***Audits and the Quality of Government***
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**D.T.: Nº 141**                                                                                          **Junio 2020**

# Audits and the Quality of Government

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June 8, 2020

## Abstract

We exploit the well-documented random assignment of Brazilian municipalities to an audit program to explore the link between audits and the quality of government. We find that audited municipalities employ less labor to provide a given level of public services, and change the way in which they screen their employees—relying less on discretion and more on merit. These improvements in bureaucratic efficiency and professionalization imply an increase in the quality of municipal governments.

Keywords: bureaucracy, corruption, audits, efficiency, public sector employment.

JEL codes: D73, D78, H11, H70, J45, O12.

## I.    Introduction

Embezzlement, graft, influence peddling, bribery, kickbacks, fraud, favoritism, cronyism, nepotism, parochialism, patronage, capture, collusion, extortion—call it what you like, corruption (the misuse of public office for private gain) matters. Even though obtaining reliable statistics on the magnitude of corruption is difficult, the World Bank Institute estimates corruption to be around $1 trillion per year, a significant 3 percent of world GDP—and that just in bribes.[1] There is a growing consensus that corruption is a major impediment to economic development (see, e.g., Mauro, 1995; and Olken and Pande, 2012), and, non-surprisingly, fighting corruption has become a prime concern in countries all over the world.[2]

The topic has attracted increasing interest in recent years from the media, academics, policymakers, and the public at large, and few seem to doubt that reducing corruption would be beneficial (Jain, 2001). How best to achieve such a goal (through, for example, top-down monitoring, grassroots participation, information dissemination, or political, judicial, and prosecutorial institutions that constrain rent-seeking), however, remains a disputed issue (Olken, 2007) in spite of abounding suggestions (see, e.g., Eigen, 1996; Leiken, 1997; and Klitgaard, 1998).

In practice, audits (a form of top-down monitoring) are a key policy instrument in the fight against corruption. The idea of providing incentives to corruptible politicians or bureaucrats to behave honestly through an increased probability of detection and punishment is hardly new (Becker, 1968; Becker and Stigler, 1974), and the evidence shows that the basic economic intuition is correct: audits can reduce corruption—at least in the particular activities being audited (Olken, 2007; Bobonis et al., 2016; Avis et al., 2018; Zamboni and Litschig, 2018).[3]

There is less evidence, however, on if and how these reductions in corruption—and audits more generally—ultimately translate into improvements in broader outcomes, such as the quality of government.[4] Two characteristics of a well-functioning government often considered are a high quality of the bureaucracy and an efficient provision of essential public goods, like education, health and infrastructure (La Porta et al., 1999).[5]

This paper is an empirical investigation of the possible consequences of selective anticorruption monitoring on the quality of government, in the context of a large random audits program in Brazil that has proved successful in reducing the misuse of federal funds at the municipal level (Avis et al., 2018; Zamboni and Litschig, 2018). We focus here on how auditing municipal governments affects mayors' subsequent use of their discretion in hiring bureaucrats and the efficiency in the provision of municipal services.

Bureaucracies are a key component of state capacity: they implement policies and deliver public services (Ornaghi, 2019; Xu, 2019). A high-quality bureaucracy is characterized by "meritocratic recruitment through competitive examinations, civil service procedures for hiring and firing rather than political appointments and dismissals, and filling higher levels of the hierarchy through internal promotion" (Rauch and Evans, 2000: 50-51), and competitive salaries. Such a 'Weberian' bureaucracy (Evans, 1992) has been associated with enhanced prospects for economic growth (Evans and Rauch, 1999), reduced corruption (Dahlström et al., 2012), and improved performance (Gilmour and Lewis, 2006; Xu, 2019). The empirical evidence shows that merit-based recruitment is the single most important component of a Weberian bureaucracy driving these outcomes (Rauch and Evans, 2000; Dahlström et al., 2012).

Evans (1992) suggests using the fraction of bureaucratic positions filled by civil-service exam rather than discretionary hiring as a measure of meritocratic recruitment. We focus here

(equivalently) on its complement: the fraction filled without a civil-service exam. For each municipality we measure the number of discretionary appointments per 1,000 residents and the share of discretionary appointments in total municipal employment. We find that being audited causes a reduction in discretionary employment of about 1.4 employees per 1,000 residents (or over 11%, evaluated at the sample mean), and a reduction in the share of discretionary appointments of 1.2 percentage points (almost 5% with respect to the sample mean).

The other characteristic of good government that we consider is the efficient provision of essential public goods. Efficiency in this context relates to how a given municipal staff (the main input in the production of municipal services) translates into outputs—essential public services of local interest, such as public transport, early childhood and primary education programs, and public health services.

We first find that being audited reduces total employment in the municipality by more than 2.6 employees per 1,000 residents (about 6% at the sample mean, or around 60 employees). Next, we show that audits have *no* effect on the provision of municipal services, as measured by an index that summarizes how a municipality is doing in the areas of employment and income, education, and health. The estimated effect is largely non-significant, and the point estimate is just 0.04% of the sample mean of the index. We interpret these findings as indicative of a clear increase in (labor) efficiency: audited municipalities seem to be providing exactly the same level of public services with fewer workers. Thus, the reduction in discretionary appointments appears to be positively related to state capacity.

The literature has increasingly studied the consequences of government audits using the Brazilian random audits program. After the seminal work of Ferraz and Finan (2008), which found that exposing corruption among politicians up for re-election reduced their probability of

subsequent electoral success, a growing number of papers have found that audits have important effects on outcomes such as overall corruption (Avis et al., 2018), political clientelism (Bobonis et al., 2019), entrepreneurship and economic activity (Colonnelli and Prem, 2020), health outcomes (Lichand et al., 2016), and rent extraction among local governments (Zamboni and Litschig, 2018). Our paper contributes to this literature by studying how audits affect the quality of government and state capacity.

Our paper also relates to the literature studying the recruitment of employees in the public sector (see Finan et al., 2015). This growing literature has found that financial incentives (Dal Bó et al., 2013; Deserranno, 2019) and pro-social preferences (Ashraf et al., 2014) play a significant role in shaping the pool of individuals who self-select into applying for a public sector job. However, there is less evidence on the process through which governments select public employees (Colonnelli et al., 2018), which is a concern given the possibility that politicians use public sector hiring to reward political supporters and collaborators, considering the limited mechanisms available for constituents to punish politicians for bad performance (Finan et al., 2015). We contribute to this literature by showing that audits reduce total employment in the public sector, and change the screening strategy from discretion towards merit.

Given that the audits under study reduced corruption (Avis et al., 2018; Zamboni and Litschig, 2018), our efficiency result is consistent with previous literature that has shown that reduced corruption is strongly associated with less inefficiency (e.g., Dal Bó and Rossi, 2007; Colonnelli and Prem, 2020), and extends that literature's results at the firm level to the public sector.

## II.    Background and data

### A.    *The random audits program*

In 2003 the Brazilian federal government audit agency (*Controladoria Geral da União*, CGU) launched a large scale anti-corruption program (*Programa de Fiscalização de Municípios a partir de Sorteios Públicos*), aimed at reducing corruption and misuse of public funds by public administrators.[6] The program consists of random audits of municipal governments' use of federal funds transferred to them, and it was probably the first of its kind in the world. Another novelty of the program is its intention of reducing information asymmetries between voters and public officials by making the main findings for each audited municipality publicly available.

The program randomly selects a fixed number of municipalities per state (*unidad federativa*) through lotteries held by the *Caixa Econômica Federal* in Brasília, drawn in conjunction with the national lotteries.[7] To ensure a transparent process, members of the civil society, political parties, and the press are all invited to witness the lottery.

Once the municipalities are selected in a lottery, a team of CGU auditors (on average, 10 agents) collects information on the use of federal funds transferred to each municipality's government by examining accounts and documents, and visiting the existing works and services.[8] These auditors also meet with members of the local community and municipal councils to receive direct complaints. The auditors spend approximately one week inspecting, and then send a report to the central CGU office detailing all the irregularities found. These reports are sent to public prosecutors, the legislative branch of each municipality, and to the *Tribunal de Contas da União*—the different agencies in charge of corrective actions. For each municipality, a summary of the main findings is uploaded to the CGU website ([www.cgu.gov.br](www.cgu.gov.br)) and made available to the media.

The first lottery was carried out in April 2003, and by the end of that year 281 municipalities had been drafted through 7 lotteries, with about 2 billion reais of federal funds involved in the audits.

Among the most common irregularities detected by the audit teams were incomplete public works (which had already been paid for), use of fake receipts, rigged and irregular bidding processes, and over-invoicing of goods and services.

The program underwent some modifications, especially in its early years, in terms of the total number of municipalities to be drafted, the number of municipalities per state, the eligibility criteria for municipalities, and the frequency of the lotteries. From the third lottery on, the program randomly selected 50 municipalities to audit from those municipalities with less than 300,000 inhabitants; it then expanded to selecting 60 municipalities per lottery (as of lottery #10) out of those with less than 500,000 inhabitants.[9] At the very beginning of the program the lotteries were drawn on a monthly basis, but a reference periodicity was never established.

This study considers 5,476 municipalities that were eligible for the program, 496 of which were randomly selected through the first 11 lotteries, and audited in the electoral term 2001-2004.[10] The list of the municipalities selected in each of the lotteries (and eventually audited) was obtained directly from the CGU website.[11] With this information we build a dummy variable (*Audited*) that takes value 1 if the municipality was randomly audited, and constitutes our treatment indicator.

*B.    Brazilian municipalities*

Brazil is a federal presidential representative democracy, whose government is made up of a Federal District (Brasília) and three administrative tiers: the central government, 26 state governments and 5,570 municipal governments.[12] Municipalities are run by a mayor (*prefeito*), a vice-mayor (*vice-prefeito*), and members of the city council (*Câmara de Vereadores*), who are simultaneously elected every four years.

Article 30 of the 1988 Constitution charges municipalities with providing and managing essential public services of local interest—like public transport, early childhood and primary education programs, and public health services. Revenues available to municipalities to meet their responsibilities can be grouped into three categories: intergovernmental transfers (defined as transfers received from revenues generated by other government entities), locally generated revenues (defined as revenues collected from a municipality's citizens) and other miscellaneous sources of revenue. Intergovernmental transfers account for the vast majority of municipalities' receipts (99.6% on average in 2000, down to 93% in 2011), and are mostly unconditional in nature. Therefore, the mayor and the members of the city council enjoy significant discretion over how to spend these resources.

Data on municipal socioeconomic and demographic characteristics come from the Brazilian statistics office (*Instituto Brasileiro de Geografia e Estatística*, IBGE). To capture underlying differences in municipal characteristics prior to the audits, we include key variables similar to those used in Ferraz and Finan (2008): income per capita (*Income*), income inequality as measured by the Gini coefficient (*Income inequality*), total population (*Population*), share of urban population (*Urban population (%)*), and education, proxied by the literacy rate (*Literacy*).[13]

*C.    Municipal employment*

Public employees in all levels of the administration represented roughly 5% of the Brazilian population and 27% of all formal employment in 2003 – municipal employment accounted for 49% of that total, up from 38% in 1995 (De Mattos, 2011). A commonly used way to compare jurisdictions is by looking at how many employees that jurisdiction has relative to the population. We therefore compute here the total number of public employees per 1,000 residents

(*Employees per capita*) in each municipality in the electoral term 2005-08.[14] Following usual practice, we include employees in both the direct and indirect administration.[15]

Personnel practices in the public sector are different from those in the private sector. One key feature in this distinction is the reduced set of contracts that can be offered to public employees, coupled with the lack of discipline from the profit motive in the state (Finan et al., 2015). This implies that politicians may use their discretion to allocate public sector jobs to reward followers and to cement political and personal relationships – the very definition of political patronage (Grindle, 2010).

To limit this discretion in hiring, most governments have implemented career civil service systems, in which the majority of "non-elected public sector jobs are filled through a process of credentialing based on education, examination, or some other test of merit; in which a career ladder exists and is accessed through regularized demonstration of credentials of education, examination, tenure in office, or other form of assessing merit; in which tenure is secure barring malfeasance in office; and in which movement in and out (through retirement, for example) is regulated and compensated" (Grindle, 2010: 4).

In Latin America, Brazil was the first country to implement a civil service system with extensive merit-based access (through a formal examination or *Concurso Público*), widely considered to be the most successful in the region (Evans and Rauch, 1999; Gaetani and Heredia, 2002; Iacoviello, 2006).[16] About 83% of municipal employees were career civil servants in 2004.

Ample room for discretion in hiring still remains, however, as mayors can hire employees without a civil service examination in prespecified cases: commissioned posts (*cargos comissionados*), positions of trust (*função de confiança*), and temporary jobs (*emprego temporario*).[17] Temporary appointments account for the majority of discretionary hires. We

group all these categories in a single measure (*Discretionary per capita*) that represents the average total number of discretionary public employees per 1,000 residents in each municipality in 2005-08. We also compute the average fraction of discretionary employees in each municipality in the same period (*Discretionary (share)*).[18]

After dropping municipalities with missing values in our main dependent variable (18 municipalities) and our covariates (2 municipalities), we are left with an estimation sample of 5,456 municipalities, 476 of which were audited.[19] Table 1 presents summary statistics for our main variables.

[Table 1 about here]

## III.    Estimation approach

Given the randomized experimental design, estimation is a straightforward comparison of sample mean outcomes for treated and control municipalities. Let $y_{ms}$ denote the different employment and performance outcomes for municipality $m$ in state $s$. To estimate the average effect of being audited on those outcomes, we estimate different versions of the following reduced-form model through Ordinary Least Squares (OLS):

$$y_{ms} = \alpha + \beta * Audited_{ms} + \mu_s + \gamma * X_{ms} + \varepsilon_{ms} \quad (1)$$

where $Audited_{ms}$ is an indicator for whether municipality $m$ in state $s$ was audited, $X_{ms}$ is a vector of pre-treatment municipal characteristics, and $\varepsilon_{ms}$ is a random term, uncorrelated (in expectation) with $Audited_{ms}$ because of randomization.

Since treatment probabilities vary by state due to the stratified randomization we include state fixed effects $\mu_s$ for randomization strata (sometimes referred to as the "strata fixed effects" estimator).[20] The coefficient of interest is $\beta$.

## IV.    Results

This section presents evidence on the impact of audits on the quality of municipal governments. We begin by presenting estimates of the average effect of an audit on discretionary municipal employment. We then consider the impact of audits on municipal efficiency.

### A.    *Audits and discretionary employment*

Discretion in hiring in the public sector has long been regarded as a problem, since it can lead to corruption and patronage.[21] We have argued above that ample room for discretion in hiring remains in Brazilian municipalities, and Brollo et al. (2017) and Colonnelli et al. (2018) provide evidence that this discretion is used for political patronage. To assess whether the audit program affects the extent to which mayors use their discretion in hiring, we report in Table 2 OLS estimates of equation (1) using the number of discretionary public employees per 1,000 residents – columns (1) and (2) – and the share of discretionary employees – columns (3) and (4) – as our outcome variables. The specification in the odd columns control only for state fixed effects, whereas the even columns extend the specification to include municipal pre-treatment characteristics.

[Table 2 about here]

We find that being audited causes a reduction in discretionary employment of about 1.4 employees per 1,000 residents (or over 11%, evaluated at the sample mean), and a change in the composition of public employees, with the share of discretionary appointments reduced by 1.2 percentage points. A long tradition, associated with the works of Wilson (1887) and Weber (1922) has associated reduced discretion with a more competent and efficient government, and the empirical evidence shows that civil services with access largely based on merit correlate with

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higher economic growth, reduced corruption, and better bureaucratic performance (see Brollo et al., 2017, and the references therein). In this view, our findings would suggest that, on top of their explicit goal of reducing corruption in the use of federal funds, the audits have delivered better local governments.

*B.      Audits and efficiency*

The reduction in discretionary appointments documented in Table 2 may be compensated by an increase in other types of appointments. To show that this is not the case, the first two columns of Table 3 reports OLS estimates of equation (1), using total employees per 1,000 residents as our employment outcome, with and without municipal covariates.

Both specifications show a statistically significant and large negative effect: being audited in the electoral term 2001-04 reduces total employment in the municipality by more than 2.6 employees per 1,000 residents in the following term. This represents a reduction of about 6% at the sample mean, or around 60 employees, in audited municipalities.

[Table 3 about here]

The reduction, and change in composition, in municipal employment, even if it implies a better government or reduced corruption, can have a downside if it also implies that municipal service provision is negatively affected. Municipalities provide a host of services of local interest to which labor is a key input—like public transport, early childhood and primary education programs, and public health services. To measure their performance along such lines, we use an index (*Municipal performance*) that captures how a municipality is doing in the areas of employment and income, education, and health by summarizing official administrative data on several indicators in a single number between zero and one (with higher numbers indicating better performance).[22]

Table 3, columns (3) and (4), presents evidence on the effect of the audits on municipal performance. The effect is largely non-significant (the corresponding p-value is 0.926 in column (4)), and economically negligible (the point estimate in column (4) is just 0.04% of the sample mean of the index). This indicates that audited municipalities seem to be providing exactly the same level of public services with fewer workers—a clear increase in (labor) efficiency, and hence another sign of a better government.[23]


## V.    Concluding remarks

By exploiting the random assignment of Brazilian municipalities to an audit program aimed at reducing corruption in the use of federal funds, we document the existence of broader consequences in one of the largest anticorruption programs in the world: audited municipalities employ less labor to provide a given level of public services, and change the way in which they screen their employees—relying less on discretion and more on merit. As emphasized by Finan et al. (2015), different screening approaches have important implications for the quality and performance of the bureaucracy. We interpret these improvements in bureaucratic efficiency and professionalization as an increase in the quality of municipal governments.

Monetizing the wage savings is difficult, but we can provide some back-of-the envelope calculations. Employment decreases by 2.6 employees per 1,000 residents on average. This implies a reduction of 60 employees per municipality. At an average annual wage in 2004 of around 24,250 reais (in 2019 reais), the wage savings caused by the audits would amount to roughly 1,455,000 per year per municipality.[24] To put this figure in perspective, consider that Avis et al. (2018) estimate savings from reduced corruption from the audit program of about

567,000 reais (including spillover effects) per municipality per year—hence savings would more than triple.

Some evidence exists on monitoring systems that are fouled up in that corrupt officials are able to substitute to alternate forms of corruption and to adapt over time to the new system in place (e.g., by changing other dimensions of their performance)—especially when the anticorruption policy imposes controls only on certain types of corruption (see, e.g., Olken, 2007; Burgess et al., 2012; and Niehaus and Sukhtankar, 2015). Zamboni and Litschig (2018) discuss the possibility of substitution of corruption across federal vs. non-federal transfers or over time in the same audit program in Brazil, and argue that the available evidence seems inconsistent with substantial corruption displacement across transfers and over time.

Since audits increase the probability of detecting direct stealing, audited corrupt officials may opt to substitute for alternative or less traceable forms of corruption. Employment in the public sector can be used for the benefit of office holders to the extent that the latter can use their discretion in the hiring process (Brollo et al., 2017). Discretion, while providing more flexibility, can also lead to corruption and patronage (Finan et al., 2015). As long as reduced discretion can be interpreted as reduced patronage (e.g., Brollo and Troiano, 2016), and given that audits reduce corruption in the activities under scrutiny, our results suggest that different types of corruption can be *complements* rather than substitutes. Further exploration of this possibility is left for future research.

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[1] Figures quoted in Svensson (2005). Check also Shah (2006).

[2] Although corruption is a rampant in much of the developing world, developed countries are also affected. For instance, in the United States federal prosecutors have convicted more than 10,000 government officials of acts of official corruption in the period 1990-2002 (Glaeser and Saks, 2006).

[3] Olken (2007) finds that increasing government audits significantly reduces corruption in a field experiment in Indonesian villages. Similarly, Bobonis et al. (2016) find that timely and foreseeable audits induce a significant short-term reduction in municipal corruption levels in Puerto Rico. Using the same program we study in this paper, Avis et al. (2018) show that audits significantly reduce future corruption in Brazilian municipalities, while increasing the probability of facing subsequent legal action; and Zamboni and Litschig (2018) estimate that temporarily increasing audit risk reduced the share of audited resources involved in corruption in procurement.

[4] Bobonis et al. (2019) focus on another broader outcome, and estimate that audits reduce subsequent levels of vote-buying and political clientelism in Brazilian municipalities.

[5] The empirical evidence shows that good government is ultimately good for growth (see La Porta et al., 1999, and the references therein), which underscores the importance of looking at the quality of government.

[6] This description draws heavily from CGU (2004, 2016) and Lopes Gomes (2013). For further description of the audit program see Ferraz and Finan (2008), where the random assignment was first used to analyze how exposing government corruption affected the electoral performance of incumbent politicians.

[7] There are 27 *unidades federativas* in Brazil, including Brasília, the federal capital, which is not eligible for the audit program. The sampling procedure is stratified by state.

[8] The main areas under scrutiny are education, health and social services.

[9] In spite of the population threshold, over 98% of Brazil's 5,570 municipalities were eligible for the lotteries.

[10] These are the same lotteries considered by Ferraz and Finan (2011), and roughly the same as in Ferraz and Finan (2008).

[11] Retrieved from http://www.cgu.gov.br/assuntos/auditoria-e-fiscalizacao/programa-de-fiscalizacao-em-entes-federativos/edicoes-anteriores/municipios on 9/27/2018.

[12] This account is mostly based on Gardner (2013), where further details can be found.

[13] The Gini coefficient, the education data, and the share of urban population are all from the 2000 Census (http://tabnet.datasus.gov.br/cgi/ibge/censo/cnv/ginibr.def, https://sidra.ibge.gov.br/tabela/200, https://www.ibge.gov.br/estatisticas/multidominio/cultura-recreacao-e-esporte/9663-censo-demografico-2000.html?edicao=9859&t=resultados). Population estimates are for 2000 and were obtained from https://www.ibge.gov.br/estatisticas/sociais/populacao/9103-estimativas-de-populacao.html?=&t=downloads. Income is measured through GDP per capita, computed as

municipal GDP/population in 2002. Municipal GDP data was obtained from https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9088-produto-interno-bruto-dos-municipios.html?edicao=18021&t=downloads.

[14] All employee figures were obtained from the website of the Instituto Brasileiro de Geografia e Estatística: https://www.ibge.gov.br/estatisticas/sociais/protecao-social/10586-pesquisa-de-informacoes-basicas-municipais.html?=&t=downloads. We transform the raw figures into per capita figures by dividing them by population (in thousands).

[15] The direct administration is directly connected to the municipal executive power (the mayor), has no separate legal status, and has no administrative autonomy. The indirect administration is characterized by entities (e.g., autarchies, public foundations, public enterprises and mixed-capital companies) that have their own separate legal status, having therefore, administrative autonomy and specific budgets for their purposes.

[16] Check Grindle (2010) and Iacoviello and Rodríguez-Gustá (2006) for characterizations of the evolution of civil service in Brazil.

[17] Check Colonnelli et al. (2018) and IBGE (2017) for further details.

[18] All employee figures were obtained from the website of the IBGE: https://www.ibge.gov.br/estatisticas/sociais/protecao-social/10586-pesquisa-de-informacoes-basicas-municipais.html?=&t=downloads. We transform the raw figures into per capita figures by dividing them by population (in thousands). The share of discretionary employees is calculated as the number of discretionary employees over the total number of municipal employees.

[19] Including municipalities with missing values for the covariates does not affect our estimates of the unadjusted relationship between discretionary employment and audits.

[20] Previous papers that have explored the effects of the CGU random audits program have implemented methodologies along these lines (Ferraz and Finan, 2008; Ferraz and Finan, 2011; Avis et al., 2018; Zamboni and Litschig, 2018).

[21] Discretion may also be put to good use (e.g., to improve selection or mitigate agency problems—check Brollo et al., 2017, for a discussion and some evidence), but on the whole, restrictions on discretionary appointments are mostly welcome. Already in 1883, the Pendleton Civil Service Act established a merit-based public service system in the federal U.S. government to reduce the discretion of party bosses (Grindle, 2010).

[22] We use the *Índice FIRJAN de Desenvolvimento Municipal* (IFDM), obtained from https://www.firjan.com.br/ifdm/. Some variables considered in the index are primary school dropout, average classroom-hours, prenatal care, and child mortality. Full details can be found at the IFDM website (https://www.firjan.com.br/ifdm/).

[23] For studies of the efficiency of the local public sector check, e.g., De Borger et al. (1994) and Balaguer-Coll et al. (2007). De Sousa and Stosic (2005) analyze the efficiency of Brazilian municipalities.

[24] Wage data correspond to employees in the public administration, and was obtained from http://dataviva.info/en/data/. This may include public employees at other levels of government. We could not find the corresponding figure for just municipal employees. Wages were converted to 2019 reais through the consumer price index of the IBGE (https://www.ibge.gov.br/estatisticas/economicas/precos-e-custos/9256-indice-nacional-de-precos-ao-consumidor-amplo.html?=&t=series-historicas).

**Table 1. Summary statistics**

| Variable | Obs. | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| *Employees per capita* | 5,456 | 44.41 | 18.75 | 10.01 | 220.46 |
| *Discretionary per capita* | 5,456 | 12.23 | 10.62 | 0 | 187.09 |
| *Discretionary (share)* | 5,456 | 0.263 | 0.162 | 0 | 1 |
| *Audited* | 5,456 | 0.087 | 0.281 | 0 | 1 |
| *Municipal performance* | 5,430 | 0.583 | 0.127 | 0.268 | 0.901 |
| *Population* | 5,456 | 22,419 | 42,822 | 795 | 493,468 |
| *Urban population (%)* | 5,456 | 58.50 | 23.18 | 0 | 100 |
| *Income inequality* | 5,456 | 0.554 | 0.068 | 0.297 | 0.880 |
| *Income* | 5,456 | 5,798 | 8,357 | 576 | 273,433 |
| *Literacy* | 5,456 | 81.03 | 11.18 | 39.91 | 99.30 |

Notes: *Employees per capita* and *Discretionary per capita* represent the average total number of public employees per 1,000 residents and the total number of discretionary public employees per 1,000 residents in each municipality in 2005-08. *Discretionary (share)* is the average fraction of discretionary employees in each municipality in 2005-08. *Audited* is a dummy that takes value 1 if the municipality was audited in 2003-04. *Municipal performance* is measured through the IFDM index of municipal development. *Population* is the total number of residents in the municipality in 2000. *Urban population (%)* is the share of the population living in urban areas in 2000. *Income inequality* is measured through the Gini coefficient of per capita household income for each municipality in 2000. *Income* is proxied by municipal GDP per capita in 2002. *Literacy* is the share of the population that is literate in 2000.

## Table 2. Audits and discretionary employment

| Dependent variable: | Discretionary per capita | | Discretionary (share) | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Audited* | -1.432*** | -1.382*** | -0.013* | -0.012* |
| | (0.411) | (0.406) | (0.007) | (0.007) |
| Mean of dep. variable | 12.23 | | 0.263 | |
| Municipal characteristics | No | Yes | No | Yes |
| Observations | 5,456 | 5,456 | 5,456 | 5,456 |

Notes: All models include state fixed effects. Robust standard errors are in parentheses. *Discretionary per capita* represents the average total number of discretionary public employees per 1,000 residents in each municipality in 2005-08. *Discretionary (share)* is the average fraction of discretionary employees in each municipality in 2005-08. *Audited* is a dummy that takes value 1 if the municipality was audited in 2003-04. Municipal characteristics are pre-treatment, and include share of urban population, income per capita (in logs), education, and the Gini index. ***Significant at 1 percent level. *Significant at 10 percent level.

## Table 3. Audits and efficiency

| Dependent variable: | Employees per capita | | Municipal performance | |
|---|---|---|---|---|
| | (1) | (2) | (5) | (6) |
| Audited | -2.704*** | -2.624*** | 0.0038 | -0.0003 |
| | (0.805) | (0.745) | (0.0035) | (0.0271) |
| Mean of dep. variable | 44.41 | | 0.5830 | |
| Municipal characteristics | No | Yes | No | Yes |
| Observations | 5,456 | 5,456 | 5,430 | 5,430 |

Notes: All models include state fixed effects. Robust standard errors are in parentheses. *Employees per capita* represents the average total number of public employees per 1,000 residents in each municipality in 2005-08. *Municipal performance* is measured through the IFDM index of municipal development. *Audited* is a dummy that takes value 1 if the municipality was audited in 2003-04. Municipal characteristics are pre-treatment, and include share of urban population, income per capita (in logs), education, and the Gini index. ***Significant at 1 percent level.