

# Turnover: How electoral accountability disrupts the bureaucracy and service delivery\*

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## Abstract

Electoral accountability is fundamental to representative democracy. Yet, it can also be costly for governance because it generates turnover among bureaucrats (not just politicians) and disrupts the delivery of public services. Previous studies on the connection between political and bureaucratic turnover emphasize how incoming governments reshape the bureaucracy. This article argues that election losers also engage in bureaucratic shuffling before leaving office, and that this can depress public service delivery. I employ a close-races regression discontinuity design to demonstrate these turnover dynamics, using administrative data on the universe of government employees and healthcare services in Brazilian municipalities. The results show that the incumbent's electoral defeat causes dismissals of temporary employees, the hiring of more civil servants, and declines in healthcare service delivery before the winner takes office. These findings highlight the political strategies of lame-duck politicians and the consequential bureaucratic politics that follow elections.

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# 1 Introduction

Przeworski famously defined democracy as “a system in which parties lose elections” (1991, 10). Indeed, political turnover is central to many concepts of democracy, including theories of retrospective (Manin, 1997) and prospective accountability (Fearon, 1999), elitist theories of democracy (Popper, 1962), and populist and libertarian critiques of professional politics (Kufirst, 1996). Empirically, the recurrence of political turnover is often taken as an indicator of democratic consolidation (Schedler, 2001).

Yet despite its many benefits, I argue that political turnover imposes important costs, at least in the short term, through concurrent dynamics of bureaucratic turnover and disruptions to public service delivery.<sup>1</sup> I build on recent studies in political science, public administration, and economics that have demonstrated important connections between political and bureaucratic turnover, in both high- and low-income settings. Prior research has overwhelmingly focused on how election winners shape the bureaucracy upon taking office, either by hiring their supporters (Colonnelli et al., 2020; Brassiolo et al., 2020) or firing or transferring existing bureaucrats (Akhtari et al., 2020; Fagnäs and Pelkonen, 2020; Iyer and Mani, 2012). Studies of high-income democracies have focused almost exclusively on the turnover of high-level bureaucrats, resulting from decisions by the new government (Cooper et al., 2020; Dahlström and Holmgren, 2019; Kim and Hong, 2019) or resignations by bureaucrats who anticipate or respond to conflicts with the incoming administration (Bolton et al., 2020; Doherty et al., 2019a,b).

In contrast to previous research, this article emphasizes the political strategies of lame-duck<sup>2</sup> governments and their detrimental effects on the delivery of public services. I argue that—at least where politicians have formal or informal discretion over the bureaucracy, and where bureaucratic norms for autonomous performance are weak—an electoral defeat of the incumbent leads to both dismissals and hires of bureaucrats, as well as declines in public service delivery, during the transition period before the winner takes office. These effects are driven by lame-duck politicians’ unique political incentives and bureaucrats’ strategic responses to them. By studying how bureaucracies are disrupted immediately after elections, this article highlights the bureaucratic politics of transition

<sup>1</sup>I refer to the political turnover that occurs in consolidated democracies as a result of regular and generally accepted elections. Turnovers resulting from coups, revolutions, and irregular elections are likely to have more disruptive effects on bureaucracies and service delivery.

<sup>2</sup>I use “lame-duck” to refer to incumbents in the period between their electoral defeat and the end of their time in office.

periods, which have received scant attention to date. To the best of my knowledge, this is the first study to demonstrate how lame-duck politics can jeopardize the delivery of public services.<sup>3</sup>

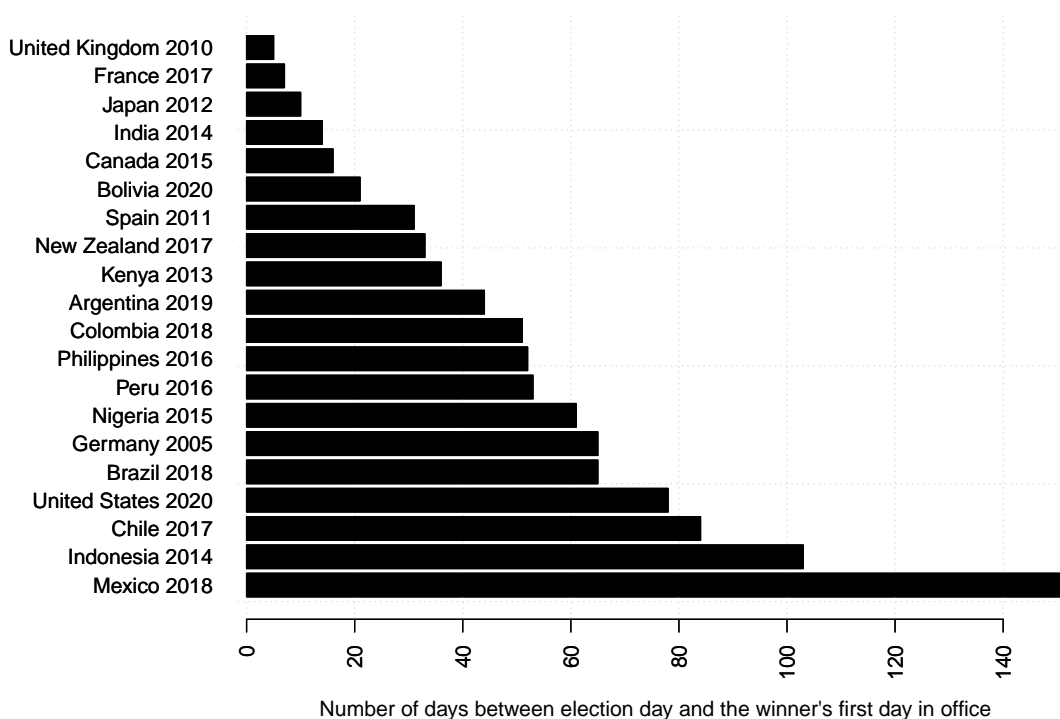
Understanding the politics of transition periods (i.e., the time between the election and the winner's first day in office) is important for at least two reasons. First, these periods are often long: incumbents frequently remain in office for weeks or months after a challenger is elected (Figure 1). Second, election losers have a unique set of concerns and motivations, which they can pursue through their executive authority while they are still in office. Chief among lame ducks' concerns is preparing for the vulnerability that comes after losing office, and laying the groundwork for their (or their party's) return to office. At the same time, lame ducks have diminished incentives and ability to monitor bureaucrats and to ensure they deliver services to citizens. The link between electoral defeat and bureaucratic disruptions highlights lame ducks' unique incentives and their impact on democratic politics.

Although accounts of the influence of lame-duck governments on the bureaucracy are common, we have little systematic evidence on how election losers affect the composition and the performance of the bureaucracy before leaving office, and how deep these effects go. Does electoral defeat depress the delivery of essential public services in the period before the winner takes office? Does electoral turnover lead to the hiring and firing of bureaucrats during the transition? If so, is bureaucratic turnover the main mechanism through which an incumbent's defeat at the polls reduces service delivery? These issues have important implications for policy debates on public sector reform, including the role of civil service systems and anti-corruption efforts for improving bureaucratic performance.

This article empirically investigates the effects of electoral turnover on bureaucratic shuffles and public service delivery using a close-races regression discontinuity design (Eggers et al., 2015), leveraging data on public employment and healthcare services in Brazilian municipalities. To identify the causal effect of an incumbent's electoral defeat, I compare outcomes in municipalities where the mayor barely loses to those in which they barely win the reelection. I complement these

<sup>3</sup>Two recent studies have examined the effect of political turnover on student test scores (Akhtari et al., 2020; Fagernäs and Pelkonen, 2020), but they focus on a development outcome of the bureaucracy (learning) rather than service delivery itself. While Akhtari et al. (2020) document an increase in bureaucratic exit during the transition period in Brazilian municipalities, their focus (both theoretical and empirical) is on the turnover that happens under the new government. Doherty et al. (2019a) focus on bureaucratic turnover during the transition period in the US federal government, but they examine only voluntary turnover of senior civil servants and do not measure impacts over policy outcomes.

Figure 1: Recent transition periods after national-level elections in a sample of 20 democracies



*For each country, data correspond to the latest instance (up until 2020) when a new party reached national-level executive office as a direct result of democratic elections (either direct elections in presidential systems, or legislative elections in parliamentary ones). See Appendix A for details.*

causal estimates with qualitative evidence from in-depth interviews I conducted with politicians and prosecutors in several states.<sup>4</sup>

Brazilian municipal governments are an ideal case to study the link between political turnover, bureaucratic turnover, and public service delivery. Municipalities in Brazil hire large numbers of bureaucrats to provide primary healthcare, education, and social assistance services to over 200 million people. Mayors, who are elected in majoritarian elections, have considerable authority over the bureaucracy they oversee. Bureaucrats can be hired either on civil service contracts (which have life tenure) or temporary contracts. Elections are held simultaneously in all municipalities on the first Sunday of October every 4 years, and winners take office on January 1st. A final but critical advantage of the Brazilian case is the availability of detailed administrative data on public employment as well as healthcare services.

<sup>4</sup>See Appendix B for details about the interviews.

I focus on healthcare provision for two additional reasons. First, healthcare is the most salient local policy area for voters (Boas et al., 2019, 395; Reis, 2016). Thus if we observe effects on healthcare, we are also likely to find impacts in other areas of government activity that are less visible and/or important to citizens. Second, municipal healthcare services in Brazil have been shown to reduce child mortality (Rocha and Soares, 2010; Aquino et al., 2009), a common proxy for health outcomes in the developing world. If election results depress the delivery of these basic healthcare services, they may therefore harm human development.

I examine the effects of an electoral defeat of Brazilian mayors on the turnover of bureaucrats at various levels of the bureaucracy (from managers to frontline service providers) and who are hired on different contracts (temporary or civil service) as well as on the delivery of key healthcare services. I leverage administrative data on the universe of government employees –which allows me to identify effects on dismissals, hires, and resignations– and administrative healthcare data. Combining data for four election cycles (2004-2016), I examine how an incumbent’s electoral defeat affects each outcome in the last quarter of their term, before the winner is sworn in. Using quarterly rather than yearly data allows me to overcome a key limitation in previous studies and differentiate the effects of electoral turnover under lame-duck government versus the incoming administration.

The regression discontinuity results demonstrate that electoral defeat triggers significant dynamics of bureaucratic turnover in the months following the election, both in the bureaucracy as a whole and among frontline service providers. This counters two common assumptions in the literature on turnover – that the link between political and bureaucratic turnover is driven only by the actions of election winners, and that turnover only affects high-level bureaucrats. Under lame-duck governments there are significant increases in the dismissal of temporary workers and the hiring of civil servants. Interview evidence suggests that lame-duck politicians engage in dismissals to improve their compliance with legal rules about hiring before leaving office, and that they sometimes hire civil servants to limit the election winner’s fiscal capacity to hire their own supporters after taking office. Bureaucrats are also more likely to resign in the period following an incumbent’s defeat. Last, and in line with previous studies, I find that political turnover causes significant increases in the hiring of temporary workers once the election winner takes office.

An incumbent’s electoral defeat also causes a significant drop in healthcare services during the transition period. Home visits by nurses and doctors, prenatal check-ups, medical consultations with infants and children, and immunizations for infants and pregnant women all decline in the last quarter of the mayor’s term. These effects suggest that lame-duck politics can jeopardize

citizen welfare, at least in the short run. Declines in healthcare services appear to be driven by a combination of turnover in the healthcare bureaucracy, disruptions to non-human resources (e.g., transportation), and weakening bureaucratic accountability under lame-duck governments, where politicians and senior officials are less able and/or willing to monitor and motivate bureaucrats.

In sum, this article advances our understanding of political turnover –a critical moment in democratic politics– by highlighting the unique political incentives of lame-duck politicians, how they shape the bureaucracy before leaving office, and their impact on the delivery of essential services. These are key aspects of political turnover that previous research has generally overlooked. I support this argument with quasi-experimental evidence from the Brazilian case, complemented by qualitative insights from interviews with politicians and prosecutors.

## 2 Bureaucratic politics during transition periods

Does political turnover disrupt the bureaucracy? Previous studies have shown that it does, especially through the turnover of high-level bureaucrats ([Bolton et al., 2020](#); [Doherty et al., 2019a](#); [Dahlström and Holmgren, 2019](#); [Christensen et al., 2014](#)) and the decisions election winners take once in office ([Colonnelli et al., 2020](#); [Akhtari et al., 2020](#); [Brassiolo et al., 2020](#)). Still, this literature has neglected the critical role that election losers play in the connection between political and bureaucratic turnover, and how lame-duck governments can depress public service delivery. This article fills that gap by offering and testing a theory of lame-duck incumbents and how they shape both the composition of the bureaucracy (through hiring and firing) and its performance.

I argue that the dynamics of turnover are shaped by the incentives, concerns, and constraints of politicians in executive office. Turnover dynamics thus differ systematically under lame-duck governments and new administrations, and for temporary versus civil service employees. While election losers and winners both make use of their (formal and informal) discretion over the bureaucracy to pursue their goals, their diverging incentives and concerns generate distinct turnover dynamics before and after the winner takes office.

Political institutions may moderate or amplify the intensity of these dynamics. First, institutional constraints on politicians' discretion over the bureaucracy and strong bureaucratic norms may moderate these turnover dynamics, although they are unlikely to completely eliminate them.<sup>5</sup>

<sup>5</sup>A change in government has been shown to lead to the turnover of bureaucrats with strong employment

Second, very short transition periods are likely to severely limit lame-ducks' ability to disrupt the composition and activities of the bureaucracy, thereby concentrating turnover dynamics on the election winner's term. Finally, institutions that allow incumbents to stay longer in office (e.g., unlimited terms) or that make transitions after elections more uncertain (e.g., parliamentary systems with proportional representation) may amplify these turnover dynamics by making it easier and more desirable for lame-ducks to disrupt the bureaucracy before leaving office.

I assume two key motivations shape the strategies of lame-duck governments: preparing themselves for the vulnerability that comes after losing office, and laying the groundwork for a return to power. Politicians who lose their bid for reelection become more vulnerable to prosecution and conviction for two reasons. First, they lose some of their ability to exert formal and informal pressures on horizontal accountability actors. Second, their opponents gain access to the government's accounts and thus obtain information about potential malfeasance. Recent studies have shown that losing power increases politicians' chances of being convicted in India ([Poblete-Cazenave, 2021](#)) and Brazil ([Lambais and Sigstad, 2021](#)) despite judges' strong formal protections against political pressure in both countries.<sup>6</sup> At the same time, politicians who fail to get reelected are arguably concerned with maximizing their (or their party's) chances of returning to office.

Viewing lame-duck politicians as actors who seek to maximize their chances of returning to power and minimize their vulnerability to prosecution suggests they may engage in two strategic uses of bureaucratic shuffles during their remaining time in office.<sup>7</sup> First, lame-duck governments may use dismissals to "clean the accounts" and reduce their chances of prosecution after leaving office. Politicians around the world frequently expand the bureaucracy ahead of elections to boost their chances of reelection ([Cahan, 2019](#); [Pierskalla and Sacks, 2019](#); [Toral, 2019](#)). Where such hiring strategies violate electoral, procedural or fiscal rules, politicians may seek to undo some of that bureaucratic expansion after the election to avoid prosecution. I thus hypothesize that dismissals of temporary workers will increase after the incumbent loses the election (Hypothesis 1).

On the other hand, lame-duck governments may use civil service hiring to constrain their protections and formally insulated from politics, even in contexts of high state capacity. Examples include agency heads in Sweden ([Dahlström and Holmgren, 2019](#)), chief executive officers of state-owned firms in South Korea ([Kim and Hong, 2019](#)), and senior civil servants in the United States ([Doherty et al., 2019b](#)).

<sup>6</sup>Relatedly, there is evidence that opposition politicians in the United States are more vulnerable to prosecution ([Davis and White, 2019](#); [Gordon, 2009](#)).

<sup>7</sup>While I focus on how lame ducks pursue these goals through bureaucratic shuffles, they may advance them by other means (e.g., regulation or procurement).

opponents, in either policy or fiscal terms.<sup>8</sup> Election losers may hire senior civil servants in order to preserve their policy legacy by constraining their successor's actions. For example, some US presidents "burrow" political appointees into the civil service at the end of their term (Lewis, 2008; Mendelson, 2003). Alternatively, election losers may hire civil servants (who have significant job security) to reduce the new administration's fiscal capacity to hire their own supporters. Civil service hiring is typically seen as being insulated from politics because civil servants are selected after passing objective, competitive examinations. In practice, however, candidates who pass the exams are not always hired automatically: at least in some civil service systems of the Napoleonic tradition, approved candidates are added to a ranked list, and are hired in order of performance as personnel needs arise. In certain contexts, therefore, lame-duck governments can legally expand the civil service by simply hiring pre-approved candidates. By strategically using their discretion over the timing of civil service hiring, election losers can reduce their opponent's ability to hire their own supporters and thus increase their own chances of returning to power in the future. Hypothesis 2 is therefore that civil service hiring will increase under lame-duck governments.

This hypothesis builds on and expands debates about the political origins of civil service reform. Geddes (1994) famously described politicians as facing a dilemma about whether to establish a civil service system, torn between their individual need for political control and their collective interest in building state capacity. Therefore, she argued, politicians would make a collective investment in civil service reform where patronage is distributed evenly among key players. Others have built on her work to argue that politicians are more likely to pass civil service reform when their exit from office is imminent (Ting et al., 2013) or certain (Schuster, 2020), in an attempt to constrain the incoming government. In countries where a civil service regime already exists that logic can be extended to quantitative expansions of civil service hiring, which lame-ducks can use to tie the hands of their opponent.

The strategy of hiring civil servants before leaving office can pay off politically because election winners typically seek to bring their political supporters into the bureaucracy, either to reward campaign supporters (Colonnelli et al., 2020; Brassiolo et al., 2020) or to better control public policy and implementation (Toral, 2021; Lewis, 2008; Peters and Pierre, 2004). Either way, we should see election winners increase the hiring of temporary workers during their first few months

<sup>8</sup>This rationale mirrors that of so-called midnight judicial appointments (Turner, 1960) or midnight regulations (Brito and De Rugy, 2009) approved by US presidents before leaving office. In a similar vein, Mexican states are more likely to pass transparency laws during lame-duck governments (Berliner and Erlich, 2015).



in office.

Incumbent bureaucrats can actively respond to the political strategies of outgoing and incoming politicians, thereby shaping the turnover dynamics of transition periods. One way bureaucrats may react to the changing political environment is by resigning. Bureaucrats may choose to leave the bureaucracy if they prefer to work in organizations whose leaders have preferences aligned to theirs, or if they anticipate new leaders will mistreat them, for example by firing or transferring them (Bolton et al., 2020; Doherty et al., 2019a). Resignations could also ensue if bureaucrats simply dislike working during the transition period, when responsibilities are less clear and organizational and policy changes abound. In any case, we would expect civil servants' resignations to increase in the months following electoral turnover.

An incumbent's electoral defeat affects not only the composition of the bureaucracy but also its performance. Hypothesis 3 maintains that public service delivery declines in the months after an incumbent is voted out. Several mechanisms may drive such an effect. The few studies that have measured the impact of political turnover on development outcomes focus on bureaucratic turnover as the main explanation (Akhtari et al., 2020; Fagernäs and Pelkonen, 2020). Firing and hiring can lead to the exit of bureaucrats with job-specific experience and know-how, and to the entry of other bureaucrats with lower endowments of both (Akhtari et al., 2020). Turnover can also lead to the selection of systematically worse bureaucrats, for example if politicians prioritize loyalty over competence (Colonnelli et al., 2020). The mere disruption of teams of providers stemming from the turnover of some of their members may negatively affect public service delivery (Fagernäs and Pelkonen, 2020; Hanushek et al., 2016) because bureaucratic effectiveness often depends on the stability of the organizations and teams in which bureaucrats are embedded (Kraft et al., 2016). Renewed leadership and the inflow of new employees may well have a positive effect on performance, but those effects are unlikely to be visible in the first few months of a new administration due to the costs of policy and managerial switches as well as learning. In sum, bureaucratic turnover can impact public service delivery through a variety of mechanisms, especially in transaction-intensive services like education, healthcare, or social assistance, which are very dependent on human resources.

An incumbent's electoral defeat can also undermine bureaucratic performance through at least two mechanisms other than bureaucratic turnover. First, an electoral defeat may lead to disruptions in procurement and contracts for services and goods on which bureaucrats depend to provide services. Second, an electoral defeat may harm performance if bureaucrats respond strategically to the changing political environment by exerting less effort. At least in the developing world,

bureaucrats' effort and performance can benefit from monitoring and accountability pressures from politicians ([Raffler, 2020](#); [Dasgupta and Kapur, 2020](#); [Gulzar and Pasquale, 2017](#)). Yet, politicians and senior officials will likely be much less able and/or willing to monitor and motivate bureaucrats if the government is about to change. Bureaucrats' level of effort and performance may therefore decline under lame-duck governments, even in the absence of bureaucratic turnover.

In sum, I advance a theory of the politics of transition periods that predicts an incumbent's electoral defeat will cause bureaucratic turnover and degrade public service delivery during the transition period. In contrast to previous research on turnover, my theory emphasizes the critical role of election losers as well as bureaucrats' response to a changing political environment, and their detrimental effect on public service delivery.

### 3 Institutional setting

Brazilian local governments have a number of characteristics that make them an ideal case to examine the effects of political turnover on bureaucratic turnover and on service delivery. In this context, elections are generally competitive, transition periods are relatively long, bureaucracies are large and responsible for major public services, and politicians have some discretion over the hiring and firing of bureaucrats. In this sense, this is a context where it may be easier to observe dynamics of turnover under lame-duck governments, in contrast to other settings where bureaucracies are smaller and/or more insulated from political discretion, or where transition periods are significantly shorter. On the other hand, Brazil is a successful case of civil service reform ([Cortázar Velarde et al., 2014](#)) and progress in the professionalization of the local bureaucracies ([Wampler et al., 2020](#); [Bersch, 2019](#)). In that sense, the effects of turnover we observe in Brazil may be modest compared to those in other middle- or low-income environments where public administration is more politicized.

Municipal elections take place every four years on the first Sunday of October, and consist of simultaneous elections for a mayor, who is elected through a majoritarian system,<sup>9</sup> and for a variable number of city councilors, who are elected through a proportional, open-list system. Mayors can run for reelection only once. Local elections are generally competitive – in the 2016 elections,

<sup>9</sup>Municipalities with over 200,000 inhabitants (fewer than 2% in 2016) hold a runoff election on the last Sunday of October if no candidate obtains an absolute majority.

almost half (about 49%) of the incumbents who ran were defeated.<sup>10</sup> Politicians are overseen by a network of horizontal accountability actors, including judges, auditors, and prosecutors, which previous studies have demonstrated reduce rent extraction (Litschig and Zamboni, 2019; Avis et al., 2018). There are currently 5,570 municipalities,<sup>11</sup> most of which are small and poor.<sup>12</sup>

Municipal governments are responsible for providing primary services in healthcare, education, and social assistance. Therefore, the local government workforce is typically large. On average, municipal governments hired in 2016 4.9% of the local population and 38.2% of those employed in the formal labor market.<sup>13</sup> Municipal employees enjoy a wage premium relative to the private sector (Colonnelli et al., 2020, 3090), similarly to other developing contexts (Finan et al., 2017). Despite important improvements in recent decades in all three areas of social policy, municipalities face substantial development challenges (Wampler et al., 2020; Castro et al., 2019). Healthcare is typically the most salient policy area for voters in municipal elections (Boas et al., 2019, 395; Reis, 2016).

Municipalities provide free primary healthcare services to all residents under the umbrella of the Unified Health System. To do so, they maintain clinics called “basic health units.” Each clinic is led by a manager, who is typically appointed by the mayor or the secretary of healthcare (Toral, 2021), and staffed with doctors, nurses, and other healthcare professionals. To assist with the provision of basic healthcare services, especially preventive care and particularly in rural areas, municipalities also hire community health agents (CHAs). CHAs work promoting health, preventing diseases, and providing maternal and child services in their own community (Ministério da Saúde, 2012d). More complex services, like specialist consultations and hospitalizations, are generally provided by state governments, especially for residents of small municipalities. Private healthcare provision is common in larger municipalities, but most citizens rely exclusively on the public system.<sup>14</sup>

<sup>10</sup>In fact, Brazilian mayors have an incumbency *disadvantage* (Klašnja and Titiunik, 2017).

<sup>11</sup>The number of municipal governments in the period I study ranges from 5,559 in 2004 to 5,569 in 2017. Brasília, the capital city, is a federal district without a municipal government or municipal elections: it has a governor instead.

<sup>12</sup>According to the 2010 census, the median municipality had fewer than 12,000 inhabitants and a per capita income of less than 500 Brazilian reais (about USD284 at the exchange rate at the time). According to administrative data described in Section 4.3, the median municipality had 446 employees in 2010.

<sup>13</sup>Figures are from administrative data described in Section 4.3.

<sup>14</sup>In 2013, 61.13% of Brazilians used the services of a public basic health unit and 20.3% received care from public hospital, compared to 18.53% who used the services of a private provider (Castro et al., 2019, 5).

Mayors and the secretaries they appoint have some discretion over the hiring and firing of bureaucrats in all policy areas, including healthcare. Such discretion differs significantly between the civil service (which makes up about two thirds of the municipal labor force) and other hiring modes with fewer employment protections. The Brazilian constitution requires all permanent staffing needs to be filled with civil service contracts. Candidates with the best performance on competitive examinations are eligible for a position, which has tenure for life after a probationary period.<sup>15</sup> Critically, however, the best performers are not automatically appointed. While politicians have no discretion over the ranking of candidates, they can choose the timing and number of civil service hires.<sup>16</sup> About a third of municipal employees are hired on temporary contracts,<sup>17</sup> which can legally be used to hire political appointees or to fill short-term or urgent staffing needs. Temporary employees generally have 1-year contracts that can be terminated by the employer much more easily than civil service contracts. In practice, temporary contracts are sometimes used where civil service contracts should prevail. Still, this practice is unconstitutional and politicians may be prosecuted for it.

## 4 Research design

To estimate the causal effect of electoral turnover on bureaucratic turnover and public service delivery I use a close-races regression discontinuity design, essentially comparing instances where the incumbent barely loses the election to instances where they are barely reelected. I focus on the electoral performance of the incumbent mayor rather than their party because Brazilian municipal politics are characterized by weak partisan attachments (Boas et al., 2019) and pervasive party switching by politicians (Peterlevitz, 2021; Klačnja and Titunik, 2017). Nearly one third (30.4%) of mayors ran for reelection in 2008 under a different party than the one they were elected under 4 years earlier, 19.1% in 2012, and 26% in 2016.<sup>18</sup> It would therefore be misleading to examine the electoral performance of the incumbent party.

This quasi-experimental design is important because simple comparisons of cases in which

<sup>15</sup>Once tenured, civil servants can be dismissed only in extraordinary circumstances such as being convicted of corruption.

<sup>16</sup>This is not unique to Brazil: Mexico for example uses a similar system.

<sup>17</sup>I use the term temporary contracts to refer to all non-civil service contracts. These contracts can use a variety of labor regimes, all of which lack tenure.

<sup>18</sup>Data are from Brazil's Supreme Electoral Court.

incumbents win or lose the reelection are likely to be biased. If local actors anticipate that the incumbent will lose the reelection, bureaucratic turnover may be higher (and public service lower) before the election. In those cases, low levels of service delivery may be more a cause than a consequence of the election result. Descriptive data reported in Appendix F show that municipalities in which the incumbent loses the election have systematically different patterns of public service delivery in the quarter before the election. By examining what happens in close elections, where the outcomes are uncertain *ex ante*, we can estimate the causal effect of political turnover.

The regression discontinuity design allows me to identify the causal effect of the mayor's electoral defeat on dynamics of bureaucratic turnover (fires, hires, and resignations) and healthcare service delivery in the two quarters immediately after the election, i.e. between the election day and the winner being sworn, and in the first 3 months of the winner's term in office. I use quarter-level data because the hypotheses relate to turnover dynamics under the lame-duck government, which lasts a quarter in Brazil.<sup>19</sup>

## 4.1 Identification

The core of regression discontinuity designs is a forcing variable, with treatment determined sharply at a given threshold along its distribution. Here, the forcing variable for municipality  $i$  in election cycle  $c$  is the difference between the vote share of the strongest opposition candidate and that of the incumbent:  $D_{ic} = V_{ic}^o - V_{ic}^g$ . Treatment is the electoral defeat of the mayor, which is determined sharply when the forcing variable is positive:  $T_{ic} = \mathbb{1}(\text{vote share of the strongest challenger} > \text{vote share of the incumbent})$ .<sup>20</sup> Intuitively, this allows us to interpret a discontinuous jump in the outcome at the threshold as the causal effect of the mayor's electoral defeat. More formally, the goal is to identify the difference in potential outcomes under treatment (i.e., the incumbent is defeated) versus control (i.e., the incumbent is reelected), namely  $\tau = \mathbb{E}[Y_{1ic} - Y_{0ic}]$ . We can estimate the local average treatment effect (LATE) for municipalities around the threshold<sup>21</sup> by taking the difference between the limits from above and below the cutoff:

<sup>19</sup>Results using monthly data are of similar substantive and statistical significance.

<sup>20</sup>Conversely, if that difference is negative, the incumbent wins the election and there is no change of mayor on January 1st.

<sup>21</sup>That is, municipalities in which the mayor runs and their vote share is close to that of the strongest challenger. See Appendix G for a characterization of municipalities with close elections.

$$\tau = \mathbb{E}[Y_{1ic} - Y_{0ic}|D_{ic} = 0] = \lim_{D_{ic} \downarrow 0} \mathbb{E}[Y_{1ic}|D_{ic} = 0] - \lim_{D_{ic} \uparrow 0} \mathbb{E}[Y_{0ic}|D_{ic} = 0] \quad (1)$$

The key assumption of this design is that potential outcomes are continuous around the threshold. While this assumption is empirically untestable, we can examine some of its observable implications. Appendix H shows that there are no signs of sorting or discontinuity around the threshold, as confirmed by the test proposed by McCrary (2008), and that pre-treatment covariates are continuous around the threshold.

## 4.2 Estimation and inference

I follow the standard practice of using local linear regression with a triangular kernel smoother (Cattaneo et al., 2019),<sup>22</sup> and apply it to the following estimating equation:

$$Y_{ic} = \alpha + \beta_1 T_{ic} + \beta_2 D_{ic} + \beta_3 T_{ic} D_{ic} + \gamma_c + \delta \tilde{Y}_{ic} + \varepsilon_{ic} \quad (2)$$

$Y_{ic}$  is the outcome of interest (e.g., dismissals of temporary workers during the last quarter of the mayor's term) for municipality  $i$  in electoral cycle  $c$ . Since the outcomes are count variables with skewed distributions, I take the log (after adding 1 to retain observations where the outcome equals 0), such that the effects can be interpreted as percentage changes.<sup>23</sup>  $T_{ic}$  is the treatment indicator.  $D_{ic}$  is the forcing variable.  $\gamma_c$  is an electoral cycle fixed effect and  $\tilde{Y}_{ic}$  is a measure of the outcome in the quarter before the election, which I add as controls to increase efficiency (Calonico et al., 2019).  $\varepsilon_{ic}$  is the error term. If potential outcomes are continuous around the threshold,  $\beta_1$  in Equation 2 identifies the LATE. For inference I use the robust bias-corrected procedure developed by Cattaneo et al. (2019). To choose the optimal bandwidth I use the algorithm of Calonico et al. (2020). I then demonstrate the sensitivity of the results to alternative bandwidths.

<sup>22</sup>The results are similar using quadratic or cubic polynomials, and using uniform or Epanechnikov kernels.

<sup>23</sup>Results are similar when using the inverse hyperbolic sine transformation.

## 4.3 Data

I leverage administrative data on elections, public employment, and healthcare service delivery in Brazilian municipalities. While previous studies generally examine yearly variation in employment (and in some cases development outcomes), I focus on quarterly variation to identify turnover dynamics associated to both lame-duck and incoming governments.

To measure the performance of incumbents and their challengers I use candidate-level data from Brazil's Supreme Electoral Court (TSE, *Tribunal Supremo Eleitoral*). This data has unique identifiers for mayors, which allows me to observe whether they run for re-election and how they perform. I use data across four election cycles (between 2004 and 2016) to increase statistical power.

To measure how election results affect the turnover of public employees I leverage the Ministry of the Economy's Annual Social Information Report (RAIS, *Relação Anual de Informações Sociais*) from 2004 to 2017. Formal employers –including municipal governments– are legally obliged to report all their contracts to the Ministry of the Economy every year.<sup>24</sup> RAIS therefore contains data on the universe of municipal employees, including contract type, start and end dates, salary, reason for termination, and professional category, among other variables. Using RAIS, I generate counts of dismissals, hires, and resignations, by type of contract, for each municipality in each quarter before and after elections.<sup>25</sup>

To measure effects on public service delivery, I use data from the Ministry of Health's Basic Healthcare Information System (SIAB, *Sistema de Informação da Atenção Básica*).<sup>26</sup> The data are collected by municipal secretariats of healthcare, consolidated by state governments, and published by the federal government at the municipality-month level from 2004 to 2015.<sup>27</sup> I use SIAB to

<sup>24</sup>Entities that fail to comply with the obligation to report employment data to RAIS or reporting inaccurate data are subject to fines. Moreover, employers have a direct incentive to comply since employees who do not appear in RAIS are not eligible for PIS-PASEP, a well-known and constitutionally-enshrined program that complements the wages of formal workers who make less than twice the minimum wage. In 2017, about half of municipal labor contracts were below that threshold. Accordingly, the vast majority of municipal governments supply data to RAIS. Additional details of the labor dataset are reported in Appendix C.

<sup>25</sup>I consider dismissals to be contract terminations initiated by the employer (*exonerações a iniciativa do empregador*), and resignations terminations initiated by the employee (*exonerações a pedido*).

<sup>26</sup>Additional details of the healthcare services dataset are reported in Appendix D.

<sup>27</sup>The 2016 election cycle is thus excluded from these analyses.

generate counts of a number of healthcare services for each municipality in each quarter around elections. First, I use data on the number of home visits done by community health agents, nurses, and doctors. Second, I use data on the number of prenatal care check-ups, medical consultations involving infants (less than 1 year old), and medical consultations with children (1-5 years old). Third, I use data on the numbers of pregnant women and infants who are up to date with the vaccines mandated for those groups.

I focus on these dimensions of healthcare service delivery for three main reasons. First, these activities are at the core of Brazil's municipal healthcare system. Indeed, studies seeking to assess the effectiveness of the system often include these variables as outcomes ([Bhalotra et al., 2020](#); [Castro et al., 2019](#); [Aquino et al., 2009](#)). Second, these activities are of substantive importance, since they help keep the local population alive and healthy. Vaccinations have been shown to reduce death and disease ([Andre et al., 2008](#)). Prenatal and child healthcare are critical for lifelong health ([Forrest and Riley, 2004](#)) and frequently used as proxies for the quality of healthcare systems.<sup>28</sup> Home visits help provide care to people with reduced mobility (including people in rural areas) and complement services provided in healthcare facilities ([Ministério da Saúde, 2012b](#)).<sup>29</sup> Last, these healthcare services are mandated rather than elective, so they are less subject to variation in citizen demand and sociodemographics than other healthcare services. Brazil's Ministry of Health recommends at least 1 monthly visit to every household ([Ministério da Saúde, 2012b](#)), 6 prenatal check-ups during pregnancies ([Ministério da Saúde, 2012a](#)), 7 medical consultations for children in their first year of life, and at least 1 medical consultation per year for children older than one ([Ministério da Saúde, 2012c](#)). The national vaccination schedule mandates a series of immunizations for infants and pregnant women (Appendix E).

## 5 Results

Regression discontinuity results demonstrate that, in Brazilian municipalities, mayors' electoral defeats cause significant increases in the firing of temporary workers and the hiring of civil servants, as well as declines in the delivery of healthcare services, in the months before the election winner

<sup>28</sup>For example, reducing child mortality and improving maternal health are two of the eight main United Nations Millenium Development Goals.

<sup>29</sup>For example, home visits allow healthcare providers to change citizens' practices in order to prevent diseases and improve health outcomes. These at-home interventions are particularly important in rural and less developed areas.



takes office. These results highlight the importance of lame-ducks' political strategies and their impact over the composition and the performance of the bureaucracy.

## 5.1 Effects of electoral defeat on bureaucratic turnover

Figure 2 displays the effects of electoral turnover on the dismissal, hiring, and resignation of temporary and civil service employees. Each panel in Figure 2 shows three sets of results. On the left, the effect of the incumbent's electoral defeat on a given outcome during the 3 months before the election (July through September, or the fifteenth quarter of a mayor's term). Reassuringly, all these placebo tests return statistically insignificant effects. In the center, each panel reports the effect of an incumbent's electoral defeat on bureaucratic turnover during the 3 months between election day and the start of the winner's term in office (October through December, or the sixteenth and final quarter of the incumbent's term). On the right, each panel shows the effects of the mayor losing the election on outcomes in the first quarter of the winner's term (January through March).

Table 1 details the regression results for the effects during the last quarter of the incumbent's term.<sup>30</sup> Figure 3 visualizes the discontinuity for the main results. Figure 4 demonstrates that discontinuity estimates are robust to a broad spectrum of bandwidths. Placebo tests moving the discontinuity threshold return insignificant results (Appendix M).

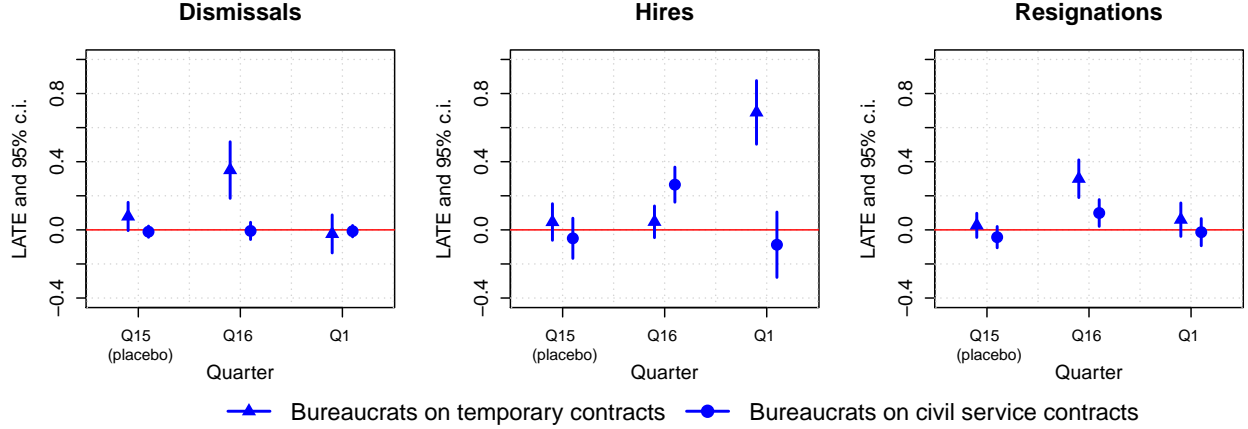
These effects are not only driven by the turnover of employees working directly for local politicians, such as managers, advisors, or assistants. Similar effects can be observed if we exclude managerial jobs (Appendix N), or if we examine only frontline providers in the healthcare sector (Appendix O) or in education (Appendix P).

In line with Hypothesis 1, an incumbent's electoral defeat leads to a large and statistically significant increase in the dismissal of temporary workers, as shown in the left-hand panel of Figures 2 and 3. Election losers increase dismissals of temporaries by 42% in the last 3 months of their term,<sup>31</sup> compared to incumbents who win the reelection ( $p < 0.001$ ). The election results do not

<sup>30</sup>Regression tables for all models, with and without controls, are reported in Appendices I and J. Statistically significant results for all models in Figure 2 are robust to the omission of controls. The main results are robust to specifying outcome variables with the inverse hyperbolic sine transformation, using the log and dropping observations where the outcome equals 0, or as binary variables for whether the count is larger than zero (Appendix K).

<sup>31</sup>Since outcomes are log transformed, coefficients should be interpreted as follows: the LATE of a

Figure 2: Effect of an incumbent's electoral defeat on bureaucratic turnover



Each point and its robust bias-corrected confidence interval (c.i.) comes from a separate local linear regression discontinuity model, as per Equation 2. Dependent variables are in the log scale. Q15 corresponds to the 15th quarter of a mayor's term (i.e., July to September of its last year). Q16 corresponds to the 16th and final quarter of a mayor's term (October to December). Q1 corresponds to the first quarter of the election winner's term (January to March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.

Table 1: Effect of an incumbent's electoral defeat on bureaucratic turnover in the quarter after the election (Q16)

	Temporaries			Civil servants		
	Dismissals	Hires	Resignations	Dismissals	Hires	Resignations
Incumbent defeated	0.351*** (0.085)	0.047 (0.047)	0.3*** (0.056)	-0.006 (0.026)	0.265*** (0.052)	0.099* (0.04)
Bandwidth	0.166	0.164	0.124	0.187	0.168	0.197
Observations	6191	6137	5008	6649	6236	6852
Control mean (untransformed)	24.044	5.189	5.332	0.654	2.447	2.276

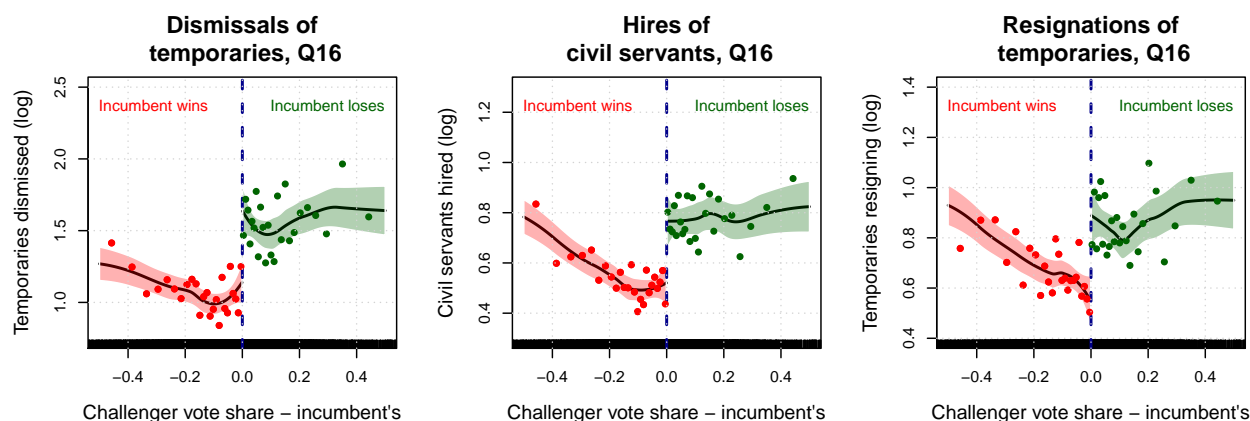
\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . The bandwidth is determined by the algorithm of Calonico et al. (2020). Robust standard errors in parentheses. All regressions follow the specification in Equation 2. Dependent variables are in the log scale. The last row reports the mean of the outcome, untransformed, in municipalities within the bandwidth where the incumbent wins the reelection.

affect dismissals of civil servants, which are uncommon due to the the legal protections they enjoy.

In-depth interviews with prosecutors and politicians suggest that dismissals of temporary workers after an incumbent's defeat are intended to balance the accounts before handing the government

mayor's electoral defeat is a change of  $(100 \times e^{\hat{\beta}_1} - 100)\%$  in the outcome.

Figure 3: Regression discontinuity plots for the main results in Figure 2



Colored dots are local averages for equally-sized bins. Lines are loess regression lines estimated at both sides of the threshold with no controls. Shaded regions denote 95% confidence intervals.

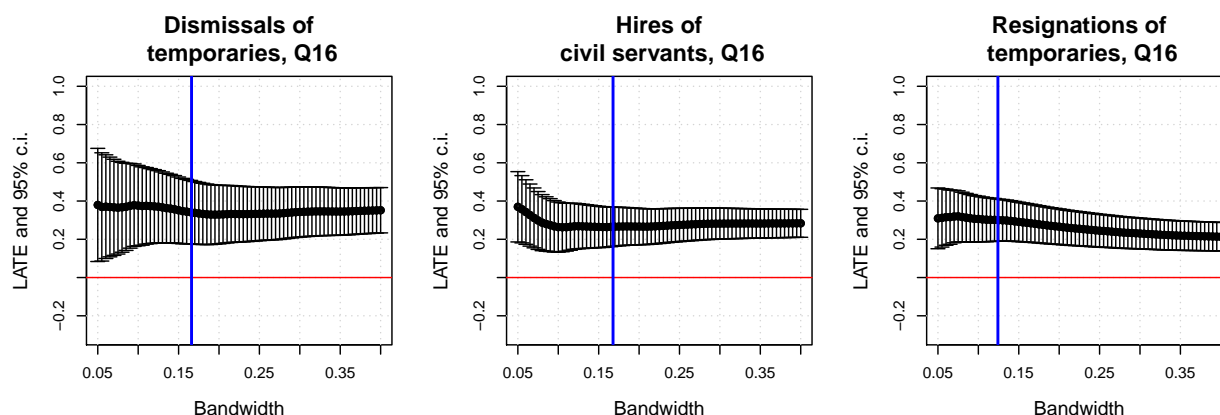
over to the winner. When asked about the transition period before their term began, a municipal secretary of administration (in charge of human resources) in the northeastern state of Rio Grande do Norte explained: “There were cuts in personnel to hand the accounts cleaner, with resources in the account. Expenses were cut to hand over a more balanced city hall. [...] If there is no political turnover expenses do not drop.”<sup>32</sup> Horizontal accountability actors also point to this phenomenon. A prosecutor in Rio Grande do Norte said: “When a mayor loses the election, they try to save money and they try not to hand out the accounts in a bad state. [...] Once the mayor is out of office they are not able to afford equally good lawyers, and they know that [legal problems] can arrive later.”<sup>33</sup>

Media reports provide additional qualitative evidence on how election results affect the dismissal of temporary workers. For example, the local government of Porto Nacional, in the central state of Tocantins, reportedly dismissed large numbers of employees immediately after an electoral defeat. The mayor argued this was necessary to adjust public expenses before leaving office (G1, 2016b). In Miracema, another municipality in Tocantins, the mayor reportedly dismissed about 150 municipal employees after she lost the reelection, alleging the municipality was experiencing financial hardship (G1, 2016a). Media reports about this phenomenon are common in other states as well. For example, dismissals were reported following the mayor’s electoral defeat in multiple municipalities in the northern state of Amazonas (A Crítica, 2016) and in the southern state of Rio Grande do

<sup>32</sup>Municipal secretary of administration interviewed in the state of Rio Grande do Norte in June 2018.

<sup>33</sup>State prosecutor interviewed in the state of Rio Grande do Norte in June 2018.

Figure 4: Robustness of the main results in Figure 2 to alternative bandwidths



*Vertical blue lines indicate the optimal bandwidth.*

Sul (G1, 2012). A recurrent theme in all these reports is the negative impact of dismissals on the delivery of education and healthcare services.

Heterogeneity analyses provide additional, suggestive evidence consistent with dismissals being driven by lame-ducks' motivation to clean the accounts before leaving office. First, an incumbent's electoral defeat causes a larger increase in dismissals among high-pay bureaucrats than among low-pay bureaucrats, although this difference is not statistically significant (Appendix Q). Second, the effect on the dismissal of temporaries is larger in municipalities previously exposed to a random anti-corruption audit (Appendix Z), although that difference is also not statistically significant.

The results displayed in the central panel of Figures 2 and 3 show that the hiring of civil servants increases as a result of the incumbent losing the election, in line with Hypothesis 2. On average, electoral defeat leads to an increase of 30.3% in the hiring of civil servants, when compared to municipalities without electoral turnover ( $p < 0.001$ ).

Data from in-depth interviews suggest that these increases correspond to a strategy of hiring civil service employees to decrease the opponent's ability to hire their own supporters after taking office, and thus facilitate their return to power. Another secretary of administration in the state of Rio Grande do Norte illustrated this with a report about the preceding government: "The previous mayor hired many people [who had previously passed the civil service exam], especially after they lost the election, to make things harder for the new administration."<sup>34</sup> The fact that about half

<sup>34</sup>Municipal secretary of administration interviewed in the state of Rio Grande do Norte in June 2018.

of the mayors who narrowly lost their reelection in 2008 or 2012 ran again four years later helps understand why election losers would seek to undermine the incoming government.<sup>35</sup>

The hiring of civil servants to constrain the opponent is not unique to Brazil. A qualitative study of the Dominican Republic, for example, notes that incumbent politicians there gave tenure to bureaucrats as a form of “insurance against an opposition party successor,” since “tenure would reduce the number of public sector jobs [... an] opposition party President could exchange for political support” (Schuster, 2020, 36).

Lame-ducks’ use of civil service hiring can hurt their opponents because election winners in fact use their discretion to hire as soon as they take office. The hiring of temporary workers increases on average by 99.2% in the first quarter of a post-electoral year in municipalities with a new mayor, compared to those where the incumbent is reelected ( $p < 0.001$ ).<sup>36</sup> These results are in line with previous findings that new mayors in Brazil use bureaucratic appointments to reward their supporters (Colonnelli et al., 2020; Barbosa and Ferreira, 2021). Consistent with this, and similarly to other horizontal accountability actors I interviewed, a prosecutor in the northeastern state of Ceará said that temporary contracts are often used as “political currency.”<sup>37</sup>

An alternative explanation for lame-ducks’ hiring of civil servants might be that they seek to protect their policy legacy before leaving office, an argument that has been made for a similar phenomenon in the US (Lewis, 2008; Mendelson, 2003). To test this possibility, I examine how this effect differs when the incumbent belongs to a large programmatic party and thus can be expected to have stronger policy concerns. The results, reported in Appendix R, show that in those cases an incumbent’s electoral defeat does not trigger an increase in the hiring of civil servants in the last quarter of the election year. This, together with the interviews, suggests that these hires are driven by a strategy to constrain opponents in fiscal rather than policy terms.

This finding contradicts the common view that civil service hiring is politically neutral. Whereas civil service systems dramatically reduce (or eliminate) politicians’ discretion over *who* to hire, they often do not eliminate their discretion regarding *how many* people to hire or *when* to do so. The quantity and timing of hires are important dimensions of human resources management in any

<sup>35</sup>50.75% (49.2%) of the mayors who lost their bid for reelection in 2008 (2012) by less than 10 points ran again 4 years later (TSE data).

<sup>36</sup>Municipalities without turnover hire on average 95 bureaucrats in the first quarter of the post-election year.

<sup>37</sup>State prosecutor interviewed in the state of Ceará in August 2017.

organization, and these results suggest that politicians can use them strategically for political gain.

While lame-ducks' use of civil service hiring is politically motivated, in practice it may be beneficial for governance. At least if new civil service hires occupy a job that would have gone to less qualified political appointees (Colonnelli et al., 2020), and to the extent that civil servants perform better, this effect can have an unintended but salutary effect over the bureaucracy.<sup>38</sup>

Electoral turnover also causes an increase in bureaucratic resignations immediately after the election, as shown in the right-hand panel of Figures 2 and 3. While researchers have often noted the difficulty of differentiating voluntary from involuntary bureaucrat turnover (Hong and Kim, 2019; Dahlström and Holmgren, 2019; Grissom et al., 2016), the RAIS dataset allows us to neatly separate the two. On average, an electoral defeat of the incumbent causes a 30.3% increase in resignations of temporary employees ( $p < 0.001$ ) and a 10.4% rise in civil servant resignations ( $p < 0.05$ ) in the quarter following the election.

This increase in resignations could be due to strategic exit by bureaucrats who anticipate conflicts with the incoming government (Bolton et al., 2020; Doherty et al., 2019a,b). Consistent with this interpretation, resignations by high-pay employees appear to increase more after an electoral defeat than those among low-pay bureaucrats, although the difference is not statistically significant (Appendix Q). Resignations could also rise if bureaucrats simply dislike the post-election environment of policy and organizational switches. In any case, a key implication of the effect of election results on resignations is that previously hired bureaucrats are not passive subjects of election losers' political strategies. Instead, they sometimes actively respond to the changing political environment, thereby shaping the bureaucratic politics of transition periods.

Finally, it is worth noting that these effects on bureaucratic turnover during the lame-duck period are quantitatively and qualitatively different from those under the incoming administration, on which other studies have focused. First, turnover under the incoming administration is quantitatively more pronounced. In an average municipality, an incumbent's electoral defeat leads to about 13 contract changes (dismissals, hires, or resignations affecting temporaries and civil servants) in the final quarter of the election year, compared to about 94 in first quarter of the following year.

<sup>38</sup>I find no evidence consistent with these civil service hires being targeted to political supporters, or with politicians obtaining the political support of those civil servants in the future. As shown in Appendix S, there is no jump at the discontinuity in the share of civil servants hired in the last quarter of the year who run to city council in the previous or in the following election. In this context, running for city council is a good proxy for political support (Colonnelli et al., 2020).

Second, the dynamics of bureaucratic turnover are more diverse under the election loser (with dismissals, hires, and resignations) than under the winner (where we only observe an increase in the hiring of temporaries). Third, despite these effects during the transition period being relatively small, the next section demonstrates they have significant costs in terms of declines in public service delivery.

## 5.2 Effects of electoral defeat on public service delivery

The results displayed in Figure 5 demonstrate that, in line with Hypothesis 3, electoral turnover has large, negative effects on the delivery of healthcare services during the transition period.<sup>39</sup> Regression results, discontinuity plots, and plots showing the robustness to alternative bandwidths are in Table 2 and Figures 6 and 7, respectively.<sup>40</sup>

The left-hand panel shows that an incumbent's electoral defeat causes declines in home visits of healthcare professionals. Visits by nurses and doctors decline by 24.9% and 39%, respectively ( $p < 0.001$ ). The decline in home visits by community health agents is not statistically significant. These declines are not compensated for by increases in the first quarter of the new administration.

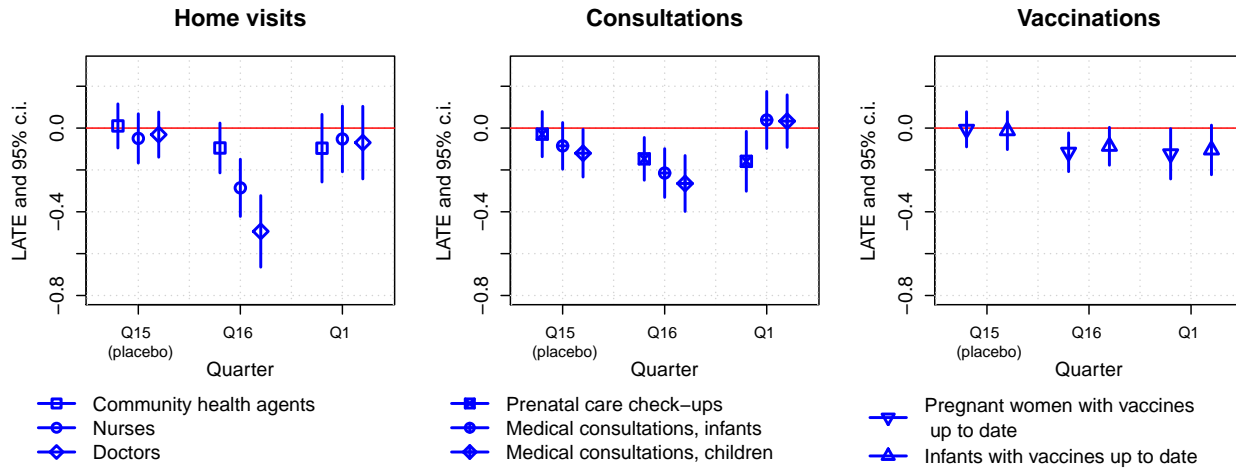
Electoral turnover also causes declines in maternal and child healthcare services, as shown in the central panel of Figure 5. Prenatal care check-ups go down by 13.7% in the last quarter of the mayor's term as a result of their defeat ( $p < 0.01$ ). This effect persists into the first quarter of the new administration, where we observe 14.7% fewer prenatal check-ups than in municipalities where the mayor wins the reelection ( $p < 0.05$ ). Medical consultations with both infants and children also decrease after an incumbent loss, by 19.3% and 23.3%, respectively ( $p < 0.001$ ). As with home visits, these declines are not compensated for by increases in service delivery when the winner takes office.

Finally, the right-hand panel of Figure 5 shows that the mayor losing the reelection also causes

<sup>39</sup>Placebo tests using healthcare services in the quarter before the election return null effects, with the exception of the one for medical consultations with children.

<sup>40</sup>Regression tables for all models, with and without controls, are included in Appendices I and J. While the significant results for home visits and medical consultations with children are robust to the omission of controls, those for prenatal care check-ups, medical consultations with infants, and vaccinations for pregnant women are not. The main results are robust to specifying the outcome variable with the inverse hyperbolic sine transformation, or using the log and dropping observations where the outcome equals 0 (Appendix K).

Figure 5: Effect of an incumbent's electoral defeat on the delivery of healthcare services



See notes under Figure 2.

Table 2: Effect of an incumbent's electoral defeat on healthcare service delivery in the quarter after the election (Q16)

	Home visits			Prenatal	Medical consultations		Vaccines up to date	
	CHAs	Nurses	Doctors	Check-ups	Infants	Children	Pregnancies	Infants
Incumbent defeated	-0.095 (0.061)	-0.286*** (0.07)	-0.494*** (0.087)	-0.147** (0.052)	-0.215*** (0.059)	-0.265*** (0.068)	-0.115* (0.047)	-0.087 (0.046)
Bandwidth	0.165	0.14	0.106	0.22	0.168	0.139	0.167	0.183
Observations	4648	4130	3320	5424	4681	4094	4675	4960
Control mean (untransformed)	13495.105	380.936	183.305	369.019	142.447	292.068	284.89	636.221

See notes under Table 1.

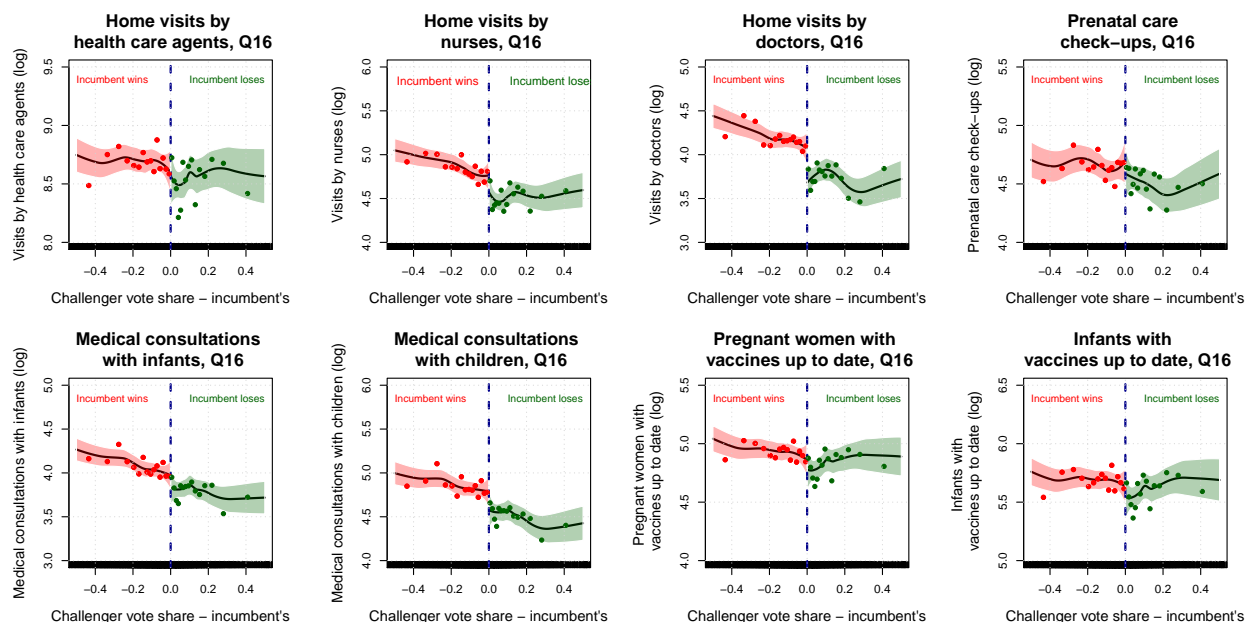
declines in immunization. The number of pregnant women with their vaccines up to date goes down by 10.9% in the last quarter of the electoral year as a result of an incumbent defeat ( $p < 0.05$ ). There is a similar decline of 8.3% in the number of infants with their vaccines up to date, although it is marginally insignificant ( $p = 0.06$ ). These effects are also not compensated for by an increase in immunizations after the winner takes office.<sup>41</sup> Given the critical role that vaccines play in preventing death and disease (Andre et al., 2008), these results suggest that the declines in healthcare services caused by electoral turnover may hurt health outcomes.

In sum, an electoral defeat of the incumbent causes significant declines in the delivery of healthcare services. In an average municipality, these effects add up to a loss of about 311 en-

<sup>41</sup>In fact, the negative effect on vaccinations among pregnant women persists in the first quarter of the year (11.6%,  $p < 0.05$ ).



Figure 6: Regression discontinuity plots for the main results in Figure 5



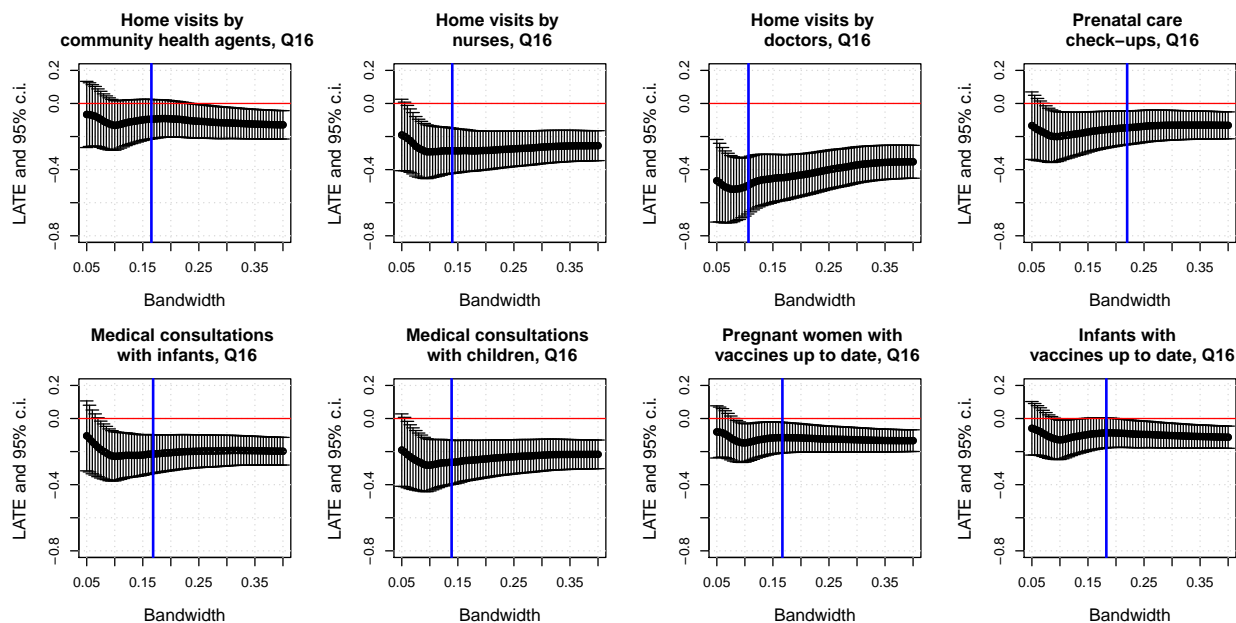
See notes under Figure 3.

counters between citizens and healthcare providers. Since these services are mandated rather than elective, effects are unlikely to be driven by variation in demand. Given that these services are central to the mission of local healthcare systems in Brazil, which are highly visible and salient for local voters, these declines suggest other services may also suffer as a result of an electoral defeat of the incumbent – at least in policy areas where delivery depends on human resources.

The worsening in public service delivery may be driven by a variety of factors, including bureaucratic turnover, disruptions to other inputs like transportation, and changes in bureaucrats' level of effort.<sup>42</sup> A quote from an interview with a municipal secretary of healthcare in the north-eastern state of Ceará illustrates some of these potential mechanisms: "A change in government stops everything, because of the transition... The population suffers as a result. For example, we were a reference municipality in the fight against dengue, but because of that transition dengue cases have increased by over 500%. Pregnant women who used to do prenatal check-ups regularly stopped, which led to fetal deaths, infant deaths, etc. [...] Workers stop working. Those who are

<sup>42</sup>An alternative explanation for these results could be that services are being provided at the same rate but healthcare professionals are failing to register them. Two findings suggest this is not the case. First, results are similar when we exclude observations where the outcome equals zero (Appendix K). Second, there are null effects on placebo outcomes measured in the same dataset (Appendix T).

Figure 7: Robustness of the main results in Figure 5 to alternative bandwidths



*Vertical blue lines indicate the optimal bandwidth.*

in temporary contracts are dismissed, and contracts for example for transportation are canceled. The outgoing mayor does not want to have any more expenses. [...] Tenured professionals stay but with no conditions to do their job, with no materials.”<sup>43</sup>

A first possible mechanism driving the healthcare delivery declines observed in Figure 5 is the turnover of healthcare personnel and the ensuing disruptions to teams of providers. Human resources are the main input to primary healthcare in this context and the largest spending category (Medeiros et al., 2017). The same dynamics of bureaucratic turnover observed in the overall municipal bureaucracy are found among specialized healthcare professionals like doctors, nurses, and community health agents (Appendix O). Additional evidence on the turnover of healthcare personnel comes from examining effects on the net change in the total stock of municipal healthcare professionals, as measured by the Ministry of Health’s National Registry of Health Establishments (CNES, *Cadastro Nacional de Estabelecimentos de Saúde*), as shown in Appendix U. This mechanism is consistent with previous research on education, in Brazil and elsewhere, that has associated teacher turnover to declines in student test scores (Akhtari et al., 2020; Fagnäs and Pelkonen, 2020; Ronfeldt et al., 2013).

<sup>43</sup>Municipal secretary of healthcare interviewed in the state of Ceará in August 2017.

To better assess the causal link between bureaucratic turnover and declines in service delivery, I exploit variation in the prevalence of civil service hiring among healthcare bureaucrats before the election. The larger the share of healthcare bureaucrats with civil service contracts, the less pronounced bureaucratic turnover is likely to be, at least in terms of dismissals and resignations.<sup>44</sup> This comparison provides variation in municipalities' vulnerability to bureaucrat turnover in the healthcare sector while avoiding conditioning on post-treatment variables, which would introduce bias.

The results, displayed in Figure 8, suggest that bureaucratic turnover is not the only mechanism connecting the incumbent's electoral defeat and decaying public service delivery. Municipalities where a larger share of healthcare workers have civil service contracts (and thus are protected from dismissal) experience less turnover in the healthcare bureaucracy but larger declines in service delivery. On the other hand, municipalities where a larger proportion of healthcare professionals have temporary contracts do not experience significant disruptions in the delivery of healthcare.<sup>45</sup> These results imply that bureaucratic turnover is not the only factor connecting electoral defeat and public service delivery under lame-duck government. More generally, these results suggest that insulating bureaucrats through civil service protections does not necessarily eliminate the connection between an incumbent's electoral defeat and declines in service delivery, at least in this context.

The interview quote above suggests two other mechanisms that may contribute, together with bureaucratic turnover, to the declines in service delivery observed in Figure 5. First, declines could be partly driven by disruptions to transportation contracts. This may help explain why effects are more pronounced for home visits than for consultations. Still, changes to transportation cannot explain the large and significant declines for the latter, which take place in the clinics and for which healthcare personnel need no transportation. Moreover, there is no significant heterogeneity between geographically smaller and larger municipalities (Appendix X). Disruptions in transportation are thus likely to play only a partial role in explaining the results in Figure 5.<sup>46</sup>

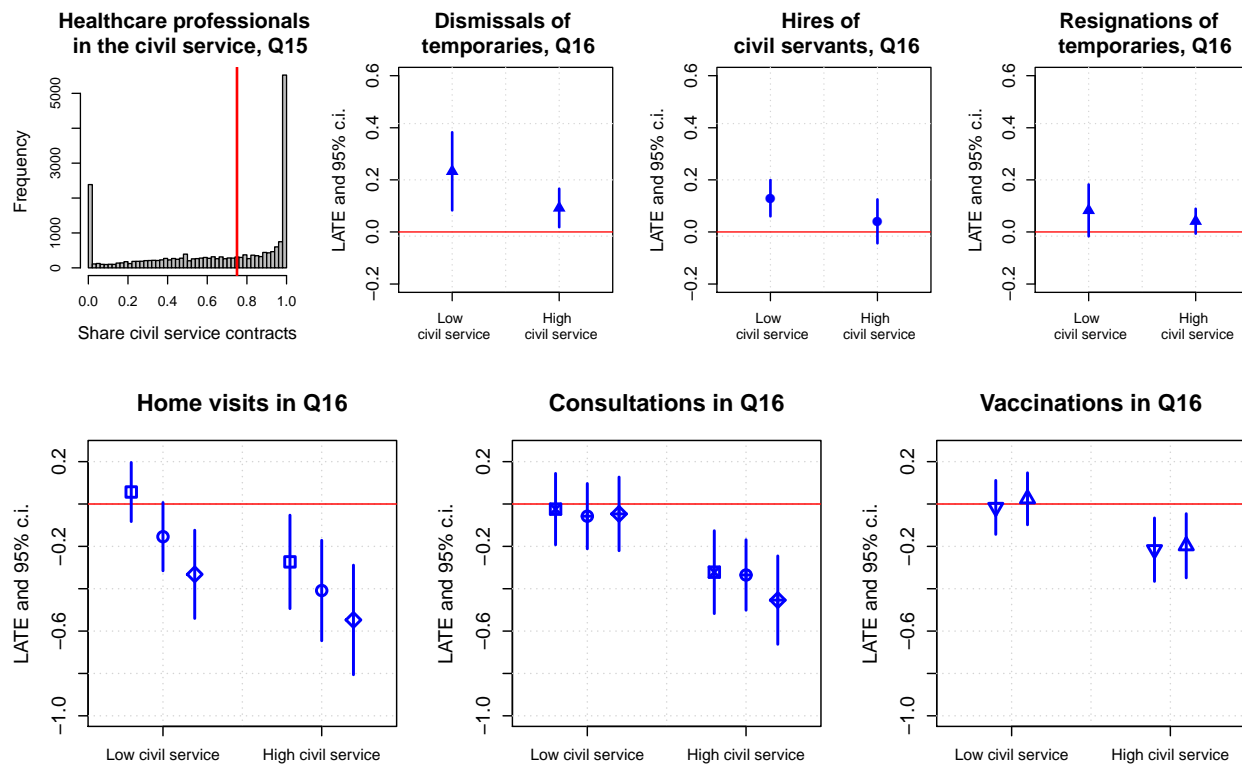
A final possibility is that the effects on service delivery are not driven by variations in inputs (e.g., human resources, transportation) but rather by weakening bureaucratic accountability.

<sup>44</sup>See Appendix V for a characterization of municipalities with a larger share of healthcare bureaucrats are under civil service contracts.

<sup>45</sup>Effects are similar when comparing municipalities where either all or none of the healthcare bureaucrats have civil service contracts in the quarter before the election (Appendix W).

<sup>46</sup>Disruptions in other material inputs could play a role too, but they are unlikely to be central. Human resources and infrastructure are the main inputs to primary healthcare delivery in this context.

Figure 8: Effect of an incumbent's electoral defeat on the turnover of healthcare bureaucrats and on services they provide, by whether the share of healthcare bureaucrats with a civil service contract before the election is below or above the median



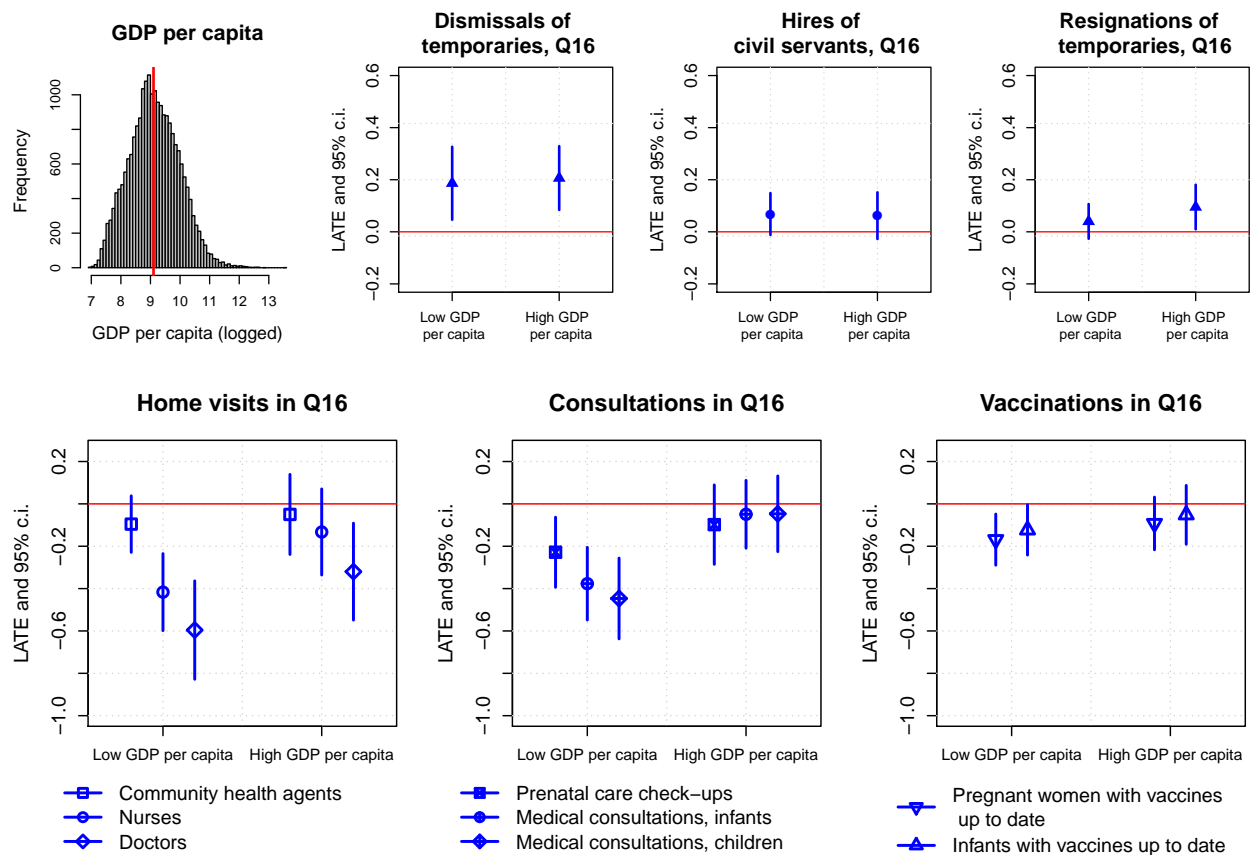
See notes under Figure 2.

Bureaucratic effort and public service delivery have been found to respond to monitoring and accountability pressures from politicians, at least in developing contexts (Raffler, 2020; Dasgupta and Kapur, 2020; Gulzar and Pasquale, 2017). Yet, lame-duck politicians and senior officials are likely to be less able and/or willing to monitor and exert pressure on bureaucrats in their last months in office. Bureaucrats may therefore reduce their level of effort during the lame-duck period, which would contribute to the observed effects of electoral turnover on service delivery. Another municipal secretary of healthcare in the state of Ceará stated that this was the main problem in transition periods: “tenured bureaucrats close their arms, because no one is holding them to account. [...] Temporaries do not work because they know their days [in the job] are counted.”<sup>47</sup>

Two additional pieces of evidence support the hypothesis that a temporary depression of bu-

<sup>47</sup>Municipal secretary of healthcare interviewed in the state of Ceará in August 2017.

Figure 9: Effect of an incumbent's electoral defeat on the turnover of healthcare bureaucrats and on services they provide, by whether the municipality's per capita GDP is below or above the median



See notes under Figure 2.

reaucratic accountability contributes to the results in Figure 5. First, the results generally disappear after election winners take office. Whereas disruptions to teams continue during the first months of the new administration (with new hires and organizational changes), the weakened accountability dynamics only last while the election loser remains in office. Second, as shown in Figure 9, wealthier municipalities experience comparable effects on the turnover of healthcare bureaucrats after the election, but smaller (and often statistically insignificant) declines in service delivery compared to poorer municipalities.<sup>48</sup> This suggests that more developed localities have mechanisms that can compensate for the deleterious effects of electoral turnover on healthcare delivery, such as stronger bureaucratic norms or more robust social accountability.

Together, these results suggest that the declines in healthcare services caused by an incum-

<sup>48</sup>There is no noticeable heterogeneity by municipality population (Appendix Y).

bent's electoral defeat are likely driven by a combination of bureaucratic turnover, disruptions to other inputs like transportation, and a worsening of bureaucratic accountability during the transition period. Nonetheless, the evidence on mechanisms presented here is only suggestive. Future research might seek to uncover more conclusive evidence on the causal mechanism driving the results in Figure 5.

## 6 Conclusion

Political turnover is central to the theory and practice of representative democracy. This article argues that, despite its many benefits, political turnover also has costs, at least in the short term, as it leads to bureaucratic turnover and depresses public service delivery. Whereas previous studies of turnover emphasize the actions of election winners, this article advances a theory centered on the political strategies of lame-duck governments and how they affect the composition and performance of the bureaucracy. I demonstrate these turnover dynamics using a close-races regression discontinuity design with administrative data on public employment and healthcare service delivery in Brazilian municipalities.

To summarize, the results demonstrate that an incumbent's electoral defeat causes increases in the dismissal of temporary employees and the hiring of civil servants before the winner takes office. The evidence presented here suggests these effects are driven by lame-ducks seeking to improve their compliance with legal rules about temporary hiring before leaving office, on the one hand, and to constrain their opponent's fiscal capacity to hire their own supporters on the other hand. At the same time, the delivery of major healthcare services declines in the months immediately following the election. The negative effects on service delivery appear to be driven by a combination of bureaucratic turnover, disruptions to other bureaucratic inputs, and a worsening of bureaucratic accountability during the transition period.

These findings have important implications for how we think about political turnover and lame-duck governments. While previous studies on the connections between political and bureaucratic turnover typically examine yearly variation in outcomes, political turnover is best analyzed as a process that starts when the uncertainty characteristic of competitive elections turns into the certainty of the incumbent's defeat and the ensuing transition of power. Despite formal and informal rules limiting what lame-ducks can do, in practice these governments use their remaining

time in office to exercise their discretion over the bureaucracy by pursuing unequivocally political strategies. Bureaucrats also behave strategically during the transition period, by either resigning or changing their level of effort.

A second key implication of this study is that the fear of being prosecuted after leaving office can powerfully influence the behavior of lame-duck politicians during their remaining time in office. This suggests that there is an incumbency advantage in the control of information about government irregularities, even in contexts with strong anti-corruption institutions, and that the prospect of losing that advantage can lead to disruptive decisions in the months before the election winner takes office.

A third important implication of the results is that neither public employment in the civil service nor the performance of civil servants is as insulated from political influence as is typically assumed. Whereas the targeting of civil service jobs is generally protected from political influence through competitive examinations, politicians often retain discretion over the scale and timing of civil service hiring. Lame-ducks can strategically mobilize this discretion by hiring civil servants before leaving office to reduce their opponents' fiscal capacity to hire their own supporters after taking office. This perspective highlights the need to extend the comparative research on civil service reform to study when and why politicians widen the scope of civil service hiring once legal reforms are passed.

Finally, the findings in this article suggest that the dynamics of political turnover can jeopardize citizen welfare, at least in the short run. If political turnover depresses service delivery in a policy area that is both salient to voters and consequential for human development, it is plausible that it also disrupts other areas of government activity, at least those that depend heavily on human resources. From a policy standpoint, this study suggests that shortening the transition period between election day and the start of the winner's term can enhance citizen welfare. While there may be good administrative reasons to allow a few days or weeks for the transition, longer lame-duck periods may carry significant costs in terms of bureaucratic turnover and government standstill. Future research may seek to exploit cross- or within-country variation in formal institutions (including the length of the transition period, the electoral system, and constraints on politicians' discretion over the bureaucracy) to better understand their effects on the dynamics of turnover.

## References

- A Crítica, (2016). Após eleição, prefeituras começam demissão em massa de servidores. November 15, 2016. <https://www.acritica.com/channels/cotidiano/news/apos-eleicao-prefeituras-comecam-demissao-em-massa-de-servidores> (last accessed on October 1, 2021).
- Akhtari, Mitra, Diana Moreira, and Laura Trucco (2020). Political Turnover, Bureaucratic Turnover, and the Quality of Public Services. Working paper, available at <https://dianamoreira.com> (last accessed on October 1, 2021).
- Andre, Francis E, Robert Booy, Hans L Bock, John Clemens, Sibnarayan K Datta, Thekkekara J John, Bee W Lee, S Lolekha, Heikki Peltola, TA Ruff, et al. (2008). Vaccination greatly reduces disease, disability, death and inequity worldwide. *Bulletin of the World Health Organization* 86, 140–146.
- Aquino, Rosana, Nelson F De Oliveira, and Mauricio L Barreto (2009). Impact of the family health program on infant mortality in Brazilian municipalities. *American Journal of Public Health* 99(1), 87–93.
- Avis, Eric, Claudio Ferraz, and Frederico Finan (2018). Do government audits reduce corruption? Estimating the impacts of exposing corrupt politicians. *Journal of Political Economy* 126(5), 1912–1964.
- Barbosa, Klenio and Fernando V Ferreira (2021). Occupy government: Democracy and the dynamics of personnel decisions and public sector performance. NBER Working paper, available at <https://www.nber.org/papers/w25501.pdf> (last accessed on October 1, 2021).
- Berliner, Daniel and Aaron Erlich (2015). Competing for transparency: Political competition and institutional reform in Mexican states. *American Political Science Review*, 110–128.
- Bersch, Katherine (2019). *When democracies deliver: Governance reform in Latin America*. Cambridge University Press.
- Bhalotra, Sonia, Rudi Rocha, and Rodrigo R Soares (2020). Can Universalization of Health Work? Evidence from Health Systems Restructuring and Expansion in Brazil. IEPS Working paper, available at <https://ieps.org.br/wp-content/uploads/2020/02/WPS3.pdf> (last accessed on October 1, 2021).
- Boas, Taylor C, F Daniel Hidalgo, and Marcus André Melo (2019). Norms versus action: Why voters fail to sanction malfeasance in Brazil. *American Journal of Political Science* 63(2), 385–400.
- Bolton, Alexander, John M De Figueiredo, and David E Lewis (2020). Elections, ideology, and turnover in the US federal government. *Journal of Public Administration Research and Theory, Forthcoming*.
- Brassiolo, Pablo, Ricardo Estrada, and Gustavo Fajardo (2020). My (running) mate, the mayor: Political ties and access to public sector jobs in Ecuador. *Journal of Public Economics* 191, 104286.
- Brito, Jerry and Veronique De Rugy (2009). Midnight regulations and regulatory review. *Administrative Law Review* 61, 163.
- Cahan, Dodge (2019). Electoral cycles in government employment: Evidence from US gubernatorial elections. *European Economic Review* 111, 122–138.



- Calonico, Sebastian, Matias D Cattaneo, and Max H Farrell (2020). Optimal bandwidth choice for robust bias-corrected inference in regression discontinuity designs. *The Econometrics Journal* 23(2), 192–210.
- Calonico, Sebastian, Matias D Cattaneo, Max H Farrell, and Rocio Titiunik (2019). Regression discontinuity designs using covariates. *Review of Economics and Statistics* 101(3), 442–451.
- Castro, Marcia C, Adriano Massuda, Gisele Almeida, Naercio Aquino Menezes-Filho, Monica Viegas Andrade, Kenya Valéria Micaela de Souza Noronha, Rudi Rocha, James Macinko, Thomas Hone, Renato Tasca, et al. (2019). Brazil's unified health system: The first 30 years and prospects for the future. *The Lancet* 394(10195), 345–356.
- Cattaneo, Matias D, Nicolás Idrobo, and Rocío Titiunik (2019). *A practical introduction to regression discontinuity designs: Foundations*. Cambridge University Press.
- Christensen, Jørgen Grønnegaard, Robert Klemmensen, and Niels Opstrup (2014). Politicization and the Replacement of Top Civil Servants in Denmark. *Governance* 27(2), 215–241.
- Colonnelli, Emanuele, Mounu Prem, and Edoardo Teso (2020). Patronage and selection in public sector organizations. *American Economic Review* 110(10), 3071–99.
- Cooper, Christopher A, Patrik Marier, and Ali Halawi (2020). The politics of senior bureaucratic turnover in the Westminster tradition: Trust and the choice between internal and external appointments. *Public Policy and Administration*, 0952076720929738.
- Cortázar Velarde, Juan Carlos, Mariano Lafuente, Mario Sanginés, Christian Schuster, Koldo Echebarría, and Francisco Longo (2014). *Al servicio del ciudadano. Una década de reformas del servicio civil en América Latina (2004-13)*. Inter-American Development Bank.
- Dahlström, Carl and Mikael Holmgren (2019). The political dynamics of bureaucratic turnover. *British Journal of Political Science* 49, 823–836.
- Dasgupta, Aditya and Devesh Kapur (2020). The political economy of bureaucratic overload: Evidence from rural development officials in India. *American Political Science Review* 114(4), 1316–1334.
- Davis, Lewis and KR White (2019). Is justice blind? Evidence from federal corruption convictions. *Public Choice*, 1–33.
- Doherty, Kathleen M, David E Lewis, and Scott Limbocker (2019a). Executive control and turnover in the senior executive service. *Journal of Public Administration Research and Theory* 29(2), 159–174.
- Doherty, Kathleen M, David E Lewis, and Scott Limbocker (2019b). Presidential control and turnover in regulatory personnel. *Administration & Society* 51(10), 1606–1630.
- Eggers, Andrew C, Anthony Fowler, Jens Hainmueller, Andrew B Hall, and James M Snyder Jr (2015). On the validity of the regression discontinuity design for estimating electoral effects: New evidence from over 40,000 close races. *American Journal of Political Science* 59(1), 259–274.
- Fagernäs, Sonja and Panu Pelkonen (2020). Teachers, Electoral Cycles, and Learning in India. *Journal of Human Resources* 55(2), 699–732.

- Fearon, James D (1999). *Electoral accountability and the control of politicians: Selecting good types versus sanctioning poor performance*. Cambridge University Press.
- Finan, Federico, Benjamin A Olken, and Rohini Pande (2017). The personnel economics of the developing state. *Handbook of Economic Field Experiments* 2, 467–514.
- Forrest, Christopher B and Anne W Riley (2004). Childhood origins of adult health: A basis for life-course health policy. *Health Affairs* 23(5), 155–164.
- G1, (2012). Após as eleições, prefeituras demitem funcionários no RS. October 18, 2012. <http://g1.globo.com/rs/rio-grande-do-sul/eleicoes/2012/noticia/2012/10/apos-eleicoes-prefeituras-demitem-funcionarios-no-rs.html> (last accessed on October 1, 2021).
- G1, (2016a). Prefeita demite funcionários e reduz ano letivo após não se reeleger no TO. October 18, 2016. <http://g1.globo.com/to/tocantins/noticia/2016/10/prefeita-demite-funcionarios-e-reduz-ano-letivo-apos-nao-se-reeleger-no.html> (last accessed on October 1, 2021).
- G1, (2016b). Prefeitura de Porto Nacional faz demissão de funcionários em massa. October 4, 2016. <http://g1.globo.com/to/tocantins/noticia/2016/10/prefeitura-de-porto-nacional-faz-demissao-de-funcionarios-em-massa.html> (last accessed on October 1, 2021).
- Geddes, Barbara (1994). *Politician's dilemma: Building state capacity in Latin America*. University of California Press.
- Gordon, Sanford C (2009). Assessing partisan bias in federal public corruption prosecutions. *American Political Science Review*, 534–554.
- Grissom, Jason A, Samantha L Viano, and Jennifer L Selin (2016). Understanding employee turnover in the public sector: Insights from research on teacher mobility. *Public Administration Review* 76(2), 241–251.
- Gulzar, Saad and Benjamin J Pasquale (2017). Politicians, bureaucrats, and development: Evidence from India. *American Political Science Review* 111(1), 162–183.
- Hanushek, Eric A, Steven G Rivkin, and Jeffrey C Schiman (2016). Dynamic effects of teacher turnover on the quality of instruction. *Economics of Education Review* 55, 132–148.
- Hong, Sounman and Youngrok Kim (2019). Loyalty or competence: Political use of performance information and negativity bias. *Public Administration Review* 79(6), 829–840.
- Iyer, Lakshmi and Anandi Mani (2012). Traveling agents: political change and bureaucratic turnover in India. *Review of Economics and Statistics* 94(3), 723–739.
- Kim, Bong Hwan and Sounman Hong (2019). Political change and turnovers: How do political principals consider organizational, individual, and performance information? *Public Choice* 181(3-4), 291–308.
- Klašnja, Marko and Rocio Titiunik (2017). The incumbency curse: Weak parties, term limits, and unfulfilled accountability. *American Political Science Review* 111(1), 129–148.

- Kraft, Matthew A, William H Marinell, and Darrick Shen-Wei Yee (2016). School organizational contexts, teacher turnover, and student achievement: Evidence from panel data. *American Educational Research Journal* 53(5), 1411–1449.
- Kurfirst, Robert (1996). Term-limit logic: paradigms and paradoxes. *Polity* 29(1), 119–140.
- Lambais, Guilherme and Henrik Sigstad (2021). Judicial subversion: The effects of political power on court outcomes. Working paper, available at <https://gbrlambais.github.io> (last accessed on October 1, 2021).
- Lewis, David E (2008). *The politics of presidential appointments: Political control and bureaucratic performance*. Princeton University Press.
- Litschig, Stephan and Yves Zamboni (2019). Judicial presence and rent extraction. Working paper, available at <https://ideas.repec.org/p/ngi/dpaper/19-20.html> (last accessed on October 1, 2021).
- Manin, Bernard (1997). *The principles of representative government*. Cambridge University Press.
- McCrary, Justin (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142(2), 698–714.
- Medeiros, Katia Rejane de, Paulette Cavalcanti de Albuquerque, Ricardo Antônio Wanderley Tavares, and Wayner Vieira de Souza (2017). Lei de Responsabilidade Fiscal e as despesas com pessoal da saúde: Uma análise da condição dos municípios brasileiros no período de 2004 a 2009. *Ciência & Saúde Coletiva* 22, 1759–1769.
- Mendelson, Nina A (2003). Agency burrowing: Entrenching policies and personnel before a new president arrives. *New York University Law Review* 78, 557.
- Ministério da Saúde, (2012a). *Atenção ao pré-natal de baixo risco*. Brasília: Governo Federal.
- Ministério da Saúde, (2012b). *Caderno de atenção domiciliar*. Brasília: Governo Federal.
- Ministério da Saúde, (2012c). *Cadernos da atenção básica: Saúde da criança*. Brasília: Governo Federal.
- Ministério da Saúde, (2012d). *Política nacional de atenção básica*. Brasília: Governo Federal.
- Peterlevitz, Tiago (2021). Who Turns to Clientelism? Opportunistic Politicians, Patronage Appointments, and Vote Buying in Brazil. Working paper, available at <https://www.tiagopeterlevitz.com/> (last accessed on October 1, 2021).
- Peters, B Guy and Jon Pierre (2004). *The politicization of the civil service in comparative perspective: A quest for control*. Routledge.
- Piccolo, Daiane Marcela (2018). Qualidade de dados dos sistemas de informação do datasus: análise crítica da literatura. *Ciência da Informação em Revista* 5(3), 13–19.
- Pierskalla, Jan H and Audrey Sacks (2019). Personnel politics: Elections, clientelistic competition and teacher hiring in indonesia. *British Journal of Political Science*, 1–23.

- Poblete-Cazenave, Rubén (2021). Crime and punishment: Do politicians in power receive special treatment in courts? Evidence from India. Working paper, available at <https://www.poblete-cazenave.com> (last accessed on October 1, 2021).
- Popper, Karl R (1962). *The Open Society And Its Enemies*. Princeton University Press.
- Przeworski, Adam (1991). *Democracy and the market: Political and economic reforms in Eastern Europe and Latin America*. Cambridge University Press.
- Raffler, Pia (2020). Does Political Oversight of the Bureaucracy Increase Accountability? Field Experimental Evidence from an Electoral Autocracy. Working paper, available at <http://piaraffler.com> (last accessed on October 1, 2021).
- Reis, Thiago (2016). Saúde é o principal problema citado em todas as capitais, aponta Ibope. Globo. September 4, 2016. <http://g1.globo.com/politica/eleicoes/2016/blog/eleicao-2016-em-numeros/post/saude-e-o-principal-problema-citado-em-todas-capitais-aponta-ibope.html> (last accessed on October 1, 2021).
- Rocha, Romero and Rodrigo R Soares (2010). Evaluating the impact of community-based health interventions: Evidence from Brazil's Family Health Program. *Health Economics* 19(S1), 126–158.
- Rocha, Thiago Augusto Hernandes, Núbia Cristina da Silva, Allan Claudius Queiroz Barbosa, Pedro Vasconcelos Amaral, Elaine Thumé, João Victor Rocha, Viviane Alvares, and Luiz Augusto Facchini (2018). Cadastro nacional de estabelecimentos de saúde: evidências sobre a confiabilidade dos dados. *Ciência & Saúde Coletiva* 23, 229–240.
- Ronfeldt, Matthew, Susanna Loeb, and James Wyckoff (2013). How teacher turnover harms student achievement. *American Educational Research Journal* 50(1), 4–36.
- Schedler, Andreas (2001). Measuring democratic consolidation. *Studies in Comparative International Development* 36(1), 66–92.
- Schuster, Christian (2020). Patrons against clients: Electoral uncertainty and bureaucratic tenure in politicized states. *Regulation & Governance* 14(1), 26–43.
- Ting, Michael M, James M Snyder Jr, Shigeo Hirano, and Olle Folke (2013). Elections and reform: The adoption of civil service systems in the US states. *Journal of Theoretical Politics* 25(3), 363–387.
- Toral, Guillermo (2019). Political bureaucratic cycles: Public employment and service delivery around elections in Brazil. Working paper, available at <https://www.guillermotoral.com> (last accessed on October 1, 2021).
- Toral, Guillermo (2021). The benefits of patronage: How political appointments can enhance bureaucratic accountability and effectiveness. Working paper, available at <https://www.guillermotoral.com> (last accessed on October 1, 2021).
- Turner, Kathryn (1960). Midnight judges. *University of Pennsylvania Law Review* 109, 494.
- Wampler, Brian, Natasha Borges Sugiyama, and Michael Touchton (2020). *Democracy at Work: Pathways to Well-Being in Brazil*. Cambridge University Press.

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## A Transition periods in a sample of democracies

Table A.1: Recent transition periods in a sample of 20 democracies

Country	Year	Election held	Winner took office	Transition length	Winner
United Kingdom	2010	5/6/10	5/11/10	5 days	Cameron
France	2017	5/7/17	5/14/17	7 days	Macron
Japan	2012	12/16/12	12/26/12	10 days	Abe
India	2014	5/12/14	5/26/14	14 days	Modi
Canada	2015	10/19/15	11/4/15	16 days	Trudeau
Bolivia	2020	10/18/20	11/8/20	21 days	Arce
Spain	2011	11/20/11	12/21/11	31 days	Rajoy
New Zealand	2017	9/23/17	10/26/17	33 days	Ardern
Kenya	2013	3/4/13	4/9/13	36 days	Kenyatta
Argentina	2019	10/27/19	12/10/19	44 days	Fernández
Colombia	2018	6/17/18	8/7/18	51 days	Duque
Philippines	2016	5/9/16	6/30/16	52 days	Duterte
Peru	2016	6/5/16	7/28/16	53 days	Kuczynski
Nigeria	2015	3/29/15	5/29/15	61 days	Buhari
Brazil	2018	10/28/18	1/1/19	65 days	Bolsonaro
Germany	2005	9/18/05	11/22/05	65 days	Merkel
United States	2020	11/3/20	1/20/21	78 days	Biden
Chile	2017	12/17/17	3/11/18	84 days	Piñera
Indonesia	2014	7/9/14	10/20/14	103 days	Widodo
Mexico	2018	7/1/18	12/1/18	153 days	López Obrador

Data consider the latest instance (up until 2020) in which a new party got to executive office at the national level through popular election. The date for the 2014 elections in India corresponds to the last day of voting. The dates for the elections in Brazil, Peru and Colombia correspond to the second round of presidential elections.

## B In-depth interviews

In-depth interviews with local actors gave origin to the hypotheses tested in this article, but were part of a larger empirical study of patronage in Brazil. Over 18 months of fieldwork in the period 2016-2019 I conducted 121 in-depth, semi-structured interviews with municipal bureaucrats and politicians, and with state-level horizontal accountability actors (e.g., prosecutors).<sup>49</sup> I recruited interviewees at their offices, and collected their oral consent after providing information about the research project and their rights as participants. I conducted interviews in Portuguese, face-to-face, and at the interviewee's office. I chose not to record interviews because some of the topics discussed were highly sensitive, including corrupt and illegal uses of public employment. While recording interviews would have allowed for more complete transcripts, it would have seriously hindered the reliability of the data and subjects' willingness to participate. Some subjects agreed to participate on the condition of anonymity or confidentiality. When quoting interviewees, I specify only their position, the state, and the month of the interview in order to safeguard their identity. In total, I interviewed 51 municipal politicians, 54 municipal bureaucrats, and 16 horizontal accountability actors.<sup>50</sup> Interviews were done in 45 municipalities in 7 states across 3 different regions of Brazil.<sup>51</sup> Locations were chosen to ensure diversity in political and socioeconomic variables.

Within each municipality, fieldwork focused on the center, where government offices are. I approached potential interviewees at their offices and requested an interview after introducing myself and the research project. No compensation of any sort was offered or given to participants. Most subjects that I managed to speak to directly agreed to participate.<sup>52</sup> Interviews were semi-structured, and usually started as an open conversation about the interviewee's background, the challenges they faced in their position, and their perception of public services in the municipality. As the conversation advanced, I followed up with questions about the local dynamics of public employment, including in some cases specific questions about the connection between political turnover, bureaucratic turnover, and public service delivery. I took handwritten notes during and after the interviews. The median duration of interviews was one hour.

<sup>49</sup>In-depth interviews were approved by MIT's Committee on the Use of Humans as Experimental Subjects under protocols 170593389 and 1806407144.

<sup>50</sup>41 of the 51 politicians were secretaries. 46 of the 54 bureaucrats were school directors, clinic managers, and social assistance center coordinators. Of the 16 horizontal accountability actors, 8 were state prosecutors or prosecutorial staff.

<sup>51</sup>Interviews were done in the states of Ceará (43 interviews), Rio Grande do Norte (21), Paraíba (15), Rio de Janeiro (19), Minas Gerais (10) São Paulo (1), and Goiás (12).

<sup>52</sup>Some refused, mostly arguing they did not have time. Two refused due to the research topic.

## C Administrative labor market data

I leverage the anonymized RAIS, made available by Brazil's Ministry of the Economy. In it, I identify municipal employees using the legal nature of the employer and the municipality.<sup>53</sup> Descriptive statistics for the data on municipal employees are reported in Table A.2. Between 2005 and 2017 the number of municipal government contracts has increased by 2.5 million or 60%, but the share of civil service employees has remained roughly constant at about two thirds.<sup>54</sup> I code as civil service contracts those in the *regime jurídico único de servidores públicos*, and as temporary all other employees, who are hired through a variety of legal regimes.<sup>55</sup>

Table A.2: Descriptive statistics for municipal employees as identified in RAIS, for election and post-election years between 2004 and 2017

	Number of municipalities	% of total	Millions of contracts	Share civil service
2017	5522	99.16	6.60	0.67
2016	5480	98.40	6.42	0.67
2013	5499	98.74	6.50	0.64
2012	5513	99.08	6.09	0.65
2009	5497	98.80	5.61	0.64
2008	5481	98.51	5.33	0.65
2005	5459	98.13	4.41	0.66
2004	5387	96.91	4.06	0.69

Municipal governments (like all formal employers) are legally required<sup>56</sup> to report data for all its employees<sup>57</sup> to the Ministry of the Economy through the RAIS system. Yet, a minority of them (between 0.84 and 3.09% in the years I use) do not show up in the data. Technical staff at the

<sup>53</sup>I consider only employees hired by municipal executive governments and their foundations and other dependent entities.

<sup>54</sup>This share is the same in the data about municipal employees collected through government surveys by the Brazilian Institute of Geography and Statistics (IBGE, *Instituto Brasileiro de Geografia e Estatística*).

<sup>55</sup>Unfortunately, RAIS does not allow a reliable identification of temporary workers who are politically appointed (e.g., *cargo comissionado*, *função de confiança*).

<sup>56</sup>Entities failing to comply with the obligation to report employment data to RAIS or reporting inaccurate data are subject to fines. Moreover, employers have a direct incentive to comply since employees who do not appear in RAIS are not eligible for PIS-PASEP, a well-known and constitutionally-enshrined program that complements the wages of formal workers who make less than twice the minimum wage. In 2017, about half of municipal government labor contracts were below that threshold.

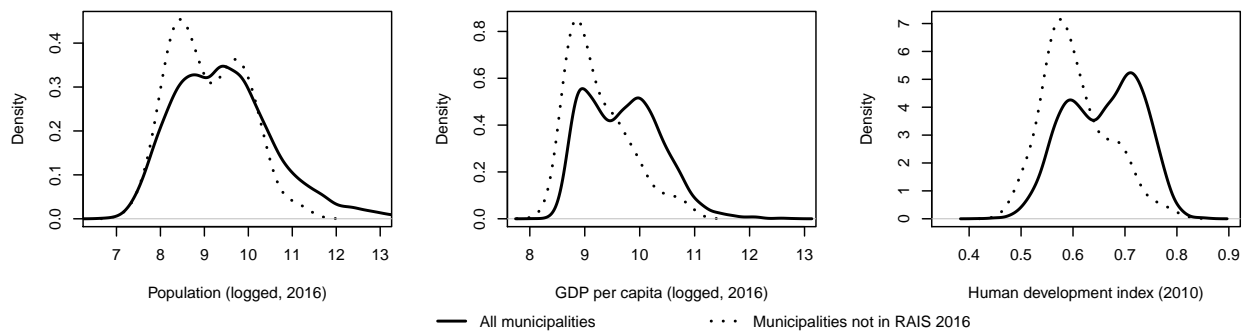
<sup>57</sup>Elected officials, interns, and very transitory workers (*eventuais*) are not considered employees for the purposes of RAIS.



Ministry confirmed that some municipalities fail to report employment data to RAIS, and associated it to capacity issues and/or corruption.

To understand the kind of municipalities that are not reporting employment data to RAIS, I examine the 89 municipalities that do not show up in the data in 2016,<sup>58</sup> and compare them to all 5,569 municipalities.<sup>59</sup> As can be seen in Figure A.1, municipalities failing to report employment data tend to be smaller, poorer, and less developed. This is consistent with both capacity and corruption mechanisms driving attrition. To the extent that municipal development correlates with the political use of public employment (Colonnelli et al., 2020; Barbosa and Ferreira, 2021), their exclusion from the data is biasing the results. This bias, however, is likely to be in the direction of attenuating results (i.e. bringing them closer to zero). In any case, results are not representative of the overall population of municipalities, but rather of those complying with the RAIS reporting requirement.

Figure A.1: Socioeconomic characteristics of municipalities not reporting employment data in 2016



<sup>58</sup>Results are similar when analyzing the municipalities not reporting data in 2004.

<sup>59</sup>I exclude Brasília because it does not have a municipal government.

## D Administrative healthcare data

I leverage two sources of administrative data on healthcare bureaucracies and the services they provide. Both can be accessed through the Ministry of Healthcare's [DATASUS](#) portal.

To measure the effects on public service delivery I use data from the Ministry of Health's Basic Healthcare Information System (SIAB, *Sistema de Informação da Atenção Básica*). The data are collected by municipal secretariats of healthcare, consolidated by state governments, and published by the federal government at the municipality-month level from 2004 to 2015.<sup>60</sup> I use SIAB to generate counts of a number of healthcare services for each municipality in each quarter around elections.

To examine the role that bureaucratic turnover plays in disruptions to the delivery of healthcare services, I use data from the Ministry of Health's National Registry of Health Establishments (CNES, *Cadastro Nacional de Estabelecimentos de Saúde*), which is collected through the same system as SIAB. CNES reports the total number of healthcare personnel working for each municipality in each month since 2007.<sup>61</sup> I use these data on stocks to measure the net change (from one quarter to the next) in the total number of healthcare professionals working for a municipality's healthcare system. Unlike RAIS, CNES does not allow us to identify hires, dismissals, and resignations, only changes in the stock of healthcare personnel. On the other hand, CNES allows a more precise count of healthcare professionals than RAIS, both in general and by skill level. Still, there is a very strong correlation between the two measures – the  $R^2$  of a regression of CNES counts on RAIS counts is 0.84.

Municipal governments are legally required to compile and submit the corresponding data to both SIAB and CNES ([Ministério da Saúde, 2012d](#)). The quality of health data collected by the Ministry of Healthcare has been examined empirically by researchers who have generally found them to be reliable despite some errors ([Piccolo, 2018](#); [Rocha et al., 2018](#)).

<sup>60</sup>The 2016 election cycle is thus excluded from these analyses.

<sup>61</sup>Therefore, the election cycles of 2008, 2012 and 2016 are included in these analyses.

## E National vaccination schedule

Figure A.2 is the most recent national vaccination schedule, which is similar to the one prevalent in 2012 ([Ministério da Saúde, 2012c, 90](#)).

Most vaccines are prescribed during babies' first year of life: BCG and hepatitis B, at birth; rotavirus, pentavalent vaccine, poliomyelitis, and pneumococcal vaccine (first doses), at 2 months; meningococcal vaccine (first dose), at 3 months; rotavirus, pentavalent, poliomyelitis (second doses), at 4 months; meningococcal vaccine (second dose), at 5 months; pentavalent vaccine and poliomyelitis (third doses), at 6 months; yellow fever, at 9 months; and pneumococcal and meningococcal (reinforcements), triple vaccine (first dose), at 12 months.

Some vaccines are prescribed to pregnant women: hepatitis B, diphtheria, tetanus, and pertussis.

Figure A.2: Brazil's national vaccination schedule

CALENDÁRIO NACIONAL DE VACINAÇÃO/2020/PNI/MS																		
Vacinas		BCG	Hepatite B	VORH Rotavírus	Pentavalente (DTP+Hib+ Hep B)	DTP	VIP e VOP	Pneumocócica 10	Meningocócica C	Febre Amarela	Tríplice Viral	Tetra Viral	Varicela monovalente	Hepatite A	HPV	Meningocócica ACWY	Dupla Adulto	dTpa (adulto)
Protege contra		Formas graves da tuberculose	Hepatite B	Rotavírus	Difteria, Tétano, Coqueluche, Hepatite B e meningite por <i>Haemophilus influenzae</i> tipo b	Difteria, Tétano e Coqueluche	Poliomielite	Pneumonia, otite, meningite e outras doenças causadas pelo pneumococo	Doença invasiva causada pela <i>Neisseria meningitidis</i>	Febre Amarela	Sarampo Caxumba e Rubéola	Sarampo Caxumba Rubéola e Varicela	Varicela	Hepatite A	HPV	Doença invasiva causada pela <i>Neisseria meningitidis</i>	Difteria e Tétano	Difteria, Tétano e Coqueluche
Grupo Alvo	Idade																	
Criança	Ao nascer	Dose Única (1)	Dose ao nascer (2)															
	2 meses			1ª dose	1ª dose		1ª dose VIP (1)	1ª dose										
	3 meses								1ª dose									
	4 meses			2ª dose	2ª dose		2ª dose VIP (1)	2ª dose										
	5 meses								2ª dose									
	6 meses				3ª dose		3ª dose VIP (1)											
	9 meses									Dose Inicial								
	12 meses							Reforço (1)	1º Reforço (1)		1ª dose							
	15 meses					1º Reforço	1º Reforço VOP (1)					Dose Única (1)		Dose Única (1)				
	4 anos					2º Reforço	2º Reforço VOP (1)			Reforço (3)			2ª dose (6)					
9 anos									Uma dose (4)					2 doses (7)				
Adolescente	10 a 19 anos		3 doses: a partir de 7 anos de idade (5)							Uma dose (4)	2 doses (5)			2 doses	Entre 11 a 12 anos de idade: 1 dose (9)	3 doses e reforço a cada 10 anos (5)	10 a 19 anos	
Adulto	20 a 59 anos		3 doses (5)							Uma dose (4)	Até 29 anos: 2 doses. Entre 30 a 59 anos: 1 dose. (5) e (8)					3 doses e reforço a cada 10 anos (5)	Profissional de Saúde: 1 dose reforço a cada 10 anos (10)	
Idoso	60 anos ou mais		3 doses (5)													3 doses e reforço a cada 10 anos (5)		
Gestante			3 doses (5)														2 doses (5)	1 dose a cada gestação (11)
(1) Até menor de 5 anos de idade;(2) Essa dose pode ser feita até 30 dias de vida do bebê;(3) Considerar intervalo mínimo de 30 dias entre as doses;(4) Pessoas entre 5 a 59 anos de idade não vacinadas - administrar uma dose e considerar vacinado;(5) A depender da situação vacinal, completar esquema;(6) Pode ser feita até menor de 7 anos de idade. Profissionais de saúde que trabalham na área assistencial devem receber uma ou duas doses a depender do laboratório produtor;(7) Para meninas de 09 a 14 anos e meninos de 11 a 14 anos de idade: 2 doses - 0, 6 meses a depender da situação vacinal. Adolescentes e adultos de 9 a 26 anos vivendo com HIV/aids: 3 doses - 0, 2 e 6 meses;(8) Profissionais da saúde devem receber duas doses independente da idade;(9) Para adolescentes na faixa etária de 11 e 12 anos de idade, com a vacina Meningocócica ACWY, independente de dose anterior de Meningocócica C ou dose de reforço;(10) Profissionais de saúde e parteiras tradicionais, como dose complementar no esquema básico da dT e reforços a cada dez anos;(11) A partir da 20ª semana gestacional (até 45 dias após o parto).																		

## F Outcome means, by whether the mayor wins the reelection

Mean of employment and healthcare outcomes, untransformed, by whether the incumbent wins the reelection (continuous lines) or loses it (dashed lines), regardless of their vote margin.

Figure A.3: Outcome means on bureaucratic turnover, by whether the mayor wins the reelection

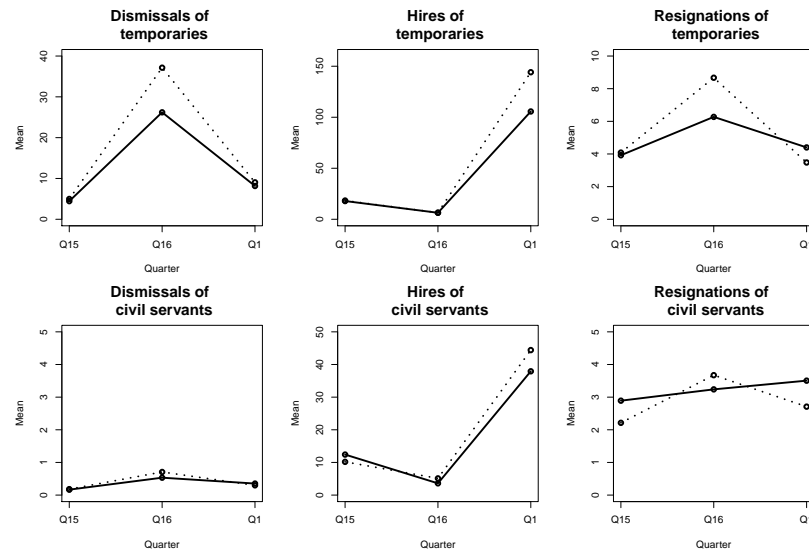
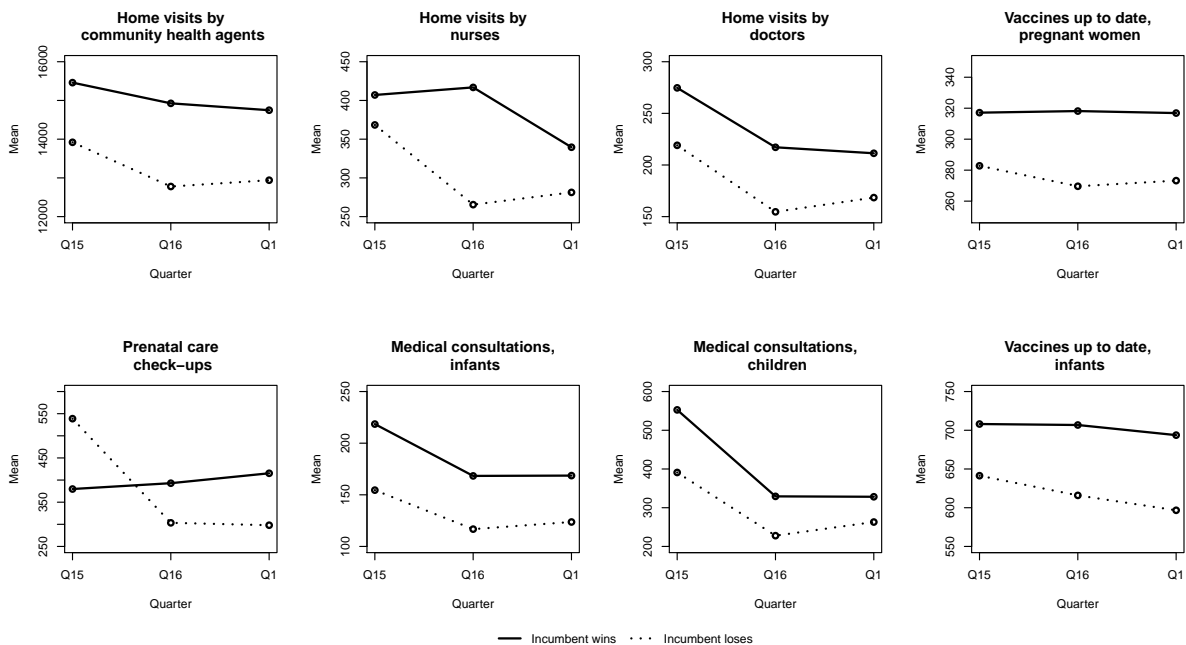


Figure A.4: Outcome means on healthcare service delivery, by whether the mayor wins the reelection



## G Characterization of municipalities with close elections

The table below characterizes the set of municipality-election observations where the election is close (i.e., the incumbent wins or loses by less than 15 or less than 10 points), relative to other observations where the mayor runs (first and second columns) and relative to all observations regardless of whether the mayor runs (third and fourth columns). Observations with close elections tend to be relatively smaller and poorer, and less likely to be in the southeast (relative to the northeast). Yet, observations within the bandwidth span the whole range of these socioeconomic variables.

Table A.3: Characterization of the regression discontinuity effective sample

	Mayor runs, 15 points	Mayor runs, 10 points	All, 15 points	All, 10 points
Population (logged)	−0.033*** (0.004)	−0.022*** (0.005)	−0.010*** (0.003)	−0.007** (0.002)
GDP per capita (logged)	−0.032*** (0.009)	−0.018 (0.009)	−0.017** (0.006)	−0.010* (0.005)
Deaths per thousand	0.005 (0.003)	0.006 (0.003)	0.003 (0.002)	0.004* (0.002)
Region fixed effects				
North	−0.042* (0.019)	−0.040* (0.020)	−0.004 (0.012)	−0.008 (0.011)
South	0.023 (0.018)	0.016 (0.019)	−0.024* (0.011)	−0.018 (0.010)
Southeast	−0.090*** (0.015)	−0.089*** (0.015)	−0.043*** (0.009)	−0.043*** (0.008)
Center-west	−0.018 (0.021)	−0.039 (0.021)	0.002 (0.013)	−0.011 (0.012)
Constant	1.189*** (0.077)	0.799*** (0.077)	0.482*** (0.047)	0.320*** (0.042)
Election fixed effects	Yes	Yes	Yes	Yes
Observations	10169	10169	21903	21903
R-squared	0.020	0.013	0.006	0.005

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ . See Appendix E for variable definitions and sources. HC2 standard errors in brackets.

## H Continuity of the forcing variable and pre-treatment covariates

First, I examine the continuity of the forcing variable, the vote margin of the strongest challenger over the incumbent. The histogram has no signs of discontinuity. This is confirmed by the formal test proposed by [McCrary \(2008\)](#).

Figure A.5: Histogram of the forcing variable

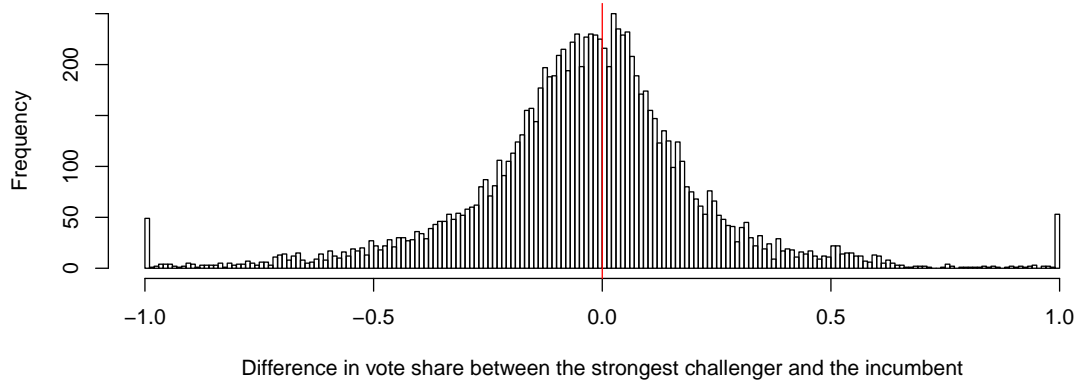
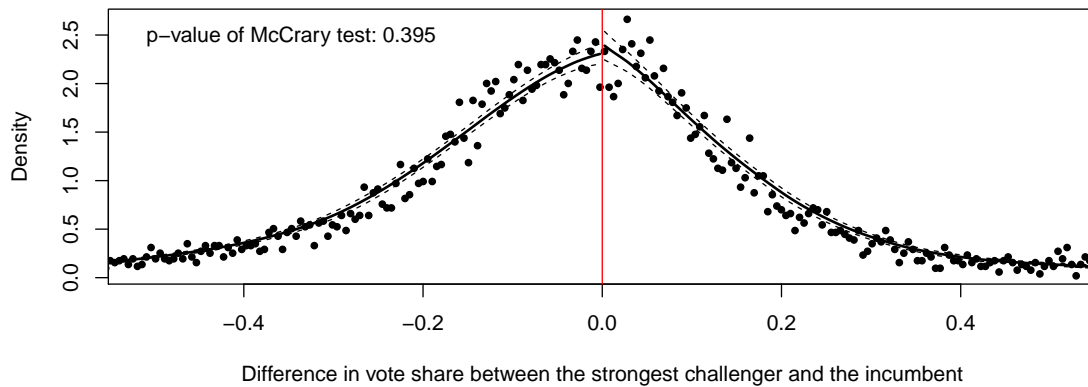


Figure A.6: Density of the forcing variable and [McCrary \(2008\)](#) discontinuity test



To check whether pre-treatment covariates are continuous around the threshold, I use them as dependent variables in the main model.

Table A.4: Effect an electoral defeat of the incumbent on pre-treatment covariates: Socioeconomics

	Population	GDP	GDP per capita	Deaths	Deaths per thousand
Incumbent defeated	0.078 (0.067)	0.126 (0.088)	0.07 (0.05)	0.049 (0.07)	-0.036 (0.093)
Bandwidth	0.154	0.135	0.136	0.148	0.217
Observations	5952	5442	5458	5822	7291

Table A.5: Effect an electoral defeat of the incumbent on pre-treatment covariates: Bureaucracies

	Number of bureaucrats	Bureaucrats per capita	Share civil servants
Incumbent defeated	0.058 (0.062)	-0.001 (0.001)	-0.006 (0.019)
Bandwidth	0.156	0.192	0.153
Observations	5911	6750	5827

Table A.6: Effect an electoral defeat of the incumbent on pre-treatment covariates: Elections

	Turnout	Concentration	PT	MDB	PSDB	Large	Aligned
Incumbent defeated	-0.006 (0.008)	0 (0.004)	0.002 (0.018)	0.019 (0.025)	-0.021 (0.021)	-0.004 (0.029)	0.016 (0.02)
Bandwidth	0.135	0.165	0.166	0.146	0.168	0.186	0.179
Observations	5418	6268	6298	5777	6347	6764	6608

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2; controls include election cycle fixed effects only. Measures of population (logged), GDP (logged) and GDP per capita come from IBGE and correspond to one year before the election. Measures of deaths (logged) and deaths per thousand residents are from the Ministry of Health and correspond to one year before the election. Numbers of bureaucrats (logged), bureaucrats per capita, and share of bureaucrats who are civil servants are from RAIS and correspond to the quarter before the election. Turnout is the number of valid votes divided by population. Concentration is a Herfindahl index of the concentration of votes across candidates. Incumbent party is the party the mayor ran with in the previous election, as reported by TSE. Large corresponds to a mayor who belongs to either PT, MDB, or PSDB. Aligned corresponds to a mayor who belongs to the party of Brazil's president.

# I Regression tables for results shown in Figures 2 and 5

## I.1 Effects of electoral turnover on bureaucratic turnover

Table A.7: Effect of an electoral defeat of the incumbent on dismissals of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.079 (0.042)	0.351*** (0.085)	-0.024 (0.057)	-0.011 (0.017)	-0.006 (0.026)	-0.008 (0.017)
Bandwidth	0.127	0.166	0.176	0.146	0.187	0.215
Observations	5096	6191	6377	5652	6649	7079

Table A.8: Effect of an electoral defeat of the incumbent on hires of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.046 (0.055)	0.047 (0.047)	0.689*** (0.095)	-0.049 (0.06)	0.265*** (0.052)	-0.087 (0.098)
Bandwidth	0.172	0.164	0.183	0.169	0.168	0.145
Observations	6319	6137	6519	6264	6236	5595

Table A.9: Effect of an electoral defeat of the incumbent on resignations of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.027 (0.036)	0.3*** (0.056)	0.06 (0.05)	-0.043 (0.032)	0.099* (0.04)	-0.013 (0.041)
Bandwidth	0.187	0.124	0.124	0.19	0.197	0.192
Observations	6649	5008	4953	6714	6852	6695

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2. Dependent variables are in the log scale. Q15 corresponds to the 15th quarter of a mayor's term (i.e., July through September of its last year). Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.



## I.2 Effects of electoral turnover on public service delivery

Table A.10: Effect of an electoral defeat of the incumbent on home visits by healthcare professionals

	Home visits by CHAs			Home visits by nurses			Home visits by doctors		
	Q15	Q16	Q1	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.01 (0.054)	-0.095 (0.061)	-0.096 (0.082)	-0.049 (0.06)	-0.286*** (0.07)	-0.052 (0.08)	-0.031 (0.055)	-0.494*** (0.087)	-0.07 (0.088)
Bandwidth	0.119	0.165	0.182	0.138	0.14	0.161	0.213	0.106	0.152
Observations	3664	4648	4953	4072	4130	4535	5338	3320	4357

Table A.11: Effect of an electoral defeat of the incumbent on prenatal care check-ups and medical consultations with infants and children

	Prenatal care check-ups			Consultations with infants			Consultations with children		
	Q15	Q16	Q1	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	-0.029 (0.055)	-0.147** (0.052)	-0.159* (0.073)	-0.085 (0.057)	-0.215*** (0.059)	0.039 (0.069)	-0.12* (0.058)	-0.265*** (0.068)	0.033 (0.064)
Bandwidth	0.167	0.22	0.158	0.148	0.168	0.16	0.145	0.139	0.197
Observations	4660	5424	4461	4284	4681	4494	4209	4094	5146

Table A.12: Effect of an electoral defeat of the incumbent on pregnant women and infants being up to date on vaccinations

	Pregnant women			Infants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	-0.006 (0.043)	-0.115* (0.047)	-0.123* (0.061)	-0.012 (0.046)	-0.087 (0.046)	-0.104 (0.06)
Bandwidth	0.132	0.167	0.152	0.122	0.183	0.178
Observations	3943	4675	4371	3725	4960	4879

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2. Dependent variables are in the log scale. Q15 corresponds to the 15th quarter of a mayor's mandate (i.e., July through September of its last year). Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.

## J Regression tables omitting controls

This Appendix shows results when omitting controls, i.e., the lagged dependent variable and election fixed effects.

### J.1 Effects of electoral turnover on bureaucratic turnover

Table A.13: Effect an electoral defeat of the incumbent on dismissals of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.112 (0.063)	0.487*** (0.117)	0.04 (0.07)	-0.008 (0.018)	-0.006 (0.026)	-0.006 (0.019)
Bandwidth	0.137	0.145	0.161	0.148	0.197	0.176
Observations	5405	5625	6063	5723	6857	6456

Table A.14: Effect an electoral defeat of the incumbent on hires of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.039 (0.094)	0.068 (0.073)	0.733*** (0.122)	-0.073 (0.08)	0.236*** (0.062)	-0.096 (0.104)
Bandwidth	0.144	0.139	0.16	0.167	0.172	0.158
Observations	5612	5461	6024	6223	6331	5991

Table A.15: Effect an electoral defeat of the incumbent on resignations of public employees

	Temporaries			Civil servants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.076 (0.064)	0.352*** (0.075)	0.09 (0.064)	0 (0.049)	0.11* (0.051)	0.012 (0.057)
Bandwidth	0.142	0.128	0.127	0.171	0.178	0.137
Observations	5537	5131	5111	6315	6478	5414

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2 except they omit controls. Dependent variables are in the log scale. Q15 corresponds to the 15th quarter of a mayor's mandate (i.e., July through September of its last year). Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.

## J.2 Effects of electoral turnover on public service delivery

Table A.16: Effect of an electoral defeat of the incumbent on home visits by healthcare professionals

	Home visits by CHAs			Home visits by nurses			Home visits by doctors		
	Q15	Q16	Q1	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.035 (0.137)	-0.094 (0.132)	-0.107 (0.129)	0.062 (0.125)	-0.248* (0.107)	-0.03 (0.115)	0.05 (0.118)	-0.388** (0.145)	-0.068 (0.119)
Bandwidth	0.146	0.176	0.196	0.146	0.223	0.203	0.177	0.132	0.193
Observations	4256	4837	5150	4256	5459	5238	4852	3928	5080

Table A.17: Effect of an electoral defeat of the incumbent on prenatal care check-ups and medical consultations with infants and children

	Prenatal care check-ups			Consultations with infants			Consultations with children		
	Q15	Q16	Q1	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.078 (0.124)	-0.068 (0.119)	-0.078 (0.129)	0.023 (0.103)	-0.179 (0.11)	0.05 (0.105)	0.002 (0.111)	-0.237* (0.119)	0.031 (0.107)
Bandwidth	0.2	0.218	0.183	0.194	0.173	0.194	0.179	0.162	0.199
Observations	5205	5402	4946	5103	4766	5095	4869	4555	5177

Table A.18: Effect of an electoral defeat of the incumbent on pregnant women and infants being up to date on vaccinations

	Pregnant women			Infants		
	Q15	Q16	Q1	Q15	Q16	Q1
Incumbent defeated	0.018 (0.097)	-0.126 (0.089)	-0.112 (0.099)	-0.024 (0.105)	-0.121 (0.1)	-0.142 (0.097)
Bandwidth	0.163	0.22	0.181	0.168	0.198	0.216
Observations	4607	5443	4929	4693	5185	5405

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2 except they omit controls. Dependent variables are in the log scale. Q15 corresponds to the 15th quarter of a mayor's mandate (i.e., July through September of its last year). Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.

## K Regression tables using alternative specifications of the dependent variable

The log transformation used in the main results of the paper has the advantage that coefficients can easily be interpreted as percentage changes. It has the disadvantage that it requires adding 1 (or another constant) to retain observations where the untransformed outcome equals 0. This is particularly problematic for the employment data, where zeroes are common. To address this limitation, this appendix shows results when using other specifications of the dependent variables.

### K.1 Effects of electoral turnover on bureaucratic turnover

First, results are robust when using the inverse hyperbolic sine transformation on the outcome and the lagged dependent variable. This log-like transformation,  $\ln(y + \sqrt{y^2 + 1})$ , can accommodate nonpositive values without the need for any ad hoc transformations. Results are similar in size and statistical significant to those with the log transformation.

Table A.19: Effect of an electoral defeat of the incumbent on bureaucratic turnover in the quarter after the election (Q16), using the inverse hyperbolic sine transformation

	Temporaries			Civil servants		
	Dismissals	Hires	Resignations	Dismissals	Hires	Resignations
Incumbent defeated	0.402*** (0.097)	0.062 (0.058)	0.352*** (0.066)	-0.005 (0.031)	0.321*** (0.063)	0.117* (0.046)
Bandwidth	0.166	0.157	0.126	0.181	0.167	0.214
Observations	6185	5926	5057	6531	6206	7133
Control mean (untransformed)	24.072	5.15	5.282	0.661	2.453	2.39

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Dependent variables are in the inverse hyperbolic sine scale. See notes under Table 1.

Second, results for employment outcomes, where zeroes are more common, are also robust to a binary specification where the dependent variables are dummies for whether the outcome (e.g., dismissals of temporaries in Q16) is larger than zero, such that the LATE estimates can be interpreted as increases in the probability that bureaucratic turnover (e.g., dismissals of temporaries) will occur. This specification severely reduces the variance of the outcome and hence the statistical power of the tests. Results are nonetheless still large and statistically significant.

Table A.20: Effect of an electoral defeat of the incumbent on bureaucratic turnover in the quarter after the election (Q16), using binary dependent variables

	Temporaries			Civil servants		
	Dismissals	Hires	Resignations	Dismissals	Hires	Resignations
Incumbent defeated	0.075** (0.029)	0.018 (0.03)	0.095*** (0.028)	-0.01 (0.016)	0.068** (0.024)	0.037 (0.027)
Bandwidth	0.148	0.131	0.131	0.156	0.222	0.143
Observations	5729	5212	5217	5915	7251	5568
Control mean (untransformed)	21.632	5.285	5.372	0.622	2.625	2.281

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Dependent variables are an indicator for whether the count is larger than zero. See notes under Table 1.

Finally, results are also robust to simply dropping observations where the outcome equals zero, taking the log of the dependent variable, and using the IHS transformation for the lagged dependent variable. These specifications are problematic in that some observations are being excluded from analyses. The share of observations dropped is very large in some cases, for example when examining effects on the dismissals of civil servants. Still, results for the lame-duck period are comparable in size and statistical significance to those with the  $\log(y + 1)$  specification.

Table A.21: Effect of an electoral defeat of the incumbent on bureaucratic turnover in the quarter after the election (Q16), omitting observations where the untransformed dependent variable equals 0

	Temporaries			Civil servants		
	Dismissals	Hires	Resignations	Dismissals	Hires	Resignations
Incumbent defeated	0.554*** (0.129)	0.06 (0.087)	0.507*** (0.121)	0.07 (0.205)	0.464*** (0.112)	0.249* (0.101)
Bandwidth	0.182	0.155	0.138	0.198	0.156	0.164
Observations	2930	2879	2094	530	2207	2159
Control mean (untransformed)	38.037	8.307	10.406	0.716	4.978	6.871

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Dependent variables are logged, and lagged dependent variables are in the inverse hyperbolic sine scale. See notes under Table 1.

## K.2 Effects of electoral turnover on public service delivery

For healthcare data results are also robust to using the inverse hyperbolic sine transformation, and to dropping observations where the outcome equals zero. Again, results are comparable to those

with the  $\log(y+1)$  specification in the main body of the paper. Since zeroes are a lot less common in this data and means are larger, results with a binary specification are not statistically significant.

Table A.22: Effect of an electoral defeat of the incumbent on healthcare service delivery in the quarter after the election (Q16), using the inverse hyperbolic sine transformation

	Home visits			Prenatal	Medical consultations		Vaccines up to date	
	CHAs	Nurses	Doctors	Check-ups	Infants	Children	Pregnancies	Infants
Incumbent defeated	-0.1 (0.064)	-0.299*** (0.075)	-0.541*** (0.097)	-0.155** (0.057)	-0.231*** (0.065)	-0.277*** (0.074)	-0.125* (0.05)	-0.093 (0.049)
Bandwidth	0.165	0.138	0.104	0.22	0.165	0.137	0.165	0.179
Observations	4640	4080	3263	5426	4619	4049	4637	4902
Control mean (untransformed)	13510.914	381.823	182.909	369.039	143.26	292.005	284.582	637.394

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Dependent variables are in the inverse hyperbolic sine scale. See notes under Table 1.

Table A.23: Effect of an electoral defeat of the incumbent on healthcare service delivery in the quarter after the election (Q16), omitting observations where the untransformed dependent variable equals zero

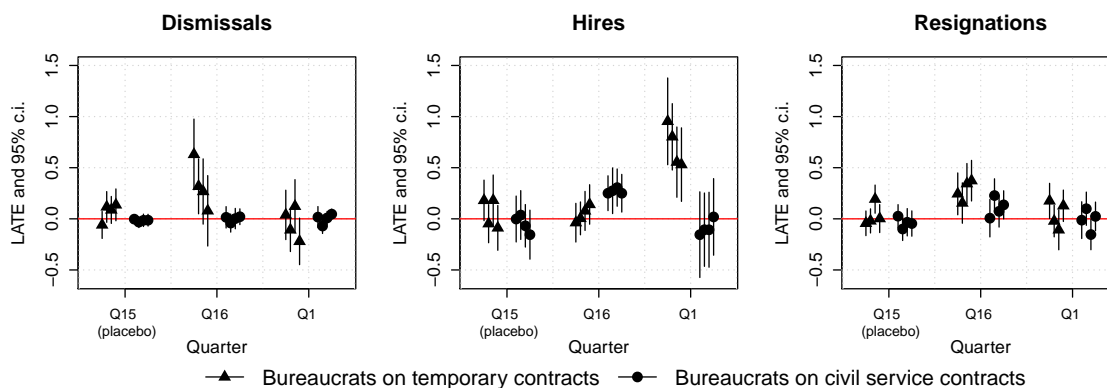
	Home visits			Prenatal	Medical consultations		Vaccines up to date	
	CHAs	Nurses	Doctors	Check-ups	Infants	Children	Pregnancies	Infants
Incumbent defeated	-0.068 (0.044)	-0.25*** (0.058)	-0.374*** (0.072)	-0.123* (0.051)	-0.177*** (0.054)	-0.23*** (0.058)	-0.102* (0.044)	-0.083* (0.04)
Bandwidth	0.174	0.166	0.126	0.185	0.192	0.14	0.16	0.178
Observations	4629	4359	3450	4543	4695	3826	4367	4700
Control mean (untransformed)	13874.222	387.555	201.389	378.298	144.409	299.803	290.905	654.599

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . Dependent variables are logged, and lagged dependent variables are in the inverse hyperbolic sine scale. See notes under Table 1.

## L Effects separated by election cycle

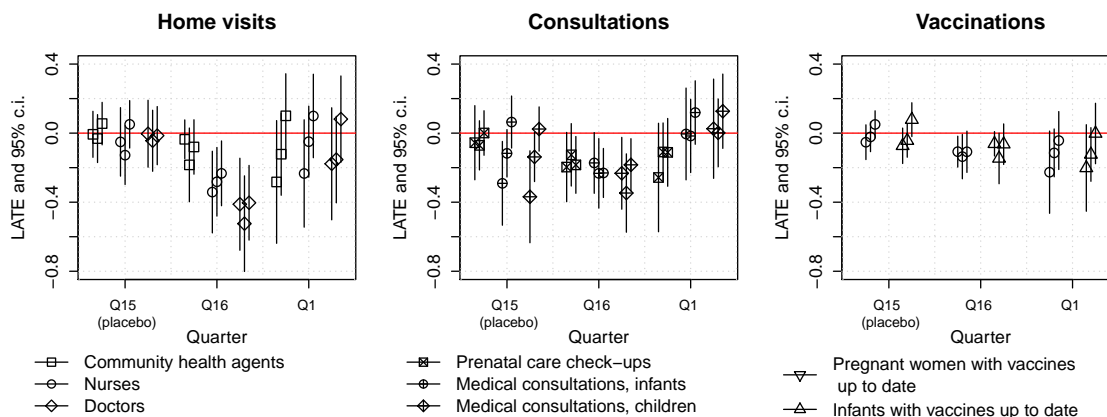
The analyses presented in the main body of the article pool data of between 3 and 4 election cycles. This Appendix presents the results disaggregating by election cycle. As can be expected with smaller sample sizes, the uncertainty around these election-specific estimates is wider than in the pooled results. While there are differences in the estimates across election cycles, these differences are not statistically significant.

Figure A.7: Effect of an electoral defeat of the incumbent on bureaucratic turnover, by election cycle



For each dependent variable, estimates are ordered from earlier to later elections (i.e., 2004, 2008, 2012, 2016), from left to right. See notes under Figure A.7.

Figure A.8: Effect of an electoral defeat of the incumbent on healthcare service delivery, by election cycle



For each dependent variable, estimates are ordered from earlier to later elections (i.e., 2004, 2008, 2012), from left to right. See notes under Figure A.7.

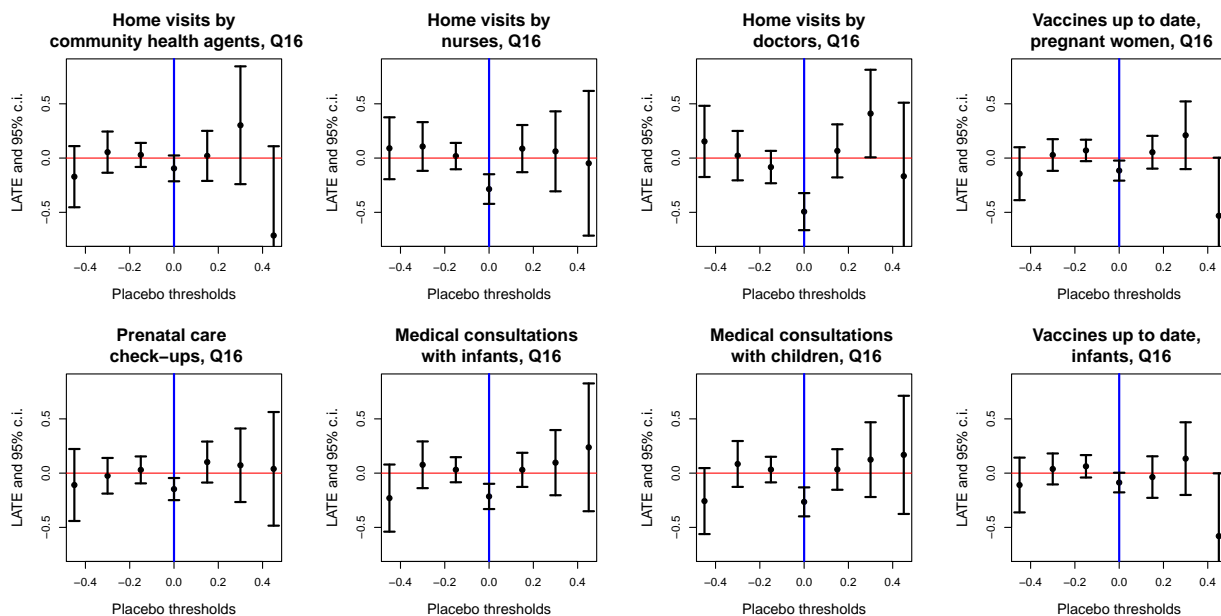
## M Placebo tests with fake thresholds

As an additional robustness test, I run placebo tests where I change the regression discontinuity threshold to different points in the distribution of the forcing variable away from zero. Only 2 of these placebo tests returns statistically significant results, which is within what we would expect with  $\alpha = 0.05$ .

Figure A.9: Placebo tests varying the RD threshold for the main results in Figure 2



Figure A.10: Placebo tests varying the RD threshold for the main results in Figure 5



Vertical blue lines indicate the actual RD threshold



## N Effects on the turnover of managers and non-managers

This Appendix examines effects on the turnover of employees in management positions, as identified through occupational identifiers in RAIS, and all other employees. The percentage of municipal contracts in with an occupation code corresponding to a management position ranges from 7.2% in 2004 to 8.6% in 2017.

Figure A.11: Effect of an electoral defeat of the incumbent on bureaucratic turnover among workers in management positions

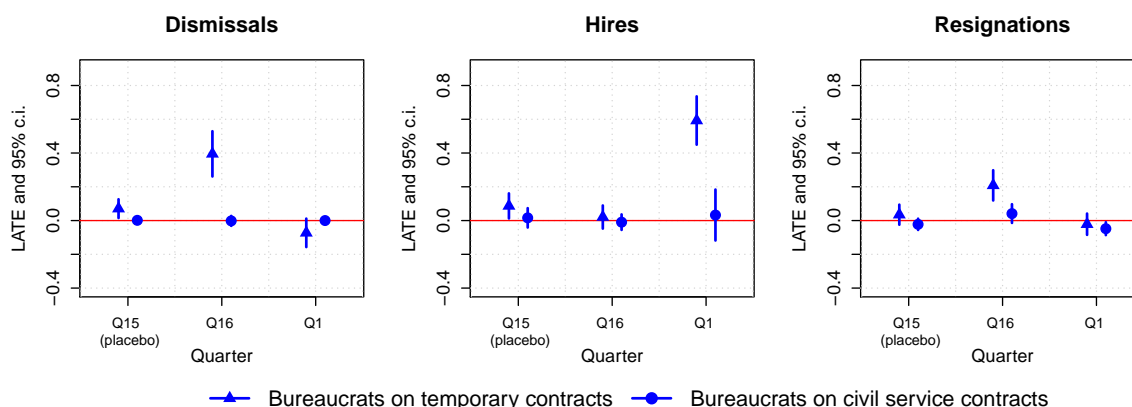
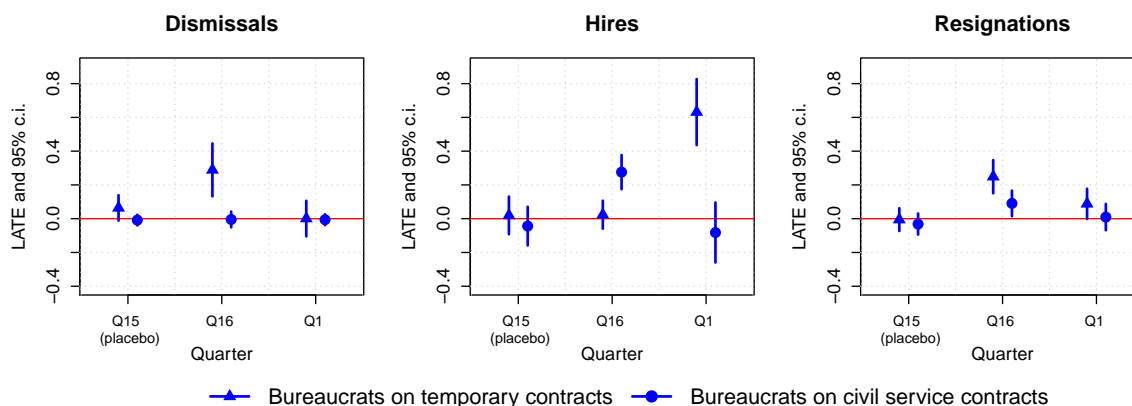


Figure A.12: Effect of an electoral defeat of the incumbent on bureaucratic turnover among workers in non-management positions

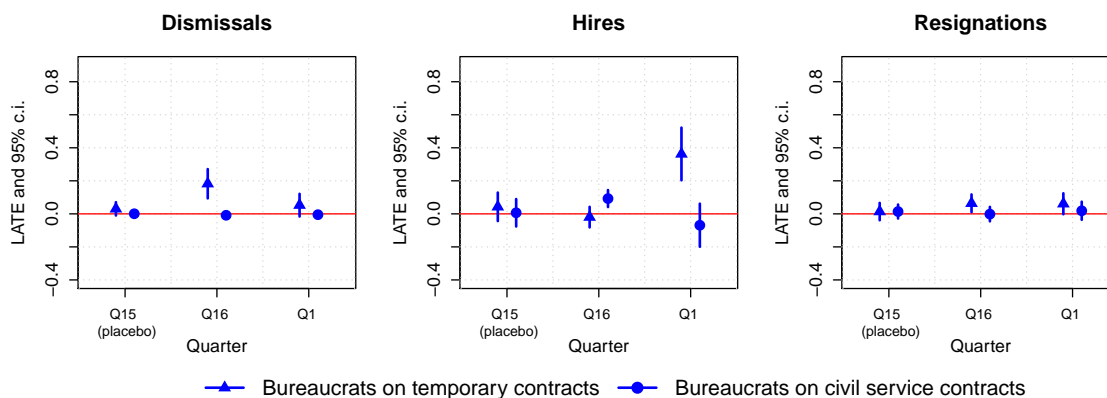


Each point and its robust bias-corrected confidence interval comes from a separate local linear regression discontinuity model, as per Equation 2. The dependent variable is in the log scale. Q15 corresponds to the 15th quarter of a mayor's mandate (i.e., July to September of its last year). Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October to December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January to March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. Results for Q15 are placebo tests.

## O Effects on the turnover of specialized healthcare workers

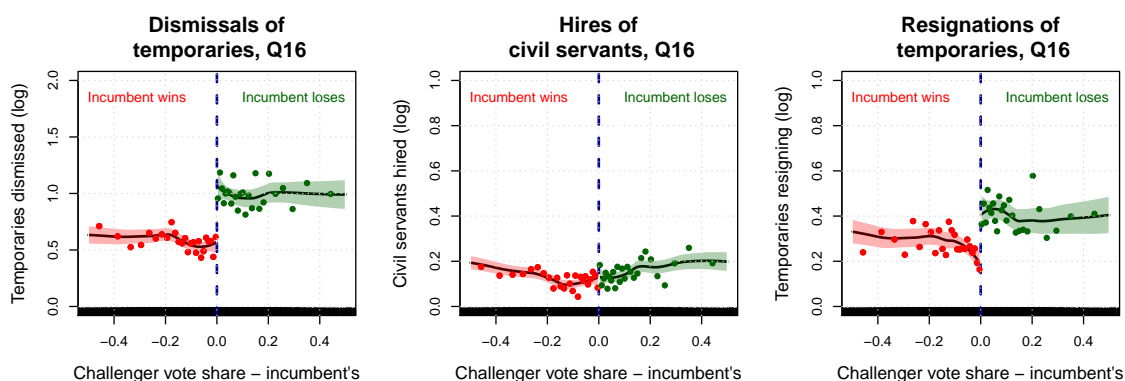
This Appendix examines effects on the turnover of specialized healthcare workers, as identified through the occupational identifiers in RAIS. These include occupations like doctors, nurses, or community health agents, but do not include many workers in the healthcare sector that have more generic occupation codes, such as receptionists, cleaners, or drivers. The percentage of municipal contracts with an occupation code corresponding to specialized healthcare jobs ranges from 12% in 2004 to 16% in 2017.

Figure A.13: Effect of an electoral defeat of the incumbent on bureaucratic turnover among specialized healthcare workers



See notes under Figure A.12.

Figure A.14: Regression discontinuity plots for the main results in Figure A.13

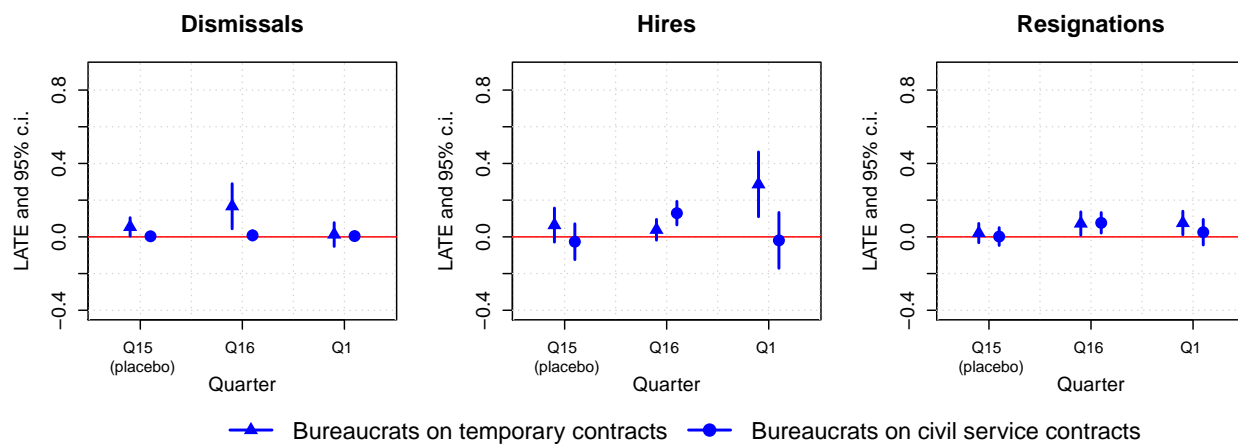


Colored dots are local averages for equally-sized bins. Lines are loess regression lines estimated at both sides of the threshold with no controls. Shaded regions denote 95% confidence intervals.

## P Effects on the turnover of specialized education workers

This Appendix examines effects on the turnover of specialized education workers, as identified through the occupational identifiers in RAIS. These include teachers and other education occupations like school inspectors, but do not include many workers in the education sector that have more generic occupation codes, such as receptionists, cleaners, or drivers. The percentage of municipal contracts with an occupation code corresponding to specialized education jobs ranges from 27% in 2008 to 30% in 2017.

Figure A.15: Effect of an electoral defeat of the incumbent on bureaucratic turnover among specialized education workers



See notes under Figure A.12.

## Q Effects on the turnover of low- versus high-pay bureaucrats

This Appendix shows the results when considering only bureaucrats whose mean salary is below or above the median of municipal employee salaries for a given year. The point estimate for the dismissal of temporaries in the last quarter of the mayor's mandate is almost twice as large for high-pay than for low-pay employees, although the difference is not statistically significant.

Figure A.16: Effect of an electoral defeat of the incumbent on bureaucratic turnover among low-pay bureaucrats

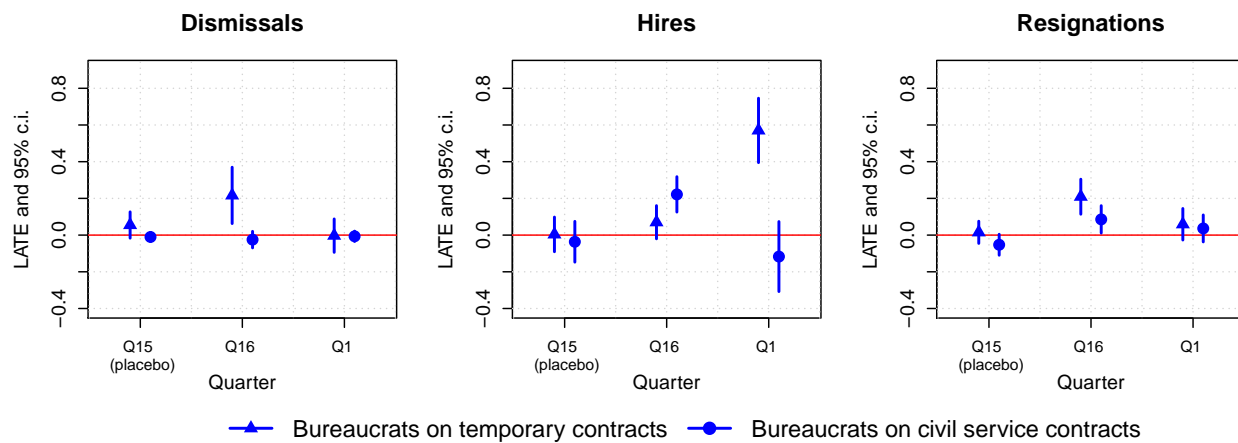
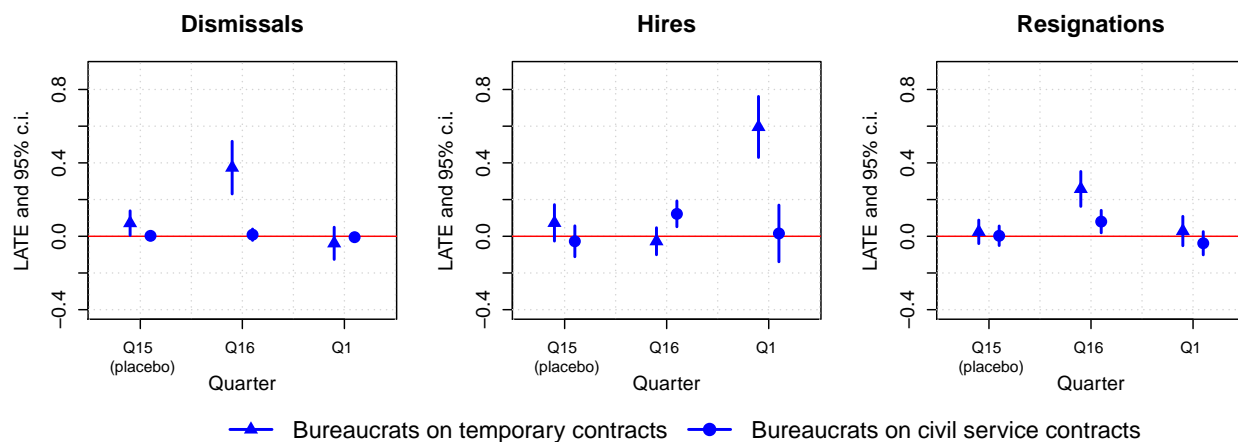


Figure A.17: Effect of an electoral defeat of the incumbent on bureaucratic turnover among high-pay bureaucrats

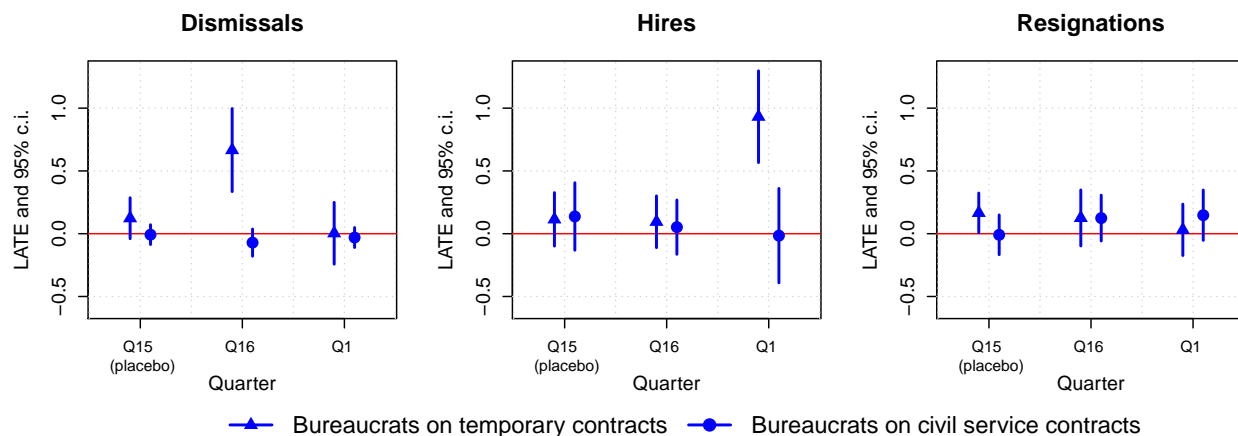


See notes under Figure A.12.

## R Effects on bureaucratic turnover when the incumbent mayor belongs to a large programmatic party

This Appendix examines effects on the turnover in cases where the incumbent was elected under the label of one of the two large programmatic parties in Brazil during the 2004-2016 period, PT and PSDB. The results show that in these cases electoral turnover does not lead to an increase in the hiring of civil service employees under the lame-duck government. All other results are similar to those in Figure 2, except for the larger confidence intervals resulting from a smaller sample.<sup>62</sup> This suggests that increases in civil service hiring after an electoral defeat are unlikely to be motivated by policy concerns. Still, these heterogeneity analyses need to be taken with caution – the partisanship of the mayor could be correlated with both observable and unobservable characteristics of the municipality and the incumbent which could explain this variation.

Figure A.18: Effect of an electoral defeat of the incumbent on bureaucratic turnover in municipalities where the incumbent belongs to a large programmatic party



See notes under Figure A.12.

<sup>62</sup>23% of the cases where the mayor runs for reelection have a mayor who was elected in a PT or a PSDB ticket.

## S Civil service hires and political support

A potential concern with the increase in civil service hiring during the lame-duck period is that election losers are fraudulently targeting those hires to their own political supporters. Alternatively, they might be seeking the political support of those civil service hires in the future, creating a sense that they owe them their job. The evidence does not suggest this is the case. If we compare the civil servants hired during the last quarter of the election year, under lame-duck government and under a re-elected mayor, we see no significant difference in the share who are still in their post four years later, the share who run for city councilor in the previous election, or the share who run for city councilor in the following election.<sup>63</sup> Regression discontinuity estimates are statistically insignificant and have signs opposite to what we would observe if lame-ducks targeted or mobilized these hires. Running for city councilor is a good proxy for political support in this context, where elections are held on an open-list, proportional representation system ([Colonnelli et al., 2020](#)).

Table A.24: Effect of an electoral defeat of the incumbent on the behavior of civil servants hired during the last quarter of the election year

	Share of Q16 civil service hires who		
	Are in post 4 years later	Ran in the election	Run in next election
Incumbent defeated	0.033 (0.034)	-0.026 (0.02)	-0.021 (0.019)
Bandwidth	0.159	0.178	0.193
Observations	2236	2424	1840
Control mean (untransformed)	0.478	0.08	0.062

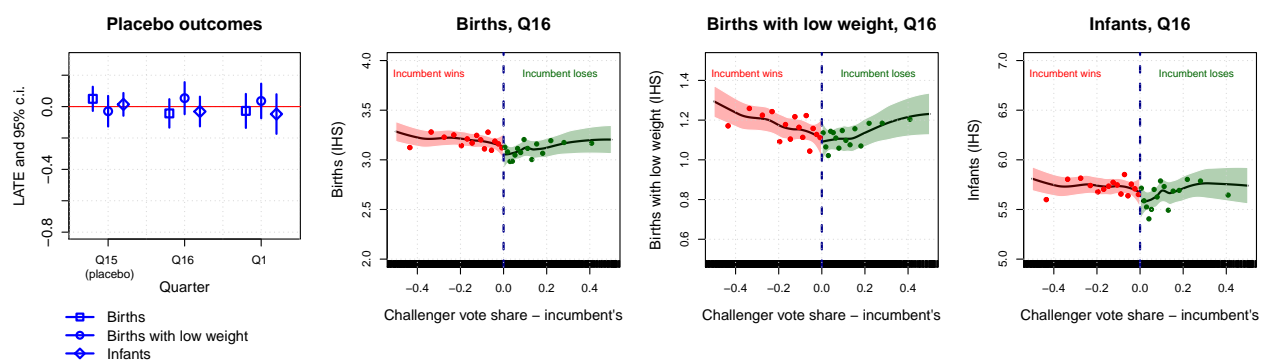
\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . The bandwidth is determined by the algorithm of [Calonico et al. \(2020\)](#). Robust standard errors in parentheses. All regressions follow the specification in Equation 2.

<sup>63</sup>Results for the following election exclude data for 2016, since the unique identifiers of candidates for the 2020 elections have not yet been released.

## T Effects on placebo outcomes measured in DATASUS

Effects identified on the delivery of healthcare services might in theory be driven not by a decline in services but a decline in bureaucrats' diligence registering such services. To assuage concerns about this, I replicate the main analyses with three placebo outcomes for which we would not expect the electoral defeat of the incumbent to have an impact in the short term: the number of births, the number of births with low weight at birth (below 2,500 grams) and the number of infants. As can be seen below, estimates for these outcomes are small and statistically insignificant.

Figure A.19: Effect of an electoral defeat of the incumbent on births, low-weight births, and infants



See notes under Figure 2.

Table A.25: Effect of an electoral defeat of the incumbent on placebo outcomes (Q16)

	Births	Births with low weight	Infants
Incumbent defeated	-0.043 (0.046)	0.054 (0.052)	-0.031 (0.048)
Bandwidth	0.168	0.165	0.16
Observations	4690	4638	4525
Control mean (untransformed)	50.135	4.981	657.947

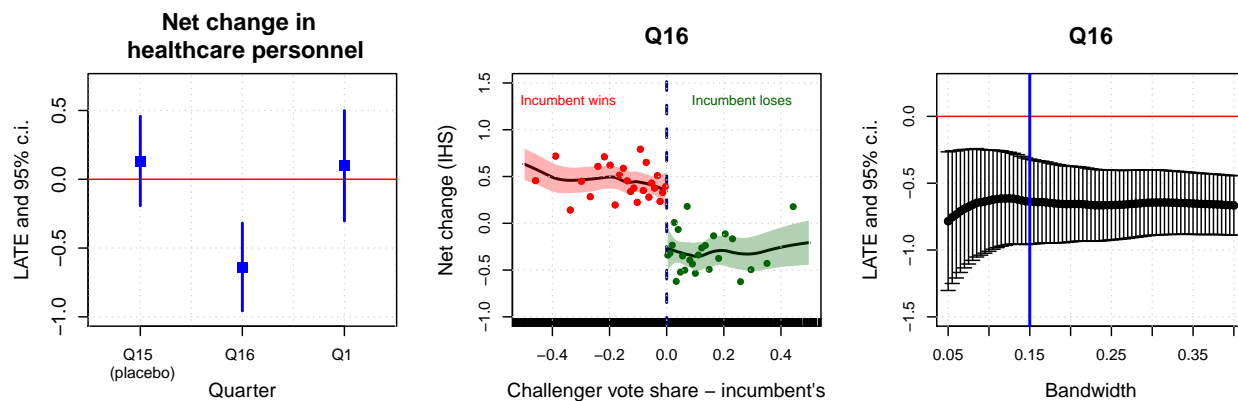
See notes under Table 2.

## U Effects on the net turnover of healthcare professionals, as measured in CNES

To further examine the role that bureaucratic turnover plays in disruptions to the delivery of healthcare services, I use data from the Ministry of Health's National Registry of Health Establishments (CNES, *Cadastro Nacional de Estabelecimentos de Saúde*), which is collected through the same system as SIAB. CNES reports the total number of healthcare personnel working for each municipality in each month since 2007.<sup>64</sup> I use these data on stocks to measure the net change (from one quarter to the next) in the total number of healthcare professionals working for a municipality's healthcare system. Unlike RAIS, CNES does not allow us to identify hires, dismissals, and resignations, only net changes in the stock of healthcare personnel. Since this variable can take positive or negative values, I use the inverse hyperbolic sine transformation.

These effects on net changes provide additional evidence that an electoral defeat of the incumbent causes bureaucratic turnover, thus complementing the results with RAIS dataset.

Figure A.20: Effect of an electoral defeat of the incumbent on net changes in the stock of healthcare personnel



See notes under Figure 2.

<sup>64</sup>Therefore, the election cycles of 2008, 2012 and 2016 are included in these analyses.



## V Characterization of municipalities by share of healthcare professionals in the civil service

The table below characterizes the set of municipality-election observations by the share of healthcare professionals who, in the quarter before the election, are in the civil service. Figure 8 shows that municipalities where all specialized healthcare workers are (not) in the civil service do (not) experience significant declines in the delivery of healthcare services. Examining those two extreme types of municipalities is useful because it allows us to rule out the hypothesis that declines are driven purely by bureaucratic turnover. Yet, these municipalities tend to be smaller. Moreover, municipalities where all healthcare professionals are (not) in the civil service are poorer (wealthier) and have lower (higher) mortality rates.

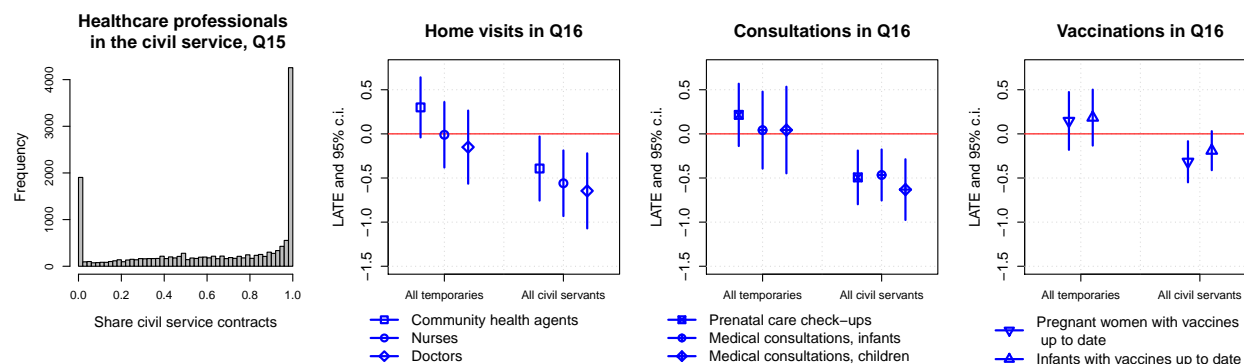
Table A.26: Characterization of municipalities by their share of healthcare professionals in the civil service

	All civil servants	All temporaries	Share civil servants
Population (logged)	−0.039*** (0.003)	−0.015*** (0.002)	−0.002** (0.002)
GDP per capita (logged)	−0.058*** (0.005)	0.041*** (0.004)	−0.033** (0.005)
Deaths per thousand	−0.007*** (0.002)	0.006*** (0.001)	−0.003** (0.002)
Region fixed effects			
North	−0.109*** (0.012)	0.024** (0.009)	−0.109* (0.010)
South	−0.032** (0.011)	−0.058*** (0.008)	−0.024** (0.009)
Southeast	−0.100*** (0.009)	0.051*** (0.007)	−0.140** (0.007)
Center-west	0.011 (0.013)	−0.101*** (0.010)	0.061* (0.011)
Constant	1.302*** (0.045)	−0.100** (0.034)	1.015* (0.038)
Election cycle fixed effects	Yes	Yes	Yes
Observations	20699	20699	20699
R-squared	0.065	0.038	0.050

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$ . See Appendix E for variable definitions and sources. HC2 standard errors in brackets.

## W Heterogeneity of effects by whether all or none of the healthcare professionals are on civil service contracts

Figure A.21: Effect of an electoral defeat of the incumbent on bureaucratic turnover and healthcare service delivery, by whether the municipality's healthcare personnel before the election are all in temporary contracts or civil service contracts

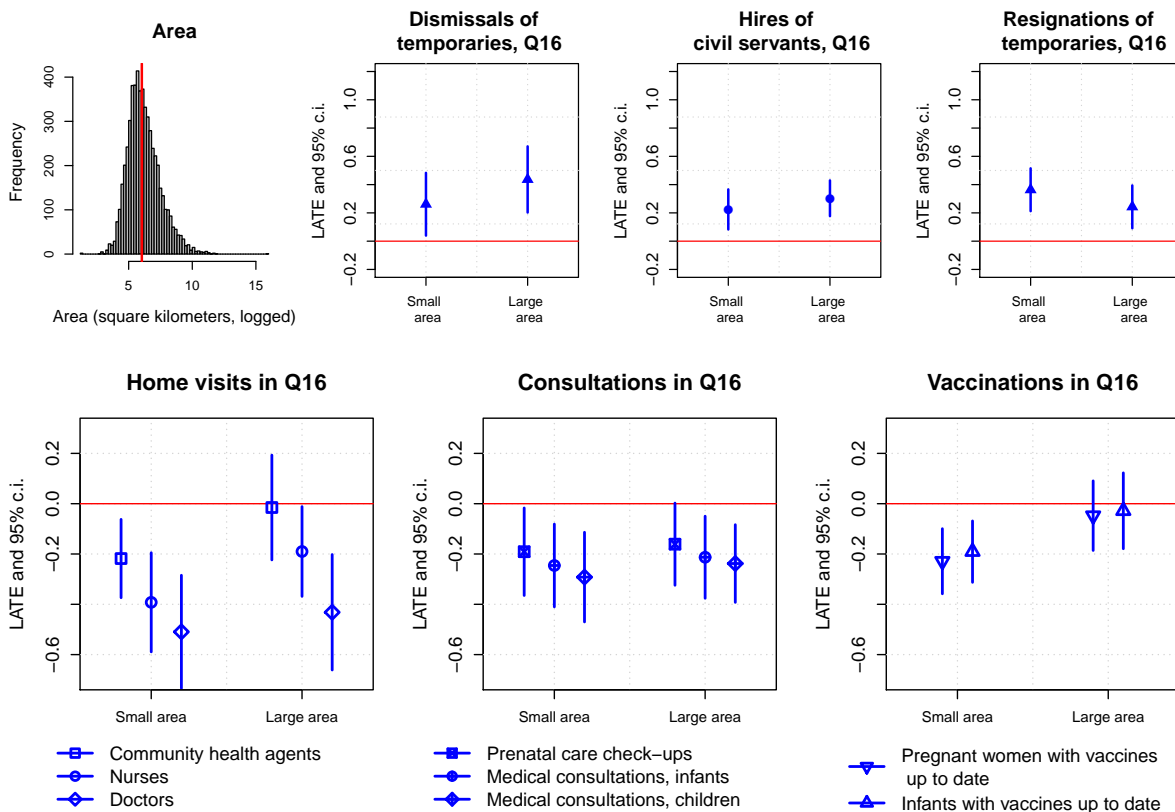


See notes under Figure 2.

## X Heterogeneity of effects by municipality area

This Appendix explores how results in Figure 5 differ by whether the municipality's surface is small or large, and in particular by whether its area is below or above the median. Results below show that smaller and larger municipalities see similar declines in public service delivery, with the exception of home visits by community health agents and immunizations, which see a decline in smaller municipalities but not in larger ones. These results suggest that disruptions to transportation are not the main mechanism driving the connection between electoral turnover and the declines in public service delivery.

Figure A.22: Effect of an electoral defeat of the incumbent on bureaucratic turnover and healthcare service delivery, by whether the municipality's geographic area is below or above the median

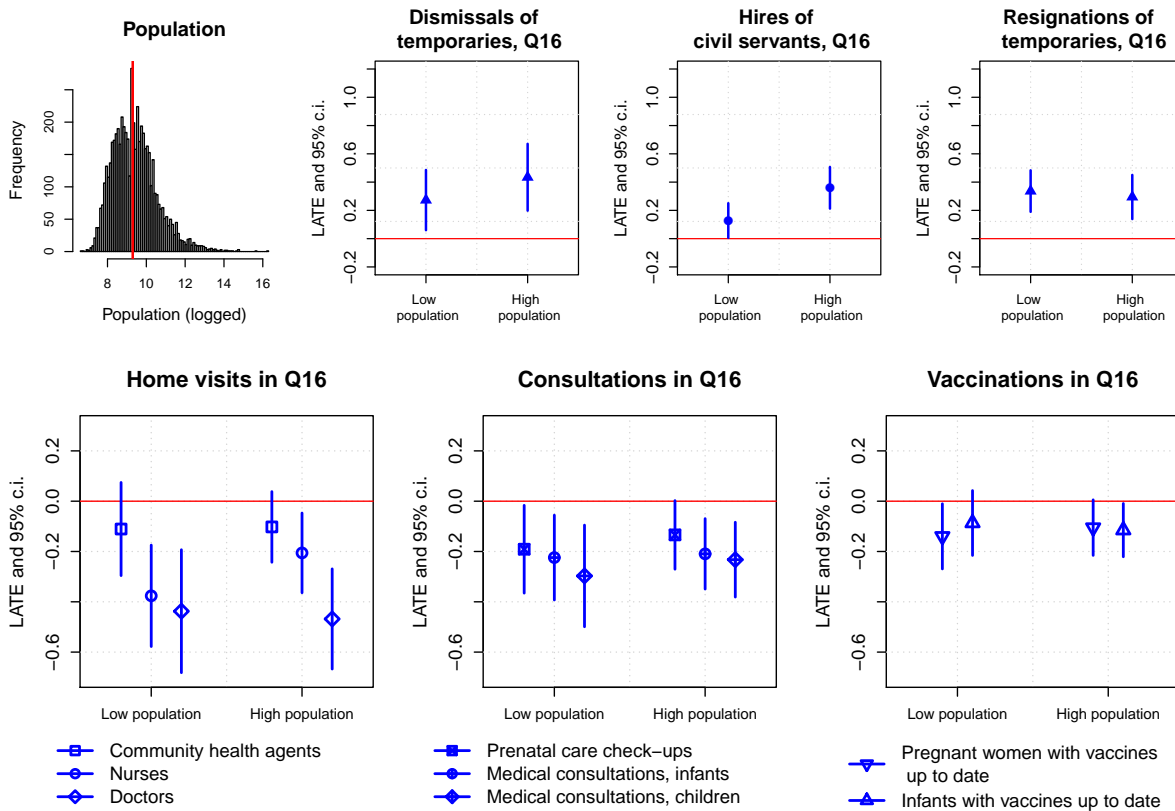


Each point and its robust bias-corrected confidence interval comes from a separate local linear regression discontinuity model, as per Equation 2. The dependent variable is in the log scale. Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. The red line on the histogram marks the median.

## Y Heterogeneity of effects by population

This Appendix explores how results in Figures 2 and 5 differ by municipality population, and in particular by whether the local population is above or below the median for a given year. In contrast to GDP per capita (Figure 9), there is no discernible heterogeneity by population: observations below and above the median municipality population for a given year experience remarkably similar effects.

Figure A.23: Effect of an electoral defeat of the incumbent on bureaucratic turnover and healthcare service delivery, by whether the municipality's population is below or above the median for that year



Each point and its robust bias-corrected confidence interval comes from a separate local linear regression discontinuity model, as per Equation 2. The dependent variable is in the log scale. Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. The red line on the histogram marks the median.

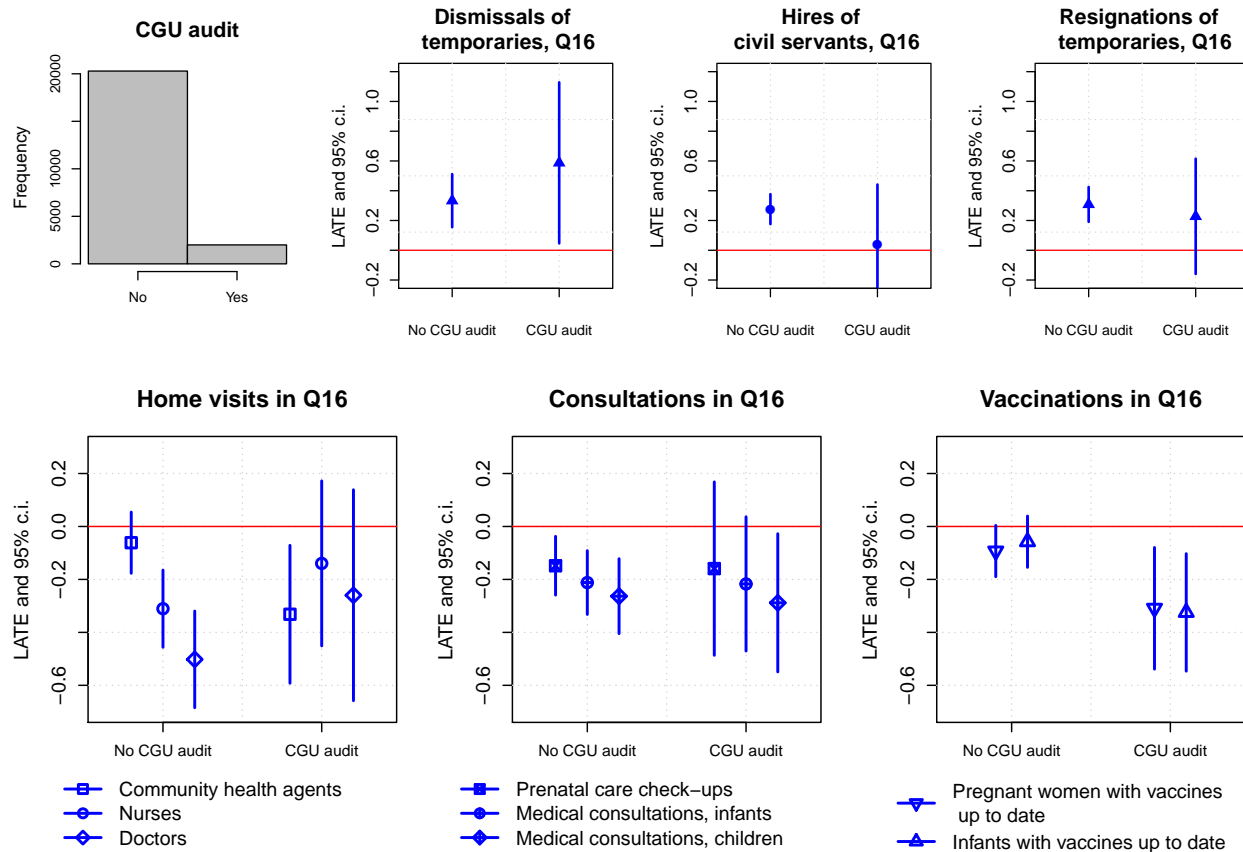
## Z Heterogeneity of effects by randomized anti-corruption audits

This Appendix explores how results in Figures 2 and 5 differ by whether the municipality experiences a random federal audit during the first three years of the incumbent's mandate. Brazil's federal comptroller's office (CGU, *Controladoria-Geral da União*) has long targeted its audits through randomized lotteries. The CGU releases the results of the audits to the media and to other accountability actors like the federal prosecutor's office, the audit court, and the police, as well as to the municipal legislative chamber.<sup>65</sup> These randomized audits have been found to decrease corruption and increase the chances that mayors will be prosecuted for corruption charges (Avis et al., 2018).

As shown in Figure A.24, there is no significant heterogeneity by random audits (likely due to the audits being relatively rare). If anything, randomized audits appear to increase the effect of an incumbent defeat on the dismissal of temporaries and to reduce its effect on the hiring of civil servants in the last quarter of the mayor's mandate. This is consistent with those effects being motivated by a desire to "clean the accounts" before leaving office, on the one hand, and to use the civil service to constrain the opponent's hiring discretion, on the other. These differences are however not statistically significant. The randomized audits do not seem to alter the effect of an electoral defeat of the incumbent on the delivery of healthcare services, except in the case of vaccines where CGU audits appear to intensify the effect of electoral turnover.

<sup>65</sup>I focus on audits assigned during the first three years of the mayor's mandate because there is a substantial lag between the date of the lottery, the dates of auditors' field visit to the municipality, and the date when the audit report is published. Results are similar however when including lotteries done in the year of the election. Details of these randomized audits are described by Avis et al. (2018).

Figure A.24: Effect of an electoral defeat of the incumbent on bureaucratic turnover and healthcare service delivery, by whether the municipality is audited by the CGU during the incumbent's mandate



Each point and its robust bias-corrected confidence interval comes from a separate local linear regression discontinuity model, as per Equation 2. The dependent variable is in the log scale. Q16 corresponds to the 16th and last quarter of a mayor's mandate (i.e., October through December). Q1 corresponds to the first quarter of the election winner's mandate (i.e., January through March). Elections take place on the first Sunday of October, and winners are sworn in on January 1st. The red line on the histogram marks the median.