative interpretations for our findings. For instance, politicians in power for a longer period of time may learn corruption practices and establish networks that enable them to be more corrupt. If this was the case, our estimates would reflect the corruption know-how accumulated over time rather than the lack of re-election incentives. Also, political coalitions with higher office politicians

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[30]Due to the larger number of corruption scandals that occur in the Chamber of Deputies, it is unlikely that only less corrupt mayors are the ones who run for office.

[31]Specifically, we constructed a propensity score for whether the mayor ran as a candidate in the 2006 elections using various mayor and municipal characteristics. These characteristics included: the mayor's gender, education, marriage status, age, and party affiliation dummies; the municipality's log population, population with secondary school education, age of municipality, log GDP per capita, income equality, share of the legislative branch that supports the mayor, effective number of parties in 2000 election, an indicator for whether there is a judge in the municipality, state and lottery fixed effects. The predicted indicator is equal to one if the propensity score was greater than or equal to 0.5. The estimation predicted 89 percent of the cases correctly. The results are similar if we also condition on our corruption measure but do not use in the construction of the score.

might facilitate corrupt transactions. Since mayors that belong to the same party as the governor are more likely to be re-elected, it might be the case that higher corruption levels occur because of these political coalitions.

To account for these possibilities, we employ two strategies. First, we control for previous political experience.[32] To do so, we collect data on mayors who were in power during the 1989-1992 an 1993-1996 administrations and matched them to mayors in power during 2001-2004.[33] We then estimate the following regression:

$$r_{ij} = \beta_1 I_{ij} + \beta_2 \text{Experience}_{ij} + X_{ij}\delta + Z_{ij}\gamma + \eta_j + \varepsilon_{ij}. \tag{5}$$

where Experience equals a one if the mayor had been in power before.

Governors in Brazil often use voluntary transfers and political power to favor politically-aligned mayors (Bugarin and Ferreira 2006). As a result, second-term mayors are more likely to belong to the same party as the incumbent governor. Another peculiarity of Brazil's political system is the high frequency in which politicians change parties in search for political rents.[34] Politicians who change parties may be more corrupt and less worried about maintaining their party affiliations due to shorter political horizons. In order to control for these political changes that might be correlated with corruption, we re-estimate equation 1 controlling for whether the mayor elected in 2000 belongs to the same party as the governor elected in 1998, whether the mayor changed party during his term in office, and whether the party in the end of the term (2004) is from the same party as the governor elected in 2002.

The result from estimating these various specifications, using the share of resources associated with corruption as a dependent variable, are reported in Table 7.[35] From the specification in column 3, we see that controlling for previous political experience does not change our estimated

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[32]Note that while the possibility of re-election was only introduced in 1997, mayors could be re-elected after a one-term hiatus. One concern is that mayors in effect do not face term limits because they can run again after being out for one-term. By mis-measuring the politician's political horizon, we are simply underestimating the effects of re-election incentives.

[33]Since these data are not available on electronic format, we called each one of the 26 state level electoral courts (TRE) and obtained the names of elected mayors in the 1988 and 1992 elections. Records before 1998 are not systematically recorded.

[34]See Desposato (2006) and Mainwaring and Linan (1997).

[35]Although not reported, all of the results presented in this section, as well as the others, are similar when using the other corruption measures.

effect of re-election incentives. The point estimate on the second-term dummy drops slightly to 0.031 (standard error=0.015) but remains highly significant. The coefficient on experience itself is negative and not statistically significant. In column 4 we interact political experience with the second-term dummy to test whether more experienced mayors facing a term-limit are more corrupt. We find no significant difference of corruption for second-term mayors by experience (coefficient is 0.001 with a standard error of 0.030).

An alternative way to control for previous experience is to compare second-term mayors only with first-term mayors that have previously been in power. Hence, we re-estimate the baseline regression using all second-term mayors, but restrict first-term mayors to only those that have been in power before. The coefficient on second-term shown in column 5 increases to 0.04 and remains highly significant (standard error= 0.018) further suggesting that it is not political experience that drives the difference in corruption levels between first and second-term mayors.

The specification in column 6 controls for changes in political networks that occurred during the mayor's mandate. Specifically, we include an indicator for whether the mayor elected in 2000 belongs to the same party as the governor elected in 1998, whether the mayor changed party during the term in office, and an indicator for whether the party in the last year of the mayor's mandate is the same as the governor elected in 2002 (in the middle of the mayor's term).[36] The coefficient on the second-term indicator is almost exactly the same as in our basic specification (0.033 with standard error=0.015) suggesting that these results are robust to changes in political networks.

Corruption and Unobserved Political Ability

In the previous section we showed that in municipalities with second-term mayors there is more corruption than in municipalities with first-term mayors, even after restricting the comparison to first-term mayors who had previous political experience. However, we might be concerned that first and second-term mayors differ in other unobservable dimensions, such as competence or political ability. If a mayor's ability increases his re-election probability and enables him to be more corrupt, then our estimates are potentially biased upwards.

This section provides evidence that unobserved ability does not drive our results. To control for the political ability of mayors, we compare the level of corruption of second-term mayors with the

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[36]The municipal elections in Brazil occur two years after state level elections.

sub-sample of first-term mayors that were able to get re-elected in the following election (October 2004). This comparison removes any unobserved time-invariant heterogeneity that distinguishes a second-term mayor. The results from estimating Equation 1 using this restricted sample are shown in column 6 of Table 7. The coefficient on the second-term indicator increases to 0.052 and remains highly significant. We interpret this as evidence that second-term mayors extract a higher level of rents from office compared to first-term mayors of similar political ability.

It is important to note however that the larger coefficient on the second-term dummy was expected because the dissemination of the audit program decreased the probability that corrupt mayors were re-elected (see Ferraz and Finan (2006)). To account for this fact, the specification reported in column 8 re-estimates Equation 1 using the first-term mayors that were predicted, based on observable characteristics, to win re-election.[37] In controlling for the effects of the audits, the point reduces to 0.038 (standard error 0.018) and is still significant at 95 percent confidence.

In column 9, we compare the corruption level of second-term mayors to first-term mayors that have previously been in power (either in the 1989-1992 or 1993-1996 mandate) *and* are high ability mayors (were re-elected in the 2004 election). The coefficient estimated on the second-term dummy is again 0.04 and although it is less precise (standard-error=0.022) due to the small number of first-term mayors that fit both criteria, it is still significant at the 10 percent level.

Discipline versus Selection Effect

Recall from Section 3 that when interpreted in the context of the model, the estimated effects of re-election incentives captures both a selection and a discipline effect. Although it is difficult to separate out these two effects without knowing the proportion of non-corrupt mayors, the results presented in column 7 do provide some insights into which effect dominates. By restricting the sample to include only first-term mayors that would get re-elected, we are excluding the proportion

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[37]As we did earlier, we constructed a propensity score for whether the mayor was re-elected in the 2004 elections using various mayor and municipal characteristics. These characteristics included: the mayor's gender, education, marriage status, age, and party affiliation dummies; the municipality's log population, population with secondary school education, age of municipality, log GDP per capita, income equality, share of the legislative branch that supports the mayor, effective number of parties in 2000 election, an indicator for whether there is a judge in the municipality, state and lottery fixed effects. The predicted indicator is equal to one if the propensity score was greater than or equal to 0.5. The estimation predicted 78 percent of the cases correctly. The results are similar if we also condition on our corruption measure but do not use in the construction of the score.

of mayors that in effect decided to forgo re-election and extract rent, i.e. $(1-\pi)(1-\lambda)(1-\pi)(1-\lambda)$. The fact that the estimated effect for this sub-sample is not statistically different from the effect estimated for the entire sample suggests that on average $(1 - \pi)(1 - \lambda)(1 - \pi)(1 - \lambda)\bar{r}$ is relatively small. This implies that λ, which is the probability that a corrupt mayor is disciplined, has to be close to one.[38] Thus, if we interpret the results based on the model, our findings suggest that the discipline effect dominates the selection effect, inducing first-term mayors to refrain from rent-extraction.

Local Context and Re-election Incentives

In this section we explore the extent to which the effects of re-election incentives varies according to local characteristics. As we discussed in Section 2, the theory suggests that second-term mayors should be more corrupt, relative to first term mayors, in municipalities where the cost of corruption is higher, but also where access to information and political support is lower. Table 8 explores these implications of the model, using as proxies: the presence of judge, local media, electoral competition, and the proportion of the legislative branch that is from the mayor's party. The table presents the second-term effect and each interaction term, controlling for mayor characteristics, municipal demographics, and state fixed-effects .

As expected, the presence of a permanent judge or a local media reduces the corruption differential between first-term and second-term mayors. Among municipalities with a judge, there is virtually no difference in corruption levels between first and second-term mayors (column 1), and in municipalities with local media - in the form of either radio or newspaper - the difference is only on 2.5 percentage points (column 2). In contrast, among municipalities where there does not exist any local media, second-term mayors are almost 10 percentage points (standard error=0.04) more corrupt than first-term mayors, which represents an average R\$523,000 (US\$237,592).

Columns 3 and 4 report how the second-term effect varies with the degree of political competition, as measured by a Herfindahl index (column 3) and proportion of the local council that is from the same party as the mayor. As reported in column 3, political competition increases the difference in corruption levels between first and second-term mayors. For instance, among municipalities were

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[38]The expression could also be small if the proportion of non-corrupt mayors π is close to one. However, that β is positive in effect rules this out.

the electoral competition was 0.136 (the 5th percentile of the distribution), second-term mayors are 7 percentage points more corrupt that first-term mayors. In contrast, when elections are less competitive at 0.432 (the 95 percentile of the distribution), the difference in corruption levels between first and second-term mayors is zero.

The results reported in Column 4 tell a similar story. When only 9 percent of the legislative council is from the same political party as the mayor (5th percentile of the distribution), there an 8.8 percentage point difference between first and second-term mayors. Whereas, when the political support of the incumbent mayor represents 55 percent of the legislative branch, then there is no difference in corruption levels between first and second-term mayors. In effect, the results presented in columns (3) and (4) suggest that municipalities characterized by low competition exhibit no differential effect in rent-extraction between first and second-term mayors. First-term mayors with an extreme electoral advantage can afford to be as corrupt as a lame-duck mayor since his re-election is practically guaranteed.

7   Conclusions

Voters have imperfect information about politicians' actions. Thus, the incentives provided by elections act as a disciplining device to constrain politicians' malfeasance. In this paper we test whether political institutions that provide electoral accountability through the possibility of re-election reduces corruption. We build a new dataset of corruption practices by local politicians in Brazil using audit reports from an ambitious anti-corruption program designed to audit a municipality's use of federal funds. We exploit the variation in electoral incentives provided by term limits and show that second-term mayors are associated with significantly more corruption than first-term mayors, as measured by either the share of resources misappropriated, the share of service items related to corruption, or the number of corrupt irregularities. The reduction in corruption practices induced by electoral accountability is not only statistical significant, but economically important. Assuming that, in the absence of reelection incentives, first-term mayors would behave as second-term mayors, we estimate that reelection incentives are responsible for inducing a reduction in resources misappropriated in the order of R$600 million (US$205 million). This is more than half of what the federal government spent in the Bolsa Escola conditional cash transfer program for all municipalities in Brazil during 2002.

The difference in corruption between first and second-term mayors is remarkably robust to various specifications and alternative interpretations. We show that there is more corruption in municipalities governed by second-term mayors even when compared to first-term mayors that have been in power in a previous mandate (experienced politicians). Our findings also suggest that the effects of re-election incentives on corruption depend on local characteristics. The estimated differential effect between first and second-term mayors is more pronounced among municipalities where the cost of corruption is higher - as measured by the presence of a judge - and also where access to information and political support is lower. We also find that second-term mayors facing term-limits who later pursue further a political career behave as first-term mayors and engage in less corrupt activities.

These results can be explained by a simple political agency model similar to Besley (2006) and Smart and Sturm (2006) where the possibility of re-election creates both discipline and selection effects. Although second-term mayors face a shorter political horizon and thus have less incentive to accommodate voters' preferences, rational voters will elect into a lame-duck term politicians that are less corrupt than average. Hence, such a positive selection may counteract any adverse incentive effect induced by term-limits (Besley and Persson 2006). Our analysis tries to account for the importance of this selection effect by comparing second-term mayors with first-term mayors that later got re-elected into a second term and shows that second-term mayors are significantly more corrupt. We interpret this as evidence that, in the context of Brazil's local governments, the discipline effect dominates the selection effect inducing first-term mayors with re-election incentives to extract fewer rents from power.

Our paper complements existing studies that use variation in term-limits to show that elections act as a disciplining device for government policies (Besley and Case (1995) and List and Sturm (2006)). The findings suggest that electoral rules that enhance political accountability play a crucial role in constraining politician's corrupt behavior even in an institutional context where corruption is pervasive and elites dominate local politics. Despite this positive effect of re-election incentives on constraining corruption, further research is needed in order to assess whether electoral accountability affect other aspects of governance and ultimately improves voters' welfare.

Appendix: Coding the Audit Reports

This appendix explains how we used the audit reports to construct indicators of corruption. We provide the definition used for each type of irregularity and include an illustrative example drawn from the reports.[39]

Examples of Political Corruption

Health related purchases without procurement using false receipts: The ministry of Health transferred to the municipality R$ 321,700 for the Programa de Atenção Bsica. The municipal government used fake receipts valued at R$ 166,000 to provide proof of purchase. Furthermore, there is no proof that the goods were purchased since there were no registered entries of the merchandize in the stock. Also, in 2003 the municipality bought medicines valued at R$253,300 without procurement. In 2004, the value was R$113,700, also without procurement. We classified this violation as an incidence of irregular procurement and diversion of public funds in the area of health. We valued this irregularity as a diversion of R$166,000. This irregularity occurred in Capelinha, Minas Gerais, drawn by lottery number 9.

Evidence of irregularities in well construction: The Ministry of National Integration transferred R$117,037 to the municipality for the maintenance of water infra-structure. The working plan specified the maintenance of ten wells and four dams. None of these repairs were made. Instead, the dam Henrique Dantas, located inside a private farm was repaired. We classified this violation as an incidence of diversion of public funds in the area of water and sanitation. We valued this irregularity as a diversion of R$117,037. This irregularity occurred in Santa Cruz, Rio Grande do Norte, drawn by lottery number 9.

Over-invoice of more than R$3 million in road construction: The firm Mazda was hired, without procurement, to build approximatly nine kilometers of a road. The cost of the construction was estimated at R$ 1 million based on similar constructions. The receipts presented by Mazda and paid by the government totalled R$ 5 million. No further documentation was shown by the municipal government proving the need for the additional amount of resources. The auditors found that the firm Mazda, did not have any experience with construction and

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[39]For access to the summary of the audit reports, see www.cgu.gov.br

had sub-contracted the firm CTE for R$ 1.8 million to do the construction. Hence, the project was over paid by more than R$ 3 million. As evidence of corruption, it was late found that the firm Mazda gave an apartment for the mayor and his family valued at R$600,000 suggesting a kickback. We classified this violation as an incidence of over-invoice in the area of infrastructure. We valued this irregularity as a diversion of R$3.2 million. This irregularity occurred in São Francisco do Conde, Bahia, drawn by lottery number 6.

References

Abadie, Alberto, and Guido Imbens. 2006. "Large Sample Properties of Matching Estimators for Average Treatment Effects." *Econometrica* 74 (1): 235–267.

Adsera, Alicia, Carles Boix, and Mark Payne. 2003. "Are You Being Served? Political Accountability and the Quality of Government." *The Journal of Law, Economics, and Organization* 19, no. 2 (445-490).

Ames, Barry. 1987. *Political Survival: Politicians and Public Policy in Latin America*. Berkeley, California: University of California Press.

Bandeira, Oriana, Andrea Prat, and Tommaso Valletti. 2007. "Active and Passive Waste in Government Spending: Evidence from a Policy Experiment." *Working paper.*

Banks, Jeffrey, and R. Sundaram. 1993. "Adverse Selection and Moral Hazard in a Repeated Elections Model." In *Political Economy: Institutions, Information, Competition, and Representation*, edited by et al W. Barnett. Cambridge and New York: Cambridge University Press.

Barro, Robert. 1970. "The Control of Politicians: An Economic Model." *Public Choice* 14:19–42.

Bertrand, Marianne, Simeon Djankov, Rema Hanna, and Sendhil Mullainathan. 2006. "Does Corruption Produce Unsafe Drivers?" *NBER Working Paper No. 12274*, June.

Besley, Timothy. 2006. *Principled Agents? The Political Economy of Good Government*. Oxford, UK: The Lindahl Lectures, Oxford University Press.

Besley, Timothy, and Anne Case. 1995. "Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits." *The Quarterly Journal of Economics* 110 (3): 769–798 (August).

Besley, Timothy, and Torsten Persson. 2006. "Economic Approaches to Political Institutions." *Miemo, LSE.*

Besley, Timothy, and Michael Smart. 2007. "Fiscal Restraints and Voter Welfare." *Journal of Public Economics* 91 (3-4): 755–773 (April).

Bugarin, Mauricio, and Ivan F. S. Ferreira. 2006. "Political Budget Cycles in a Fiscal Federation: The Effect of Partisan Voluntary Transfers." *Mimeo, IBMEC-SP.*

Campante, Filipe R., Davin Chor, and Quoc-Anh Do. 2006. "Instability and the Incentives for Corruption." *Mimeo, Harvard University.*

Desposato, Scott W. 2006. "Parties for Rent? Ambition, Ideology, and Party Switching in Brazils Chamber of Deputies." *American Journal of Political Science* 50 (1): 62–80.

Di Tella, Rafael, and Ernesto Schargrodsky. 2003. "The Role of Wages and Auditing During a Crackdown on Corruption in the City of Buenos Aires." *Journal of Law and Economics* 46 (1): 269.

Duggan, Mark, and Steven D. Levitt. 2002. "Winning Isnt Everything: Corruption in Sumo Wrestling." *American Economic Review* 92 (5): 1594 605.

Engerman, Stanley L., and Kenneth L. Sokoloff. 2006. "Digging the Dirt at Public Expense: Governance in the Building of the Erie Canal and Other Public Works." In *Corruption and Reform: Lessons from Americas History*, edited by Edward L. Glaeser and Claudia Goldin. Chicago: The University of Chicago Press.

Ferejohn, J. 1986. "Incumbent Performance and Electoral Control." *Public Choice* 50:5–25.

Ferraz, Claudio, and Frederico Finan. 2006. "Exposing Corrupt Policiticans: The Effect of Brazil's Publicily Released Audits on Electoral Outcomes." *California Center for Population Research, UCLA, Working Paper CCPR-023-06.*

———. 2007. "Corruption in Local Governments: Evidence from Audit Reports." *Mimeo, UCLA.*

Fisman, Raymond. 2002. "Estimating the Value of Political Connections." *American Economic Review* 91 (4): 10951102.

Fisman, Raymond, and Shang-Jin Wei. 2004. "Tax Rates and Tax Evasion: Evidence from Missing Imports in China." *Journal of Political Economy* 112:471–496.

Fleischer, David. 2002. "Corruption in Brazil: Defining, Measuring, and Reducing." A Report of the CSIS Americas Program.

Geddes, Barbara, and A. R. Neto. 1992. "Institutional Sources of Corruption in Brazil." *Third World Quarterly*, vol. 13.

Glaeser, Edward L., and Claudia Goldin. 2006. "Corruption and Reform: Introduction." In

Corruption and Reform: Lessons from Americas History, edited by Edward L. Glaeser and Claudia Goldin. Chicago: The University of Chicago Press.

Glaeser, Edward L., and Raven E. Saks. 2006. "Corruption in America." *Journal of Public Economics* 90:1053–1072.

Henderson, J. Vernon, and Ari Kuncoro. 2004. "Corruption in Indonesia." *NBER working paper no.10674*.

Knack, Stephen, and Philip Keefer. 1995. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures." *Economics and Politics* 7 (3): 207–227.

Kunicová, Jana, and Susan Rose-Ackerman. 2005. "Electoral Rules and Constitutional Structures as Constraints on Corruption." *British Journal of Political Science* 35, no. 4 (October).

Lederman, Daniel, Norman Loayza, and Rodrigo Reis Soares. 2005. "Accountability and Corruption: Political Institutions Matter." *Economics and Politics* 17 (1): 1–35 (March).

List, John A., and Daniel M. Sturm. 2006. "How Elections Matter: Theory and Evidence from Environmental Policy." *Quarterly Journal of Economics* 121 (4): 1249–1281 (November).

Mainwaring, Scott, and A. P. Linan. 1997. "Party Discipline in the Brazilian Constitutional Congress." *Legislative Studies Quarterly* 12, no. 4.

Mauro, Paolo. 1995. "Corruption and Growth." *Quarterly Journal of Economics*, no. 110:681–712.

Myerson, Roger. 1993. "Effectiveness of Electoral Systems for Reducing Government Corruption: A Game Theoretical Analysis." *Games and Economic Behavior* 5:118–132.

Olken, Benjamin A. 2007. "Monitoring Corruption: Evidence from a Field Experiment in Indonesia." *Journal of Political Economy* 115, no. 2 (April).

Persson, Torsten, Gerard Roland, and Guido Tabellini. 1997. "Separation of Powers and Political Accountability." *The Quarterly Journal of Economics* 112 (4): 1163–1202 (November).

Persson, Torsten, and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*. Cambridge, Massachussets: MIT Press.

Persson, Torsten, Guido Tabellini, and Francesco Trebbi. 2003. "Electoral Rules and Corruption." *Journal of the European Economic Association* 1, no. 4 (June).

Reinikka, Ritva, and Jakob Svensson. 2004. "Local Capture: Evidence from a Central Government Transfer Program in Uganda." *Quaterly Journal of Economics* 119 (2): 679–705 (May).

Rose-Ackerman, Susan. 1999. *Corruption and Government: Causes, Consequences, and Reform.* New York: Cambridge University Press.

Smart, Michael, and Daniel M. Sturm. 2006. "Term Limits and Electoral Accountability." *CEPR Discussion Paper 4272*, July.

Svensson, Jakob. 2003. "Who Must Pay Bribes and How Much? Evidence from a Cross-Section of Firms." *Quarterly Journal of Economics* CXVIII (February): 207–230.

Treisman, Daniel. 2000. "The causes of corruption." *Journal of Public Economics*, vol. 76.

Trevisan, Antoninho M., Antonio Chizzotti, Joao Alberto Ianhez, Jose Chizzotti, and Josmar Verillo. 2004. *O Combate à Corrupção nas Prefeituras do Brasil.* São Paulo, Brasil: Ateliê Editorial.

VEJA. 2004. "Pragas Urbanas: Desperdício, Desvio e Corrupção."

Table 1: Descriptive Statistics of Irregularity by Type

	Type of irregularity			
	Diversion of funds	Illegal procurement	Over invoicing	Corruption indicator
Proportion of municipalities with at least one irregularity	0.490	0.601	0.053	0.778
	(0.500)	(0.490)	(0.224)	(0.416)
Conditional on at least one irregularity				
Average number of irregularities	1.639	1.638	1.037	2.368
	(1.048)	(0.943)	(0.191)	(1.638)
Average value of irregularity	97,105.21	160,124.90	50,444.78	118,486.00
	(221538.8)	(250743.9)	(95518.8)	(168259.8)
Share of audited resources related to corruption	0.046	0.089	0.023	0.095
	(0.073)	(0.104)	(0.045)	(0.116)
Share of audited items related to corruption	0.048	0.049	0.032	0.070
	(0.034)	(0.028)	(0.012)	(0.052)

Notes: Stardard deviations reported in parentheses. The sample consists on 492 municipalities. The dash represents the fact that no dollar amount was available for that type of violation.

Table 2: Descriptive Statistics of Corruption by First and Second-Term Mayor

	First-term mayors	Second-term mayors	Difference
Panel A: Share of audited resources			
Diversion of funds	0.019	0.025	0.006
	[0.004]	[0.005]	[0.006]
Illegal procurement	0.034	0.063	0.029
	[0.004]	[0.011]	[0.012]
Over invoicing	0	0.001	0.001
	[0.000]	[0.001]	[0.001]
Share of corruption	0.054	0.089	0.036
	[0.006]	[0.012]	[0.014]
Panel B: Incidence of irregularities			
Diversion of funds	0.73	0.916	0.186
	[0.072]	[0.107]	[0.129]
Illegal procurement	0.868	1.165	0.297
	[0.076]	[0.099]	[0.125]
Over invoicing	0.055	0.054	-0.001
	[0.015]	[0.018]	[0.023]
Incidence of corruption	1.653	2.135	0.483
	[0.116]	[0.173]	[0.209]
Panel C: Share of audited items			
Diversion of funds	0.021	0.028	0.007
	[0.002]	[0.004]	[0.004]
Illegal procurement	0.026	0.037	0.011
	[0.002]	[0.003]	[0.004]
Over invoicing	0.002	0.002	0.000
	[0.001]	[0.001]	[0.001]
Share of corruption	0.049	0.066	0.017
	[0.004]	[0.006]	[0.007]

Notes: Robust stardard errors reported in brackets. The sample consists on 492 municipalities. There are 279 first-term mayors and 213 second-term mayors.

Table 3: Descriptive Statistics of Mayors and Municipalities

	First-term mayors	Second-term mayors	Difference
Mayor characteristics:			
Male	0.946	0.958	0.012
	[0.014]	[0.014]	[0.019]
Schooling	6.094	6.066	-0.028
	[0.111]	[0.134]	[0.174]
Age	47.892	46.854	-1.038
	[0.553]	[0.633]	[0.840]
Municipal Characteristics			
Effective number of parties	4.561	3.911	-0.65
	[0.109]	[0.091]	[0.143]
Mayor support	0.271	0.355	0.084
	[0.009]	[0.011]	[0.014]
Judiciary district	0.587	0.509	-0.078
	[0.030]	[0.034]	[0.045]
Log population	9.635	9.525	-0.11
	[0.059]	[0.068]	[0.090]
Urban population	0.623	0.568	-0.055
	[0.013]	[0.016]	[0.021]
Secondary School	0.246	0.218	-0.028
	[0.006]	[0.007]	[0.009]
Per capita income	8.3	8.194	-0.106
	[0.047]	[0.062]	[0.078]
Income inequality	0.546	0.528	-0.018
	[0.008]	[0.007]	[0.010]
Media	0.853	0.864	0.011
	[0.021]	[0.024]	[0.032]
Total Resources Audited (R$)	5,776,129	5,081,801	-694,328
	[579,109]	[448,995]	[732,778]
Age of the municipality	60.33	58.498	-1.832
	[3.044]	[4.453]	[5.394]

Notes: Stardard deviations reported in brackets. The sample consists on 492 municipalities. Effective number of parties is the effective number of parties in the 2000 mayoral election; Mayor support is the proportion of members of the legislative branch from the same party as the mayor; Secondary School is the proportion of the population with at least a secondary school education; Income inequality is the Theil cofficient; Media is whether the municipality has a local radio station or newspaper.

Table 4: The Effect of Re-Election Incentives on Corruption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable: Share of audited resources related to corruption							
Mayor in second-term	0.036	0.034	0.033	0.038	0.036	0.035	0.033
	[0.014]	[0.013]	[0.013]	[0.014]	[0.014]	[0.013]	[0.015]
R-squared	0.03	0.09	0.13	0.13	0.14	0.19	0.23
Mayor characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes
Municipal demographics	No	No	Yes	Yes	Yes	Yes	Yes
Political institutions	No	No	No	Yes	Yes	Yes	Yes
Judicial Institutions	No	No	No	No	Yes	Yes	Yes
Lottery intercepts	No	No	No	No	No	Yes	Yes
State intercepts	No	No	No	No	No	No	Yes

Notes: Robust standard errors in brackets. Observations are weighted by the probability that a municipality is randomly audited within a state. Mayor characteristics include gender, education, marriage status, age, and party affiliation dummies. Municipal demographics include: log population, % population with secondary school education, age of municipality, log GDP per capita, income equality. Political institutions include: share of the legislative branch that supports the mayor, effective number of parties in the 2000 election. Judicial institutions include: an indicator for whether there is a judge in the municipality. Each regression has 485 observations. The sample has been restricted to the non-missing observations of the various control variables, so as to keep its size constant across specifications, this adjustment does not affect the general results.

Table 5: The Effect of Re-Election Incentives on Alternative Measures of Corruption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Numbers of irregularities related to corruption							
Mayor in second-term	0.487	0.532	0.506	0.517	0.502	0.515	0.531
	[0.210]	[0.190]	[0.184]	[0.184]	[0.186]	[0.181]	[0.190]
R-squared	0.02	0.15	0.28	0.28	0.28	0.34	0.44
Panel B: Share of audited items related to corruption							
Mayor in second-term	0.017	0.018	0.017	0.018	0.017	0.016	0.015
	[0.007]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.007]
R-squared	0.02	0.16	0.22	0.22	0.22	0.32	0.40
Mayor characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes
Municipal demographics	No	No	Yes	Yes	Yes	Yes	Yes
Political institutions	No	No	No	Yes	Yes	Yes	Yes
Judicial Institutions	No	No	No	No	Yes	Yes	Yes
Lottery intercepts	No	No	No	No	No	Yes	Yes
State intercepts	No	No	No	No	No	No	Yes

Notes: Robust standard errors in brackets. Observations are weighted by the probability that a municipality is randomly audited within a state. Mayor characteristics include gender, education, marriage status, age, and party affiliation dummies. Municipal demographics include: log population, % population with secondary school education, age of municipality, log GDP per capita, income equality. Political institutions include: share of the legislative branch that supports the mayor, effective number of parties in the 2000 election. Judicial institutions include: an indicator for whether there is a judge in the municipality. Each regression has 485 observations. The sample has been restricted to the non-missing observations of the various control variables, so as to keep its size constant across specifications; this adjustment does not affect the general results.

Table 6: The Effect of Re-Election Incentives on Corruption

	Dependent variables:		
	Share of audited resources	Number of irregularities	Share of audited items
	(1)	(2)	(3)
Matching estimator			
Mayor in second-term	0.042	0.520	0.014
	[0.010]	[0.149]	[0.003]
Tobit regression			
Mayor in second-term	0.044		0.017
	[0.013]	—	[0.006]
Poisson regression			
Mayor in second-term		0.554	
	—	[0.159]	—
Mayor characteristics:	Yes	Yes	Yes
Municipal characteristics:	Yes	Yes	Yes
Municipal institutions	Yes	Yes	Yes
State intercepts	Yes	Yes	Yes
Number of irregularities	Yes	Yes	Yes

Notes:The matching estimator was estimated using a bias corrected matching estimator from Imbens and Abadie (2006). Robust standard errors are presented in brackets and for the matching estimator they are estimated using 6 matches for the point estimate and 3 matches for the standard errors. Marginal effects are presented for the Tobit and Poisson regressions.

Table 7: The Effect of Re-Election Incentives on Corruption Accounting for Experience, Ability and Carrer Concerns

	Future career concerns	Future career concerns *Predicted*	Control for experience	Control for term and experience	Only first-term experience	Change in political alliances	Only first-term re-elected	Only first-term re-elected *Predicted*	First-term experience and re-elected
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mayor in second-term	0.040	0.044	0.031	0.031	0.040	0.032	0.052	0.038	0.040
	[0.015]	[0.019]	[0.015]	[0.016]	[0.018]	[0.015]	[0.015]	[0.018]	[0.023]
Second-term × Candidate in 2006	-0.079	-0.049							
	[0.040]	[0.027]							
Candidate in 2006	0.023	0.010							
	[0.032]	[0.024]							
Mayor with previous Experience			-0.009	-0.010					
			[0.012]	[0.013]					
Mayor in second-term				0.001					
× Experience				[0.030]					
Mayor changed party						0.017			
						[0.018]			
Mayor elected in same party as governor						-0.017			
						[0.018]			
Mayor same party as new governor						-0.007			
						[0.015]			
R-squared	0.12	0.12	0.12	0.12	0.15	0.24	0.18	0.18	0.18
Observations	485	485	485	485	299	485	319	302	242

Notes: Robust standard errors in brackets. Observations are weighted by the probability that a municipality is randomly audited within a state. All regressions include mayor characteristics, municipal demographics, political and judicial institutions, and lottery and state dummies. Mayor characteristics include gender, education, marriage status, age, and party affiliation dummies. Municipal demographics include: log population, % population with secondary school education, age of municipality, log GDP per capita, income equality. Political institutions include: share of the legislative branch that supports the mayor, effective number of parties in 2000 election. Judicial institutions include: an indicator for whether there is a judge in the municipality. The variable mayor with previous experience is a dummy variable that equals one if the mayor in power was also a mayor during the 1989-1992 or 1993-1996 terms. The variable candidate in 2006 equals one if the mayor was a legislator or governor candidate in the 2006 election and is included in the specification presented in column 8. The sample has been restricted to the non-missing observations of the various control variables, so as to keep its size constant across specifications, this adjustment does not affect the general results.

Table 8: Heterogeneity in the Effect of Re-Election Incentives on Corruption

	Dependent variable: Share of audited resources indicated as corruption			
	(1)	(2)	(3)	(4)
Mayor in second-term	0.057	0.099	-0.057	0.107
	[0.020]	[0.040]	[0.034]	[0.037]
Judiciary district	-0.003			
	[0.018]			
Second-term × Judiciary district	-0.052			
	[0.026]			
Media		-0.006		
		[0.017]		
Second-term × Media		-0.074		
		[0.043]		
Electoral competition			-0.002	
			[0.004]	
Second-term × Electoral competition			0.023	
			[0.009]	
Legislative support				0.005
				[0.054]
Second-term × Legislative support				-0.209
				[0.091]
F-test joint hypothesis	4.19	4.99	5.10	4.83
P-value	0.02	0.01	0.01	0.01
R-squared	0.14	0.15	0.15	0.16

Notes: Robust standard errors in brackets. Observations are weighted by the probability that a municipality is randomly audited within a state. Each regression includes mayor characteristics - gender, education, marriage status, age, and party affiliation dummies - and municipal demographics - log population, % population with secondary school education, age of municipality, log gdp per capita, income equality. Each regression has 485 observations. Media indicates whether the municipality has a local radio or newspaper. Electoral Competition is Herfindhal index estimated from vote shares of parties in the 2000 mayoral election. Legislative support is the proportion of legislators that are from the same political party as the mayor in the 2000 elections. Include state and loterry intercepts.
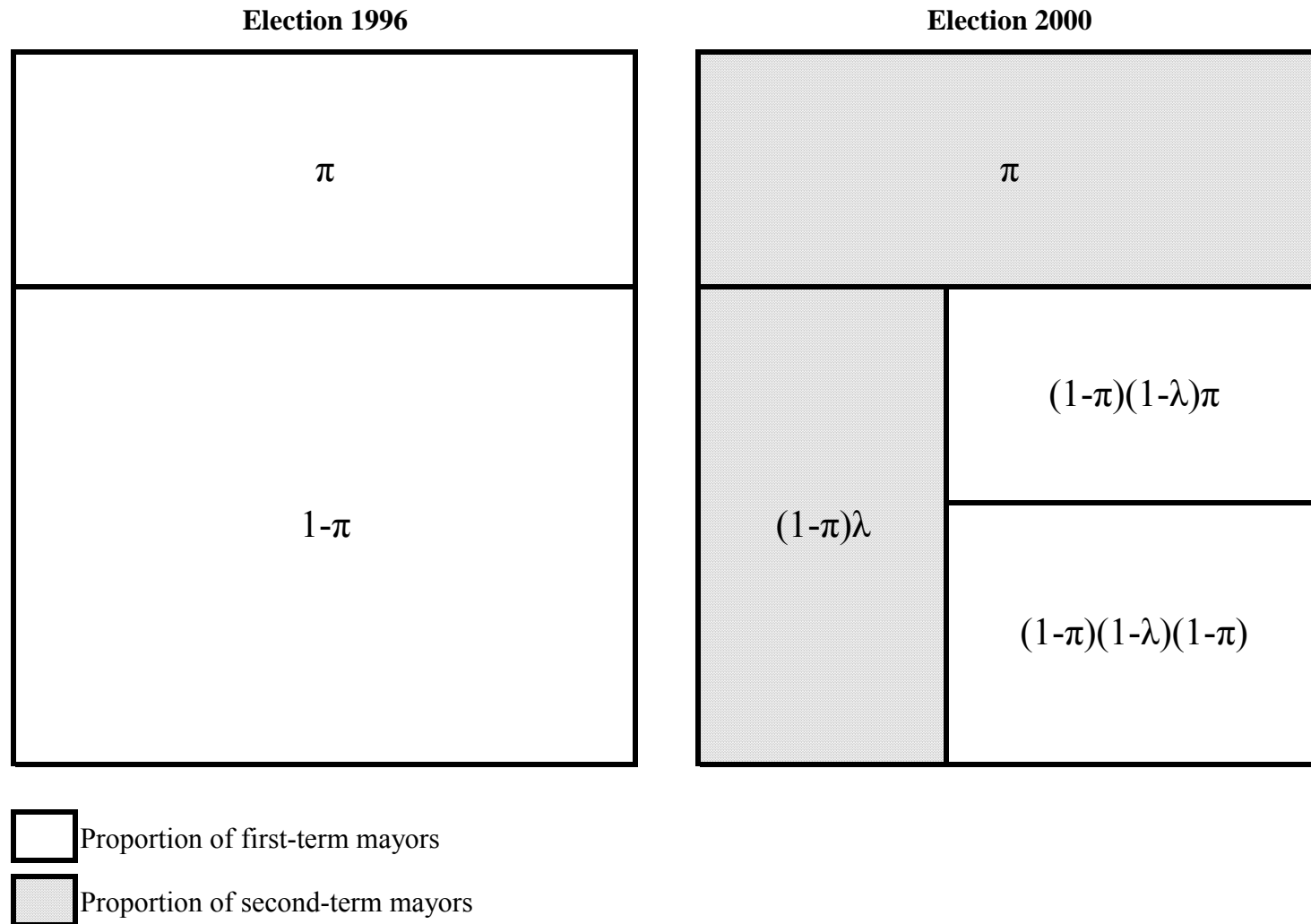
Figure 1: Composition of Types Across Elections

Election 1996

π

$1-\pi$

Election 2000

π

$(1-\pi)\lambda$

$(1-\pi)(1-\lambda)\pi$

$(1-\pi)(1-\lambda)(1-\pi)$

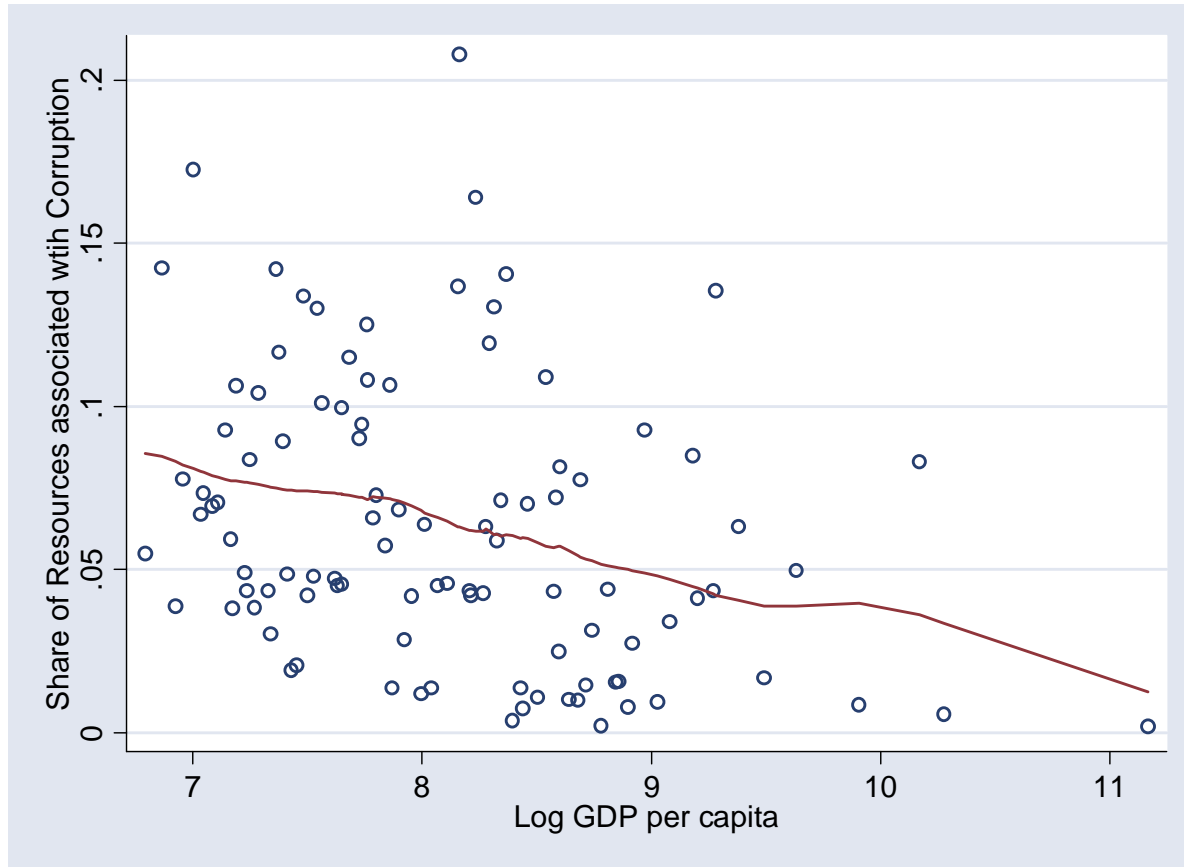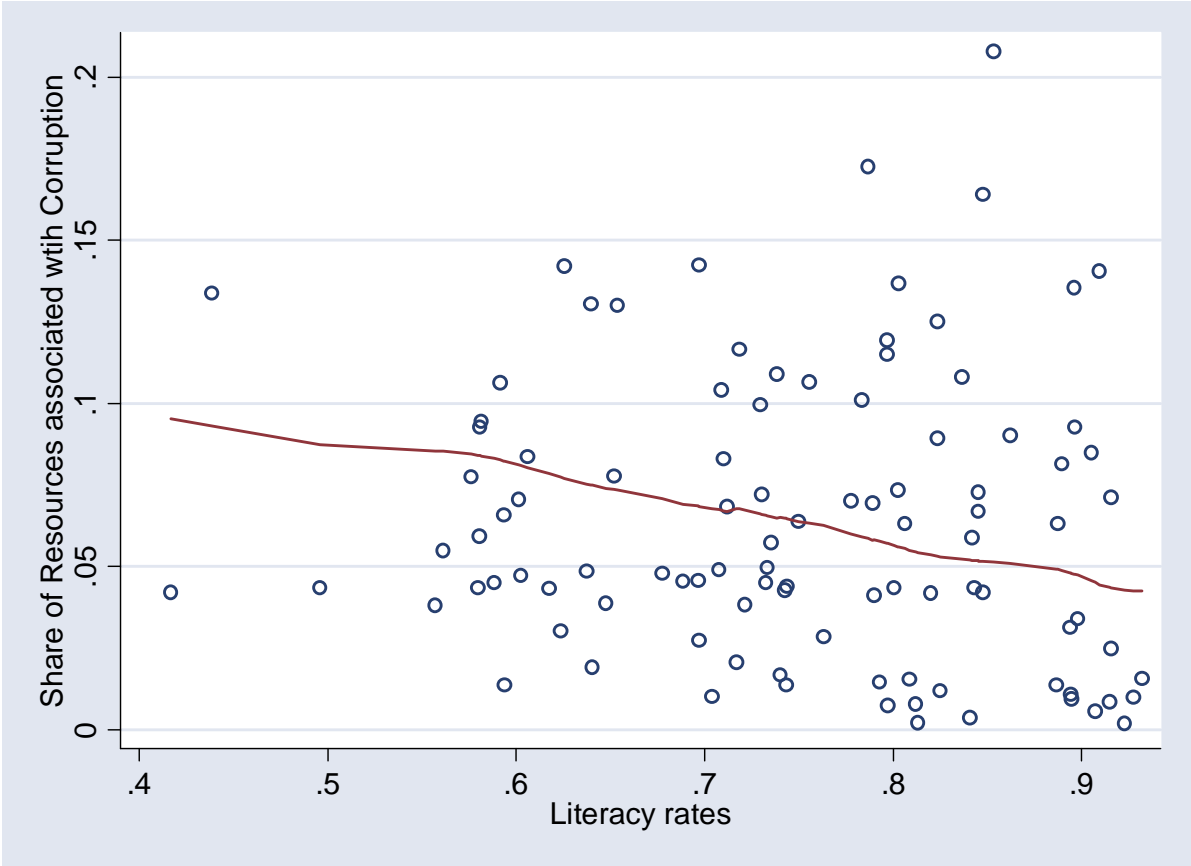Proportion of first-term mayors

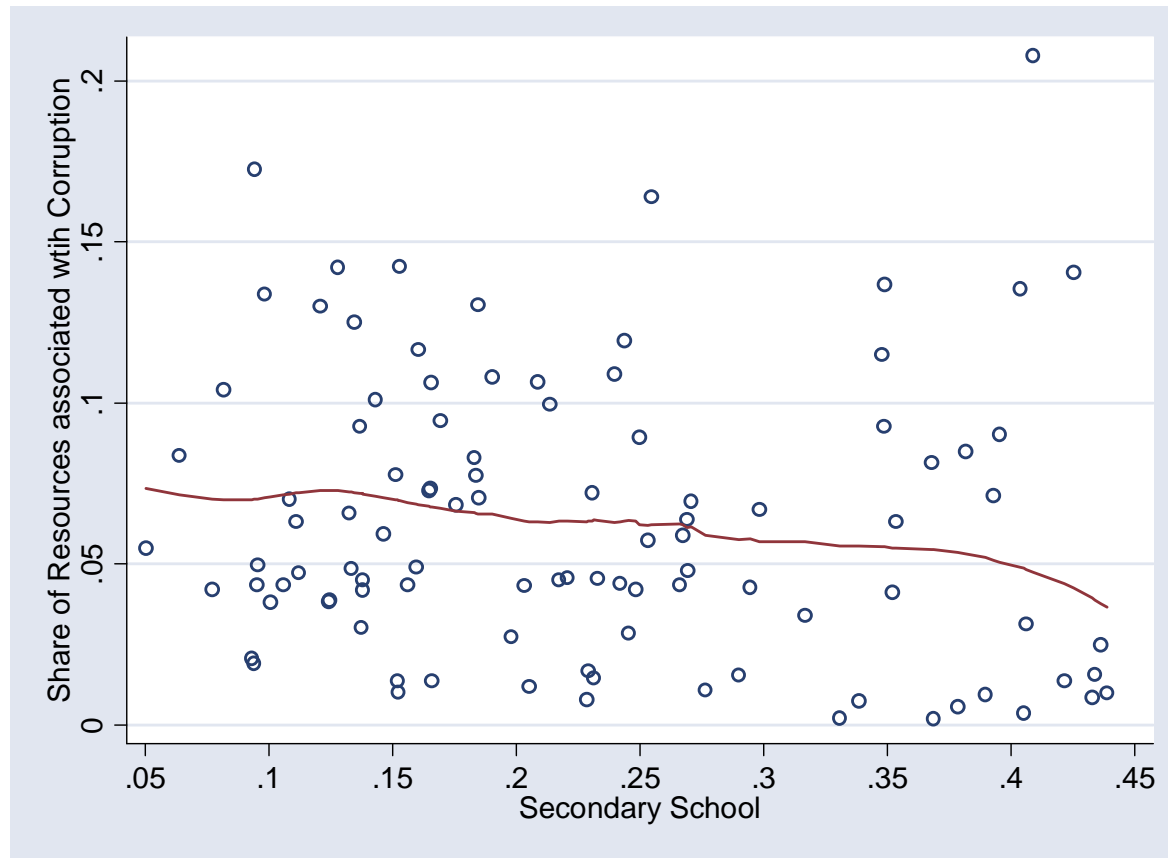Proportion of second-term mayors

Figure 2a: Corruption and GDP

Notes to Figure 2a:: Locally weighted smoothing of the share of audited resources found to be corruption by log GDP per capita; bandwidth = 0.8. Each circle represents the mean level of corruption at a percentile of log GDP per capita.

Figure 2b: Corruption and Literacy Rate

Notes to Figure 2b: Locally weighted smoothing of the share of audited resources found to be corruption by the proportion of the population that is literate; bandwidth = 0.8. Each circle represents the mean level of corruption at a percentile of literacy rates.

Figure 2c: Corruption and Secondary School Education

Notes to Figure 2c: Locally weighted smoothing of the share of audited resources found to be corruption by the proportion of the population with at least a secondary school education; bandwidth = 0.8. Each circle represents the mean level of corruption at a percentile of secondary school education.