Do Government Audits Reduce Corruption?
Estimating the Impacts of Exposing Corrupt Politicians[*]

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Abstract

Political corruption is considered a major impediment to economic development, and yet it remains pervasive throughout the world. This paper examines the extent to which government audits of public resources can reduce corruption by enhancing political and judiciary accountability. We do so in the context of Brazil's anti-corruption program, which randomly audits municipalities for their use of federal funds. We find that being audited in the past reduces future corruption by 8 percent, while also increasing the likelihood of experiencing a subsequent legal action by 20 percent. We interpret these reduced-form findings through a political agency model, which we structurally estimate. Based on our estimated model, the reduction in corruption comes mostly from the audits increasing the perceived non-electoral costs of engaging in corruption.

Keywords: Corruption, Audits, Political Selection, Political Accountability, Judicial Accountability

JEL: D72, D78, H41, K42, O17.

I. Introduction

Politicians throughout the world embezzle billions of dollars each year, and in so doing induce the misallocation of resources, foster distrust in leaders, and threaten the very pillars of democracy (Rose-Ackerman, 1999). And while the adverse consequences of corruption have been long recognized, there is little consensus over how best to fight it.[1] One point of growing emphasis in the literature has been the importance of political institutions that constrain rent-seeking, and in particular the role of elections in selecting and disciplining politicians.[2] Another strand of the literature has instead focused on the effectiveness of a country's judicial and prosecutorial institutions: If severe enough, the legal consequences of rent extraction should also discipline politicians (Becker, 1968; Becker and Stigler, 1974).

Although a successful anti-corruption strategy is likely to include reforms to strengthen both sectors, the efficacy of these institutions ultimately depends on a government's ability to detect corruption in the first place. This has led several countries to adopt audit programs aimed at uncovering the misuse of public resources, which not only increase the probability of detecting wrongdoing, but also provide the requisite information to both voters, as well as prosecutors, to hold politicians accountable for malfeasance.

In this paper, we investigate the role government audits play in reducing political corruption in local government through the promotion of electoral and judicial accountability. We do so in the context of Brazil's anti-corruption program which began in 2003 and has since audited 1,949 municipalities at random. Many municipalities have been audited multiple times. Consequently, for several rounds of later audits, we are able to compare the corruption levels discovered among the municipalities that are being audited for the first time (*control group*) to the corruption levels of municipalities that have also been audited in the past (*treatment group*). Because municipalities are selected at random, this comparison estimates the causal effects of a past audit on future corruption levels, in a setting in which both groups face the same ex-ante probability of being audited.

We find that corruption levels are approximately 8 percent lower among treated municipalities compared to control municipalities. According to most political agency models, whether a municipality has been audited in the past should not have long-term consequences on rent-seeking. If mayors have a two-term limit and are perfectly informed about the probability of an audit, the experience

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[1]See for example Fisman, Schulz, and Vig (2014) for estimates of wealth accumulation of politicians in India and Pande (2008) and Olken and Pande (2012) for overviews of the economics of corruption in developing countries.

[2]See Besley (2007) and Ashworth (2012) for reviews of agency models and Ferraz and Finan (2008), Ferraz and Finan (2011), Bobonis, Camara Fuertes, and Schwabe (2015) for evidence on how elections can discipline politicians.

of an audit should only affect corruption in the following term through its selection effects. But mayors in Brazil are not perfectly informed: Although they can potentially compute the probability of an audit for any given lottery, they do not know the likelihood of future audits occurring. Faced with this uncertainty, it is plausible that mayors update their beliefs over the audit risk through the information they acquire from their own and others' audit experiences.[3]

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[3]Although we model learning over the audit probability, it could also be the case that agents learn about the costs associated with audits. In Appendix C, we solve for and estimate such a model. Although the structure of the learning process differs between the two models, both produce very similar results.

[4]Outside of the context of our model, there are two other possible explanations for the reduction in the corruption. One interpretation for our findings is that the audits teach mayors to better hide corruption. The other interpretation is that the federal government offered fewer transfers in response to an audit, and thus made it harder for future mayors to engage in corruption. We test for both of these channels and do not find support for these interpretations.

II. Background and Data

A. Corruption in Brazil and the Randomized Anti-Corruption Program

Brazil is one of the most decentralized countries in the world. Each year, municipalities receive millions of dollars from the federal government to provide basic public services such as primary education, health care, and sanitation. An elected mayor decides how to allocate these resources in conjunction with a locally-elected legislative body. With only minimal federal oversight accompanying these transfers, corruption at the local level has been a serious concern.

Corruption in Brazil occurs through a combination of fraud in the procurement of goods and services, diversion of funds, and over-invoicing of goods and services (Ferraz and Finan, 2011). Common irregularities include incomplete public works (paid for but unfinished) and the use of fake receipts and phantom firms (i.e., firms that only exist on paper). Corruption tends to be more prevalent in places that receive more federal transfers, or where the local media and the judiciary are absent (Brollo, Nannicini, Perotti, and Tabellini, 2013; Zamboni and Litschig, 2015).

In response to widespread corruption and a lack in the capacity to systematically detect and punish malfeasance, the federal government created in 2003 Brazil's Controladoria Geral da União (CGU) – Office of Comptroller-General. The CGU, which is functionally autonomous and possesses the constitutional powers of a ministry, centralizes all of the Federal Government's internal control activities, and sets government directives for combating corruption. In order to establish horizontal accountability, the CGU also forms part of a complex system of federal agencies responsible for preventing, investigating, and punishing illicit acts in the political and public spheres. To this end, the Federal Court of Accounts (TCU), the Office of the Federal Public Prosecutor (MPF), and the

Federal Police are responsible for inspecting, controlling, correcting and instructing legal actions taken against public administrators and politicians in cases of corruption (Speck, 2011; Power and Taylor, 2011).

B. *The Randomized Audits Program*

Shortly after its creation, the CGU launched an anti-corruption program targeted at municipal governments. The program, named *Programa de Fiscalização por Sorteios Públicos* (Monitoring Program with Public Lotteries), consists of random audits of municipalities for their use of federal funds. It originally started with the audit of 26 randomly selected municipalities across different states, but then shortly moved towards auditing 60 municipalities chosen by lottery. The lotteries are held publicly in conjunction with the national lottery in Brasília, and all municipalities with a population of up to 500,000 inhabitants are eligible for selection.[6] As of February 2015, there have been 2,241 audits across 40 lotteries in 1,949 municipalities and over R$22 billion dollars worth of federal funds audited.

Once a municipality is chosen, the CGU gathers information on all federal funds transferred to the municipal government during the previous three to four years and issues a random selection of inspection orders. Each one of these orders stipulates an audit task for a specific government project (e.g. school construction, purchase of medicine, etc.) within a specific sector.[7] Once these inspection orders are determined, 10 to 15 auditors are sent to the municipality for one to two weeks to examine accounts and documents, to inspect for the existence and quality of public work construction, and to verify the delivery of public services. These auditors are hired based on a competitive public examination and earn highly competitive salaries, thus their incentives for corruption are lower than those of other bureaucrats in the federal level administration. Moreover, the inspections are done by a team which reduces the opportunity for corruption among individual auditors.[8] After the inspections are completed, a detailed report describing all the irregularities found is submitted to the central CGU office in Brasília. The central unit unifies the information and publishes a report on the internet. These reports are also sent to the Federal Courts of Accounts

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[6]This eligibility criterion has changed slightly over time.

[7]Auditors do not have discretion in auditing other projects. If they find clear evidence of corruption in their fieldwork, they need to notify the central unit of the CGU who will then decide whether to issue a new inspection order.

[8]Ferraz and Finan (2008) find no evidence that auditors manipulate the audit reports. In a recent study of Brazil's federal government, Bersch, Praça, and Taylor (2016) found the CGU to be one of the government's most autonomous and least politicized agencies.

(TCU), the Federal Prosecutors' Office (MPF), the local judiciary, the Federal Police, and to the municipal legislative branch.

Over time the program has changed in order to improve the auditing capabilities of the CGU. Because larger municipalities receive substantially more transfers, the CGU decided in August 2005 to target a limited number of randomly selected sectors in larger municipalities. For example, in the 17th lottery that took place in August 2005, the CGU chose to audit the sectors of social assistance, crime prevention, and industrial policies. Municipalities smaller than 20,000 inhabitants are still subject to audits in all sectors.

Although these changes affect the areas in which municipalities can be audited, they do not affect a municipality's audit probability. Lotteries are done by state and so the probability of being audited is constant for municipalities within the same state. For smaller states such as Alagoas, only 1 or 2 municipalities are typically drawn in a single lottery, whereas for a large state like Minas Gerais, with over 853 municipalities, as many as 8 municipalities have been drawn in a single lottery. Once audited, the municipality can only be audited again after several lotteries have elapsed.[9] Overall, as we see from Table A.1, the implied audit probabilities in any given lottery are quite small, with the average being only 1.3 percent (s.d.= 0.005) in a given lottery. But given the frequency of the lotteries, the probability of being audited in one's political term can be quite high, ranging anywhere from 8.6 percent for the state of Minas Gerais to 26.4 percent in the case of Rio de Janeiro.

Note that even though audit probabilities are known at the time of a lottery, there are two important sources of uncertainty that can affect a mayor's perception of audit risk. First, the number of municipalities audited per state changes over time and this information is only provided right before the lottery takes place. For example, consider the state of Ceará: at the beginning the program, the CGU only selected 3 municipalities per lottery. After the 9th, this number decreased to 2 municipalities, only to then increase back to 3 after the 22nd lottery. The number then changed again to 4 starting in the 34th lottery. Similar changes have occurred in other states. Second, and most importantly, due to fluctuations in the federal budget, it is extremely difficult for mayors to anticipate how many lotteries will take place during their term in office. As we document in Figure 1, the number of lotteries held per year has varied substantially over the course of the program. In some years, the program carried out as many as 7 lotteries in given year – leading to as many as 400 municipalities being audited – while in other years the program only carried out a single audit. For these reasons, it is reasonable to assume that mayors are uncertain about future audit risk.

By various accounts, the program has served as an important weapon in Brazil's fight against po-

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[9]This rule has changed over time going from 3 to 12 lotteries.

litical corruption. The information obtained from the CGU audits has been widely used in political campaigns and in voters' selection and sanctioning of municipal politicians (Ferraz and Finan, 2008). The federal police and federal prosecutors have also exploited the audits to better target their investigations, and to help build their cases against corrupt politicians and public servants. Consequently, since 2004 Brazil has witnessed a steady increase in the number of legal actions involving political corruption, evidence of which can be seen in Figure 2.

Panel A of Figure 2 plots the number of police crackdowns, called Operações Especiais (Special Operations), aimed at uncovering municipal corruption. These crackdowns, which have increased over time and to date total 199 cases throughout Brazil, are the result of a direct collaboration between the federal police and the CGU. The number of civil court cases of individuals charged with misconduct in public office has also increased since 2004. In Panel B, we plot the number of mayors convicted of misconduct in public office who are banned for running for any public office for at least five years. As the figure depicts, fewer than 50 mayors were convicted of irregularities in 2004, but more than 400 were convicted in 2009. Although the CGU is not solely responsible for the increase in anti-corruption crackdowns and convictions, it has undoubtedly increased the costs of corrupt practices in Brazil, and as we will document below, its random audit program has played a significant role in this increase.

Together with the increasing number of prosecutions and anti-corruption crackdowns by the Federal Police, the local media has also contributed to the program's effectiveness. Local media is an important source of information for both politicians and voters to learn about the audits of nearby municipalities, as well as the likelihood of future legal actions. For example, on March 31, 2010, the Federal Police arrested the mayor of Satubinha, Maranhão after the CGU had discovered that he had diverted funds from over 23 procurement contracts. According to a political activist blog, when the radio announced his arrest, the mayor of São Bento, a neighboring municipality, was seen leaving on a small airplane afraid that he would be arrested next.[10]

The radio will often report on the audit results of neighboring municipalities. For example, on September 28, 2012, Radio Três Fronteiras, located in the municipality of Campos Sales, Ceará, ran a radio program to discuss the audit results of the neighboring municipality of Arneiroz.[11] The radio station Rádio Pajeú AM 1500, which covers 23 municipalities in the states of Pernambuco and Paraíba, also airs programs about municipal audits. On December 15th, they ran a show on the CGU's audit of the municipality of Afogados, to highlight the large number of irregularities found

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[10]See http://isanilsondias.blogspot.com.br/2010/04/policia-federal-no-encalco-de-prefeitos.html. Retrieved December 12, 2016.

[11]See http://tresfronteirasam.com.br/radio/noticias.php?noticia=1003. Retrieved December 12, 2016.

in the implementation of the Conditional Cash Transfer program Bolsa Familia.[12]

C.   Data

We build measures of mismanagement and corruption from a database managed by the CGU. In our analysis, we focus on corruption occurring in the 2004-2008 and 2008-2012 electoral terms. Hence, our main estimation sample consists of all audits conducted between July 2006 and March 2013 (lotteries 22 through 38).

The dataset includes the coding of all irregularities found by the auditors for each inspection order. Although all audit reports are posted online, starting with the 20th lottery in March 2006, the CGU began to code the information used for the reports. For each inspection order, the dataset contains information on the sector and government program, the amount transferred to the municipality, and a list of findings. For each finding, the auditors describe the irregularity found and classify it as: 1) an act of mismanagement (e.g. documents were not properly filled out, or improper storage of food supplies and medical equipment), 2) act of moderate corruption, 3) act of severe corruption.[13]

While the CGU's distinction between acts of mismanagement and acts of corruption is clear, the difference between moderate versus severe corruption is less obvious. To illustrate this, consider for example the municipality of Chaval in Ceará, which was audited in the 20th lottery. The auditors went to the municipality with 25 inspection orders, one of which involved the financing of school buses for students attending primary schooling. They discovered two irregularities – one moderate and the other severe. For the moderate irregularity, a representative of the mayor withdrew R$1,200 without proving how the money was spent. The severe irregularity took place during the procurement of transportation services. The contract was awarded to a firm that did not match the original proposal, and the value of the contract was for a different amount than what was offered. While the second irregularity is arguably more severe, the CGU also classified as moderate the following irregularity discovered in Urbano Santos in Maranhão: There auditors visited three schools to check whether a school lunch program had been provided. Despite the fact that the municipality

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[12]See http://www.radiopajeu.com.br/portal/pente-fino-da-cgu-no-bolsa-familia-prefeitura-de-afogados-emite-nota/. Retrieved December 12, 2016.

[13]These data are similar to those used by Zamboni and Litschig (2015), except that our dataset spans a longer period of time. It is also worth noting that the CGU's distinction between moderate and severe irregularities does not map directly onto the categories used either by Ferraz and Finan (2008) or Brollo et al. (2013). Because the CGU classifies the irregularities based on potential losses accrued to the government, many of their "moderate" irregularities are typical examples of the corrupt practices used in the analysis by Ferraz and Finan (2008) and Brollo et al. (2013). See Zamboni and Litschig (2015) for a discussion of this point.

had received the money to pay for the program, school lunches had not been delivered for an entire year in one school, and had gone missing for a month in the other two schools. Given these types of examples, we had decided to use as our main measure the combination of both moderate and severe irregularities.

Based on this information, we construct measures of corruption and mismanagement at the municipality-lottery level. Our measure of corruption is the number of irregularities classified as either moderate or severe. Our measure of mismanagement is the number of irregularities associated with administrative and procedural issues. In Figure 3, we plot the distributions of irregularities associated with corruption and mismanagement per service order. The audits discovered on average 2.5 acts of corruption and 0.88 acts of mismanagement per service order, suggesting that 73.6 percent of the irregularities found during an average audit involves some act of corruption. To put these figures in perspective, Bandiera, Prat, and Valletti (2009) estimate only 20 percent of waste found in Italy's public procurement process was due to corruption. Similarly, Olken (2007) argues that the main reason why audited villages in Indonesia did not significantly reduce their corruption is because the audits mostly reveal acts of mismanagement as opposed to acts of malfeasance. Similar to Bandiera, Prat, and Valletti (2009) we do not find any evidence that active and passive waste are positively correlated (correlation coefficient = 0.02). In Figure A.1, we plot the average number of irregularities associated with corruption and mismanagement by lottery. While our measure of corruption has been increasing steadily over time, the number of acts of mismanagement has varied more, particularly in recent audits. Given the changes to the auditing protocol over time, one should be cautious to interpret this temporal variation. In the regression results, we control for time trends in audit practices and exploit only within-audit variation.

Four other data sources are used in this paper. The political outcome variables such as reelection, vote shares, and mayor characteristics come from the Tribunal Superior Eleitoral (TSE), which provides results for the 2004-2012 municipal elections. 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. With this information, we match individuals across elections to construct measures of reelection and whether mayors are serving on a first versus second term.

We constructed the data on the joint CGU-Federal Police crackdowns using information available on the CGU homepage, as well as internet searches.[14] For each year starting in 2003, the CGU lists the name of the Special Operations and a description of the target. For each crackdown, we

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[14]See http://www.cgu.gov.br/assuntos/auditoria-e-fiscalizacao/acoes-investigativas/operacoes-especiais.

searched for the name of each operation together with the names of the targeted municipalities and keywords such as "mayor" or "corruption". We created a dataset comprised of the municipality targeted, a description of the findings, and whether the mayor or public servants of the targeted municipalities were involved in and/or arrested during the crackdown. We then create an indicator equal to one if a municipality was subject to a crackdown in a given year and whether the mayor was involved in the irregularities and/or arrested.

Data on the convictions of mayors for misconduct in public office was obtained from the Cadastro Nacional de Condenações Cíveis por ato de Improbidade Administrativa e Inelegibilidade. This database, administered by the National Council for Justice (CNJ), includes the names of all individuals charged with misconduct in public office. We downloaded the data in 2013 so the dataset includes all agents convicted up to that point. For each individual we observe the type of irregularity (e.g. violation of administrative principles or diversion of resources), the court where the conviction took place, and the date. These data are matched to the electoral data based on where the individual was a mayor and the period he/she served in office. Individuals on this list are banned from running for any public office for at least five years.

Data on municipal characteristics come from the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística (IBGE)). The 2000 population census provides several socioeconomic and demographic characteristics used as controls in our regressions. Some of these key variables include income per capita, income inequality, population density, share of the population that lives in urban areas, and share of the population that is literate.

To control for different institutional features of the municipalities, we also use information from the municipality survey, *Perfil dos Municípios Brasileiros: Gestão Pública*, which is conducted annually from 1999-2010. This municipal survey characterizes not only various aspects of the public administration, such as budgetary and planning procedures, but also more structural features such as whether the municipality has a judge. Moreover, the survey provides our key measures of media availability, namely the number of radio stations and the number of daily newspapers.

Table 1 presents summary statistics for the municipalities in our sample, by whether they were audited previously or not. For each characteristic, we also present the difference between these characteristics. As expected from the random assignment, there are few differences in the characteristics of places audited for a first time versus those that had been audited previously. Importantly, included among these characteristics is the number of service orders. The fact that the number of service orders is balanced between treatment and control verifies the fact that the CGU does not

adjust the number of service orders based on a previous audit.[15] Out of 15 characteristics, only one is statistically significant at the 10 percent level. We also fail to reject the hypothesis that all the variables are jointly significant (F-test=1.17; p-value=0.30). Overall the results from Table 1 suggest that the lottery used by the CGU was effective.

[15]This is expected given the way inspection orders are issued. As we mentioned, within sectors inspection orders are issued based on a random selection of government projects from the last 3 to 4 years.

IV. Research Design

Before structurally estimating the model, we examine whether the audits reduce future corruption in the reduced-form using the random variation induced by the lotteries. To test this hypothesis, we need to overcome the fact that we only observe corruption once a municipality has been audited. We do so by exploiting municipalities that have been audited multiple times. As we see in Figure 4, out of the 1,949 municipalities that have been audited, 14 percent of them have been audited multiple times: 253 audited twice, 18 three times, and 1 municipality 4 times. For a given round of audits, we compare the corruption levels of municipalities that had been audited prior to this audit to those that had not (and are thus being audited for the first time).

Figure 5 shows the number of control and treated municipalities for each lottery in our estimation sample. As expected, the number of municipalities that have been audited more than once increases over time. For instance, in the 22nd lottery, only 6 out of 60 municipalities had been audited in the past, compared to 22 out of 60 in the 38th lottery. Given the structure of the data, we estimate the following model for municipality m in state s, audited at date t.

where Legal$_{mt}$ is an indicator for whether a legal action (e.g. crackdown involving political corruption or the mayor was convicted for corruption) occurred in municipality m in year t. Our treatment variable, Audited$_{mt}$, which is equal to one after the municipality has been audited for the first time, estimates the causal effect of being audited on the likelihood of incurring a subsequent legal action. The regression adjusts for municipal and year fixed effects, and the error term is clustered at the level of the municipality.

V.   Results

A.   *Reduced-form Estimates*

Effects of the Audits on Corruption and Mismanagement.   Table 2 presents OLS regression results from estimating several variants to Equation 16. The specification in the first column esti-

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mates the effects of having been audited on the log of the total number of irregularities discovered in the audit, controlling for state and lottery intercepts, as well as the number of service orders. Column 2 extends this specification to include various socio-economic characteristics of the municipality. Our preferred specification is presented in Column 3, which modifies the specification in Column 2 to control for the number of service orders in a nonparametric manner. Our estimation sample includes all audits from lotteries 22 to 38.

The results in columns 1-3 suggest that municipalities that had been audited in the past commit significantly fewer irregularities than those that had not been previously audited. Once we control for municipal characteristics and service-order fixed-effects, we estimate a reduction of 5.8 percent. We also find that the number of irregularities correlates with several of the socio-economic characteristics that we have come to expect from the cross-country literature (e.g. Treisman (2000)). For example, we see strong negative associations with income per capita and literacy rates, as well as positive correlations with income inequality and population.

As we discussed above, there is an important distinction to be made between corruption and mismanagement. We do this in columns 4-9. In columns 4-6, we replicate the previous specifications using as a dependent variable the log of total acts of mismanagement. In columns 7-9, we use the log of total acts of corruption as the dependent variable.[23]

We do not find any evidence that audits affect mismanagement. Under our preferred specification, the point estimate is small and statistically indistinguishable from zero (coefficient = -0.023, robust standard error=0.041). In contrast, we find that having been audited in the past leads to a significant reduction in corruption. Municipalities that had experienced a previous audit committed 7.9 percent fewer acts of corruption compared to those that had not. Visually, the effects of the treatment can be seen in Figure 6. The figure plots the residuals from a regression of log corruption on state, lottery, and service order fixed effects. The figures compares the distribution of these residuals between treatment and control municipalities. From this comparison, we see that the audits reduced corruption at the upper tail of the distribution. For treated municipalities, the 99th percentile of the corruption distribution corresponds to approximately the 91st percentile of the corruption distribution in control municipalities. The left tails of the corruption distributions are comparable between treatment and control municipalities.

To interpret this magnitude, consider that the average municipality in our sample receives 15 million reais in federal transfers per year. Based on our estimates of a random sample of audit reports, 30

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[23]We also estimate the effects of the audits on the totals acts of corruption and mismanagement, using a negative binomial regression model. We present the marginal effects in Table A.2. Overall, the findings are quite similar.

percent of the funds audited were found to be diverted, implying that audits reduced corruption by R$355,000 per year per municipality. The municipal characteristics are also quite predictive of corruption levels: for example, a 10 percent increase in per capita income is associated with a 1.8 percent decline in corruption.[24]

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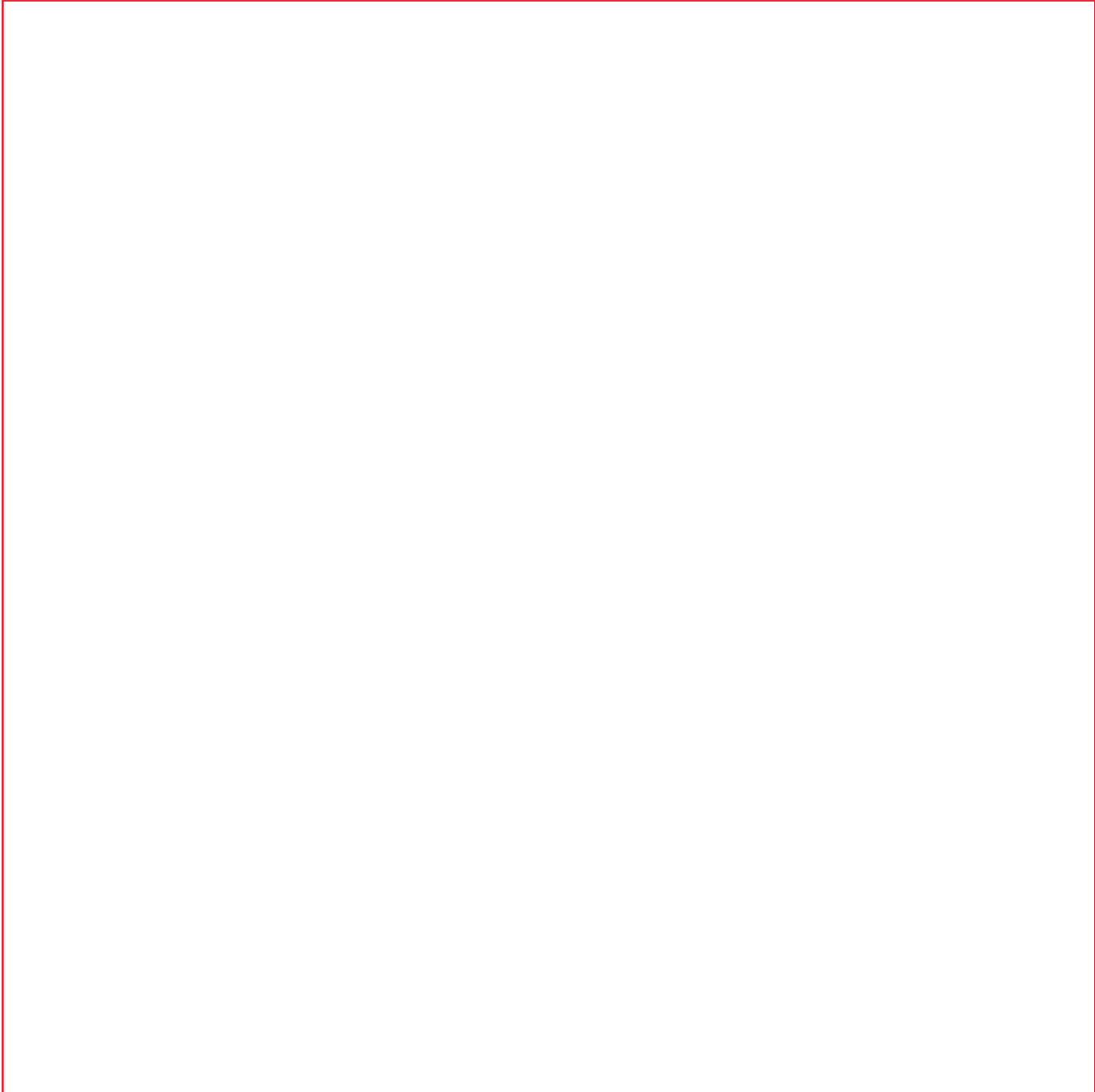
[24]We also test whether the effects of the audits vary according local characteristics, but find little evidence of heterogeneous effects (see Table A.3).

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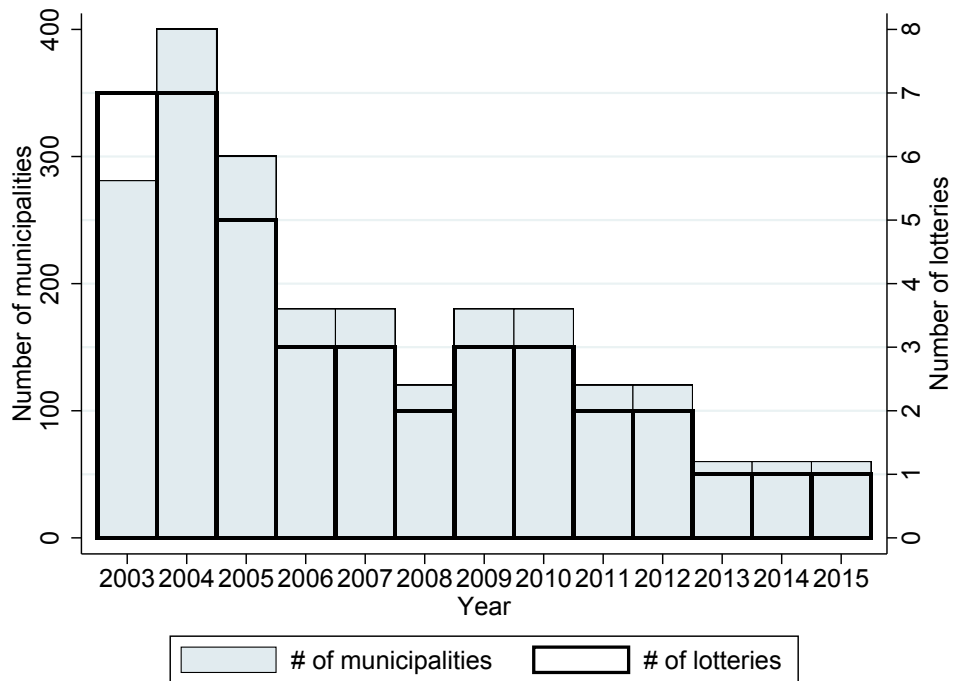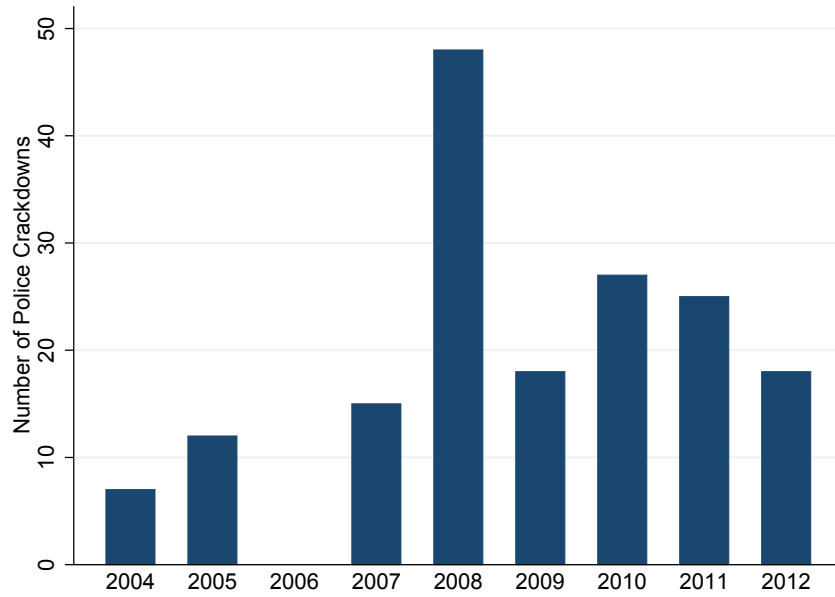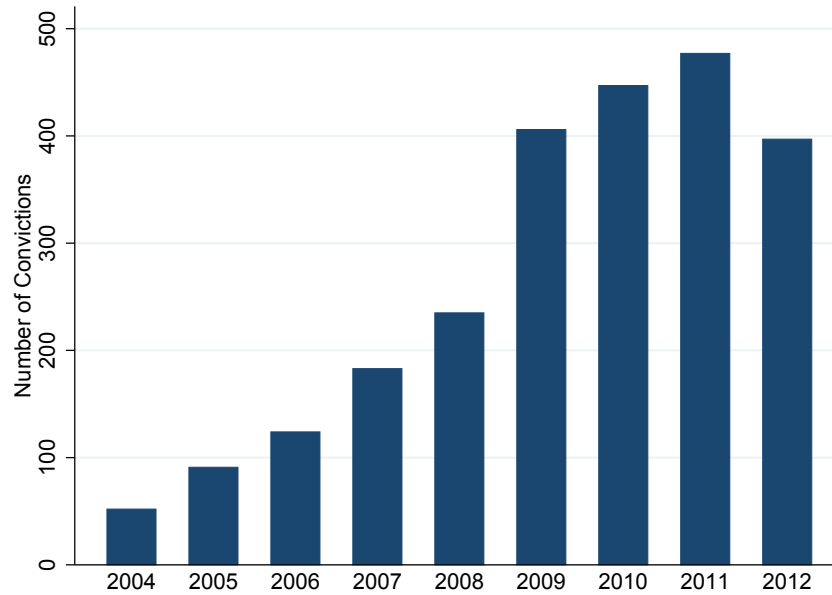
Figure 1: Number of Lotteries and Municipalities Audited Per Year

Notes: This figure plots the number of lotteries and the number of municipalities that have been audited for the full duration of the program (from 2003 to 2015).
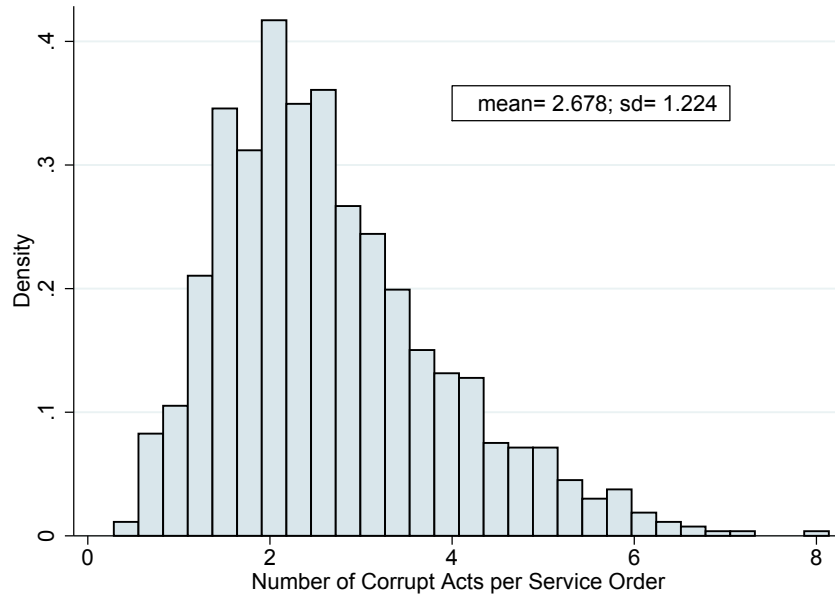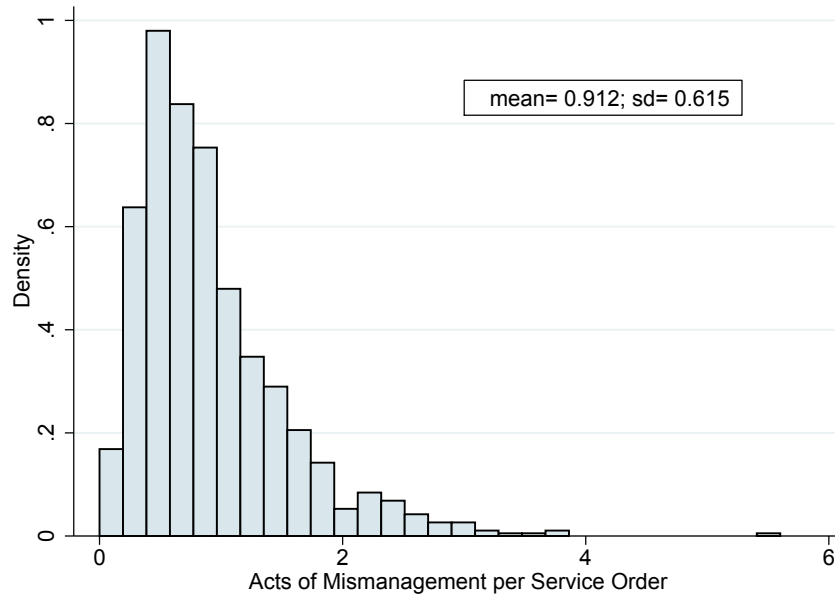
Panel A: Police Crackdowns

Panel B: Convictions

Figure 2: Number of Legal Actions over Time

Notes: This figure plots the number of police crackdowns and convictions involving political corruption during the period 2004 to 2012.

Panel A: Corruption

Panel B: Mismanagement

Figure 3: Distribution of Irregularities Associated with Corruption and Mismanagement

Notes: This figure displays the distribution of irregularities per service order associated with corruption and mismanagement. These data are based on the audits conducted in our estimation sample, from July 2006 to March 2013.
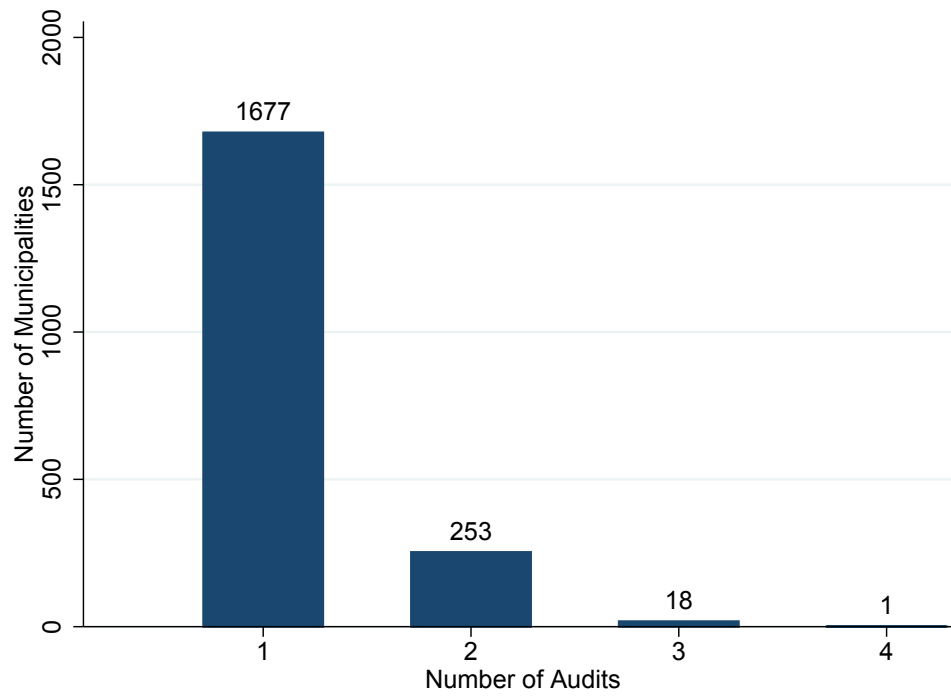
Figure 4: Distribution of Times a Municipality has been Audited

Notes: This figure plots the distribution of the number of times a municipality has been audited for the full duration of the program (from 2003 to 2015).
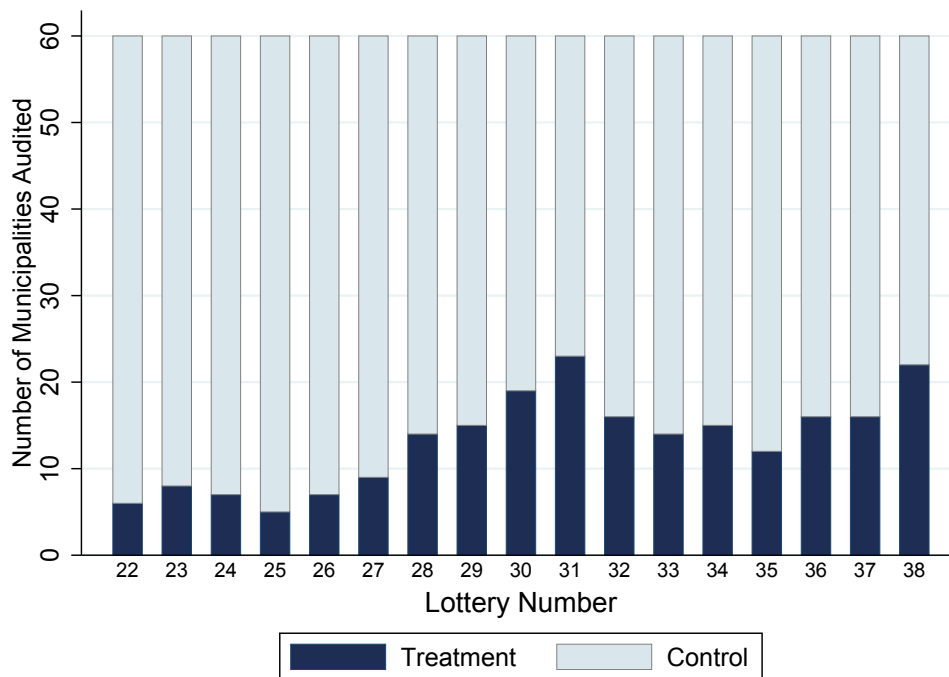
Figure 5: Distribution of Control and Treatment Municipalities Over Time

Notes: This figure plots the number of control and treated municipalities for each lottery in our estimation sample. The dark blue bars denote the number of treated municipalities (i.e. previously audited). The light blue bars denote the number of control municipalities (i.e. not previously audited).

## Table 1: Mean Comparisons Between Audited and Non-audited

	Control		Treatment		
	Mean (1)	Std Dev. (2)	Mean (3)	Std Dev. (4)	Difference (5)
Population	22992.720	45069.940	26000.850	43799.660	436.700 [2553.579]
Share female	0.495	0.015	0.496	0.014	0.000 [0.001]
Share urban	0.574	0.235	0.576	0.234	0.008 [0.014]
Human Development Index	0.507	0.105	0.492	0.101	-0.002 [0.004]
Income inequality (Gini)	0.550	0.068	0.563	0.069	0.003 [0.005]
Income per capita (log)	5.575	0.580	5.499	0.582	-0.001 [0.026]
% Poor	0.445	0.229	0.486	0.215	0.502 [0.821]
Share illiterate	0.247	0.136	0.268	0.134	0.303 [0.494]
% bureaucracy with a college degree	0.192	0.123	0.180	0.118	-0.007 [0.006]
% population with a colllege degree	0.207	0.212	0.204	0.229	0.009 [0.011]
Has AM Radio	0.211	0.408	0.243	0.430	0.017 [0.032]
Has a Judiciary District	0.447	0.497	0.523	0.501	0.002 [0.038]
Effective Number Candidates for Mayor	2.150	0.550	2.204	0.648	0.044 [0.038]
Reelection rates for Mayors	0.405	0.491	0.437	0.497	0.026 [0.048]
Mayor's Years of Education	12.009	4.194	11.868	4.355	-0.229 [0.387]
Share of Votes Mayor received	0.561	0.125	0.564	0.133	0.006 [0.010]
Number of Service Orders	25.205	9.264	24.802	9.983	-0.169 [0.618]
N	881		222		

Notes: This table shows means and standard deviations of various municipal characteristics by places that have been audited in the past (treatment) and places that have not been audited in the past (control). The difference and corresponding standard error (in brackets) are computed based on a regression that controls for both state and lottery fixed effects. All of these characteristics are based on information collected in 2000, except for the share of the bureaucracy with a college degree, which is based on a 2005 survey.

Table 2: The Effects of the Audits on Corruption and Mismanagement

	Number of Irregularities			Acts of Mismanagement			Acts of Corruption		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Audited in the past	-0.034	-0.045*	-0.058*	0.010	0.001	-0.023	-0.059*	-0.070*	-0.079*
	[0.021]	[0.021]	[0.021]	[0.040]	[0.040]	[0.042]	[0.028]	[0.027]	[0.028]
	(0.09)	(0.03)	(0.01)	(0.60)	(0.52)	(0.30)	(0.03)	(0.03)	(0.01)
Population (log)		0.057*	0.064*		0.047*	0.037+		0.053*	0.064*
		[0.011]	[0.011]		[0.020]	[0.022]		[0.014]	[0.015]
Income inequality (Gini)		0.337*	0.361*		0.137	0.177		0.449*	0.459*
		[0.140]	[0.138]		[0.272]	[0.276]		[0.185]	[0.188]
Income per capita (log)		-0.085*	-0.102*		0.111	0.103		-0.158*	-0.176*
		[0.041]	[0.042]		[0.076]	[0.079]		[0.052]	[0.054]
Illiteracy		0.003+	0.003+		0.001	0.000		0.004*	0.005*
		[0.002]	[0.002]		[0.003]	[0.003]		[0.002]	[0.002]
Share of urban population		0.123*	0.118*		-0.056	-0.068		0.190*	0.182*
		[0.050]	[0.050]		[0.109]	[0.113]		[0.072]	[0.072]
Controls	N	Y	Y	N	Y	Y	N	Y	Y
f(Service Orders)	log	log	nonpar	log	log	nonpar	log	log	nonpar
R^2	0.655	0.675	0.704	0.472	0.480	0.509	0.597	0.616	0.644
N	983	983	983	982	982	982	983	983	983

Notes: This table reports the effects of being audited in the past on corruption and mismanagement. The dependent variable in columns 1-3 is the log of the total number of irregularities discovered in the audit. In columns 4-6, the dependent variable is the log of total acts of mismanagement, and in columns 7-9 the dependent variable is the log of total acts of corruption. In addition to the controls presented in the table, each regression controls for state and lottery fixed effects. In columns 3, 6, 9 the number of service items audited is controlled for in a fully nonparametric fashion by including a vector of indicators for each possible number. In the other columns, we control for the log of the number of service items audited. P-values based on randomization inference reported in the parentheses. The p-values were computed based on 1,000 random draws. Robust standard errors are reported in brackets, + p<0.10, * p<0.05.
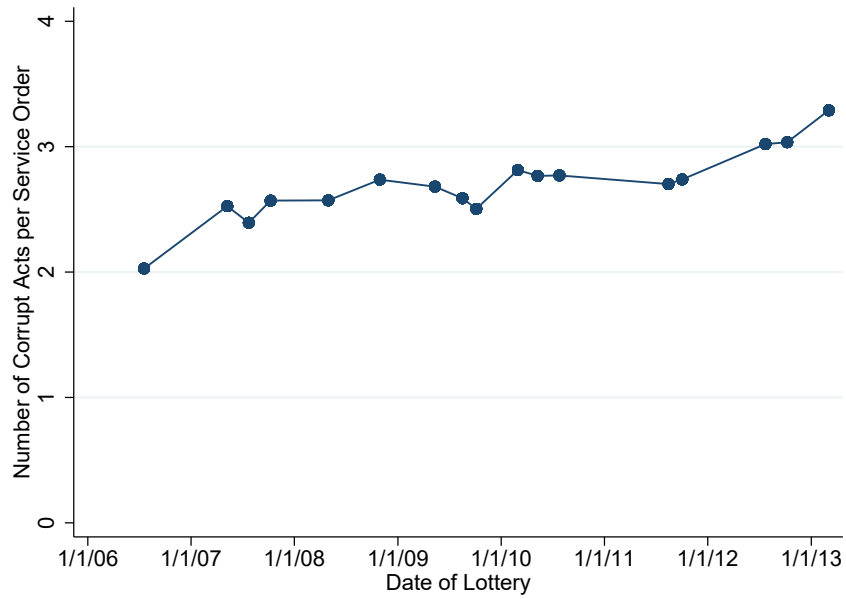
Corruption
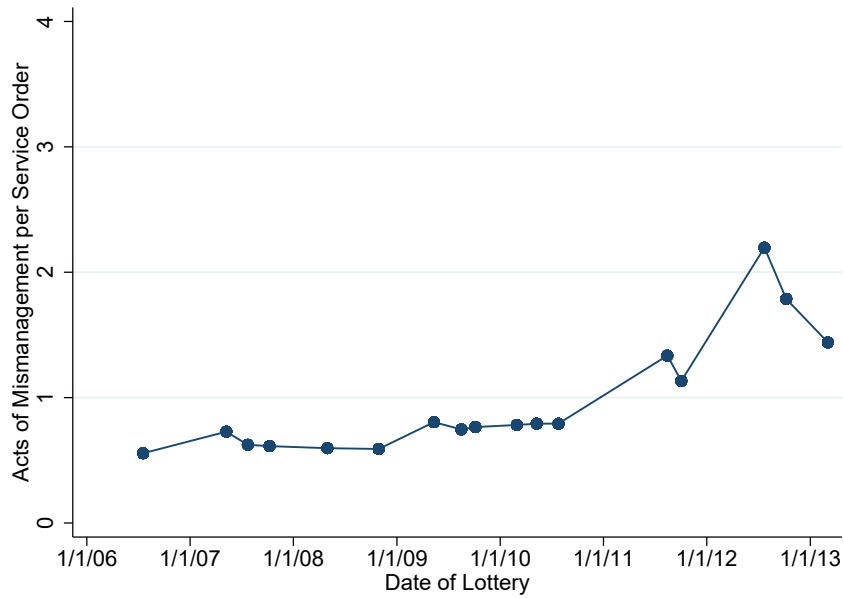
Mismanagement

Figure A.1: Average Number of Irregularities By Lottery

Notes: This figure displays by lottery the average number of irregularities per service order associated with corruption or mismanagement. These data are based on the audits conducted in our estimation sample, from July 2006 to March 2013.

Table A.1: Probability of Being Audited

	Lottery	Year	Term
Alagoas	1.4	4.9	14.7
Bahia	1.1	4.3	12.5
Ceará	1.6	5.5	16.3
Espírito Santo	1.3	5.3	14.7
Goiás	1.1	4.5	11.8
Maranhão	1.1	4.0	12.0
Minas Gerais	0.8	3.1	8.6
Mato Grosso do Sul	1.6	6.4	17.2
Mato Grosso	1.3	5.2	13.6
North	1.7	6.3	16.3
Paraíba	1.1	3.9	11.6
Pernambuco	1.4	4.7	14.6
Piauí	1.1	4.1	11.8
Paraná	0.8	3.4	9.2
Rio de Janeiro	2.3	11.5	26.4
Rio Grande do Norte	1.5	5.2	16.1
Rio Grande do Sul	0.9	3.5	9.7
Santa Catarina	0.8	3.7	9.6
Sergipe	1.8	5.7	17.2
São Paulo	0.8	3.2	9.1

Notes: This table shows the share of audited municipalities by state for a given time period, for the full duration of the program (from 2003 to 2015). Column 1 is the probability of being audited in a given lottery. Column 2 is the probability of being audited in a given year. Column 3 is the probability of being audited in a given term.