ABSTRACT

The incidence of patronage can vary widely across levels of government within a country. We present evidence of this in the context of Brazil, which has been the focus of most recent research on patronage. In particular, we find that bureaucratic turnover follows political cycles among municipal employees, but not among state or federal level employees. This is not driven by differences across levels of government in the composition of the workforce or in the labor regimes used. Thus, the most likely explanation is differences in institutional quality. Supporting the relevance of this channel, we find that post-electoral turnover is higher in municipalities with lower levels of institutional quality.
1 INTRODUCTION

Limiting the role of politicians in the management of public employment is a central tenet of modern civil service regimes. This usually entails making professional merit the main criterion to hire (and fire) bureaucrats, rather than party loyalty or clientelistic quid pro quo. It also means that positions in the bureaucracy should be created and filled according to the technical needs of agencies, and not to the arrival or departure of elected officials. Unsurprisingly, politicians typically resist these ideas and the constraints they entail. Thus, there is usually a wedge between the formal provisions of civil service regimes and the actual workings of public employment.

The gap between rules and practices is related to the level of institutional quality, which is not constant within a country. One typical source of heterogeneity in this respect is the level of government. National governments often have more resources and face greater scrutiny than local ones. Thus, institutional reforms tend to start at the national level and slowly penetrate the lower tiers of the public administration. This is illustrated by the history of civil service reform in the US, which starts at the federal level with the Pendleton Act of 1883 and slowly reaches the state and local governments through the next decades.

Still, we do not have much direct evidence on how current practices around public employment differ across levels of government in a given country. Despite the emergence of a burgeoning literature on the extent and consequences of patronage in developing countries, the within-country variation of these issues has remained unexplored. This remains a pending task and an important step to understand what explains the heterogeneous degrees of success of institutional reforms.

In this paper, we present findings for Brazil that help to close this gap in the literature. Since much of the recent work on patronage has studied the Brazilian context—specifically, municipalities—our findings naturally converse with the existing evidence. For our main results, we use data from the national household survey, the Pesquisa Nacional por Amostra de Domicilios Continua (PNAD-C), and compute the share of new employees in the public sector at each level of government, with quarterly frequency. Our main finding is that the marked increase in the share of new employees after elections—which has been documented—occurs only at the municipal level. At higher levels of government (state and federal) there is no significant increase in bureaucratic turnover after elections. The results are similar if we use instead administrative data from the social security records, Relação Anual de Informações Sociais (RAIS).

In line with previous results, we find that the increase in the share of new personnel is entirely driven by temporary workers, while civil servants do not experience any spike in turnover after elections. We also explore heterogeneity across occupations and find that the turnover increase is most pronounced at the top (managers) and bottom (clerical and elementary workers) of the hierarchy. In managerial positions, the fraction of new employees goes up by 30 percentage points.

The effect is present in all sectors of activity. Previous work has focused in the educational and health sectors, establishing a link between turnover and a decrease in the quality of service delivery (Akhtari et al. 2022; Fagernäs and Pelkonen 2020; Hanushek et al. 2016; Ronfeldt et al. 2013; Toral 2023). However, we find that post-electoral turnover is even higher for public administration workers, where measuring the effects on performance is harder.

The differences in turnover between levels of government is not explained by differences in the composition of public employment, which in fact does not change much between municipal and higher tiers of government (e.g., the ratio of temporary workers to civil servants is similar across all levels). Instead, we find that the post-electoral turnover of a given type of contract (temporary) differs across levels of government. Since the regulations on hiring and firing in the public sector—and the mechanisms to avoid them—are largely common for all levels of government, our finding suggests that the difference in turnover patterns are tied to differences in the institutional quality

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1 Overall, our results are consistent with the occurrence of small changes in bureaucratic turnover around the electoral cycle in state and federal governments, which given their limited magnitude we cannot statistically differentiate from zero in most cases.
of local versus state and national governments. Consistent with this explanation, we show that post-electoral turnover is higher in municipalities with lower levels of institutional quality, as measured by an index developed by the Brazilian Ministry of Planning and Budget.

As mentioned before, this paper adds to the recent empirical literature that shows how public employment and politics can be intertwined through patronage (Brassiolo et al. 2020; Cahan 2019; Colonnelli et al. 2020). Unlike this one, papers in this literature typically use close elections to compare the outcomes of people with political ties to election winners with those tied to losers in a given type of jurisdiction. Using that strategy, Colonnelli et al. (2020) found that Brazilian majors often reward their supporters with municipal jobs. We complement that result by showing that there is a large bureaucratic turnover right after elections in municipal governments, but not in state or federal governments. The relevance of this result is underlined by another consistent finding of the literature: that bureaucratic turnover caused by political turnover is detrimental to service delivery (Akhtari et al. 2022; Toral 2023).

This paper is also informative about the process of civil service reform. Our results are consistent with a process of top-down reform in which the higher levels of government are ahead of lower ones in terms of separating public employment from political cycles. This matches the historical experience of the US, which Folke et al. (2011) briefly describe. There, the 1883 Pendleton Act—targeted at positions in the federal government—expanded slowly and it took about 40 years for it to cover 80 percent of employees. Moreover, the same authors point out that reform at the state and local level was more cumbersome and lagged the federal process by many decades. Moreira and Pérez (2021) provide additional evidence that the adoption of reforms in this area was cumbersome.

Finally, our results add to the literature on decentralization. A first wave of mostly theoretical papers addressed the issue of the design of decentralized systems of government, stressing the role of factors like access to information about local preferences, agency problems between levels of government, and inter-jurisdictional externalities and competition (Besley and Case 1995; Besley and Coate 2003; Cai and Treisman 2004; Lockwood 2002). Recent research has looked at those issues empirically and has also raised some shortcomings in the implementation of political and administrative decentralization (Galiani et al. 2008; Labonne and Chase 2009; Lipscomb and Mobarak 2016; Zhuravskaya 2000). Still, one aspect that has been largely ignored is how the quality of the bureaucracy affects the outcomes of decentralization, even though some authors acknowledge that “officials in local governments often lack requisite administrative skills and training” (Mookherjee 2015). Our contribution highlights one specific channel for which decentralization might affect the quality of public service delivery: excessive turnover in local governments.

In the next section of this paper we discuss some relevant aspects of the federal system of government in Brazil and the labor regimes used in the public sector. Then, in Sections 3 and 4 we introduce the data and explain our empirical strategy. Section 5 presents our results, and we discuss our conclusions in Section 6.

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2 Colonelli et al. (2020) also find that the rewards to political connections to mayors do not extend to landing jobs in state and federal governments.

3 Regarding the magnitude of turnover in municipal governments, our results speak to the existing literature. While we observe 5 p.p. increase in the share of new employees among municipal workers the quarter after elections; Akhtari et al. (2022) found that party turnover increases the share of new personnel by 4 p.p. (when it is estimated quarterly). Although a direct comparison of size effects cannot be made, our results suggest that bureaucratic turnover after elections goes beyond what political change by itself can account for.

4 In particular, Moreira and Pérez (2021) study the immediate impacts of the Pendleton Act on US customs, and their results highlight issues of implementation early on: while the reform reduced turnover, it also induced hiring in exempted positions and distorted the personnel structure.

5 Mookherjee (2015) presents a good summary of this literature.
2 CONTEXT

Brazil is a large and very decentralized country, divided into 26 states (plus a federal district), which are further subdivided into 5,570 municipalities. At all levels of government, executive and legislative authorities are elected every four years. National and state authorities are elected concurrently, most recently in 2018; while municipal elections are displaced by two years. In all cases, elections take place during the month of October and the elected authorities assume office in the following January.

All levels of government participate in the delivery of public services. In many areas, responsibilities are not clearly separated, and there is a lot of sharing and overlapping of tasks (Kresch 2020). Municipalities do have exclusive competence in urban planning, basic education, primary health care and local transport. Tax collection is mostly done by states (including the VAT) and the national government. Municipalities also collect some taxes but are mostly funded by intergovernmental transfers (Ter-Minassian 2012).

Regarding the distribution of personnel, 15 percent of public employees work for the national government, 32 percent work at the state level and 53 percent at municipal level. Wages in the public sector are higher than in the private sector at all levels of government, but there is some heterogeneity: state and federal employees enjoy higher wages than municipal ones, even after controlling for individual-specific heterogeneity (Baez et al. 2021).

2.1 PERSONNEL REGULATIONS ACROSS LEVELS OF GOVERNMENT

Legal provisions on personnel policy are very similar across levels of government in, at least, three very relevant dimensions: hiring process and contract types, wage bill management, and firing.

Regarding hiring, the Constitution establishes that investiture in a public office in all levels of government depends on passing a competitive entrance examination (Concurso Publico) consisting of tests and the presentation of credentials. However, there are more flexible ways to hire in the public sector. Competitive examinations are not required for three types of positions: commissioned offices, positions of trust, and temporary hires. The first two categories are legally reserved for a handful of posts (directors, chiefs of staff, and assistants). The third category is meant to be used to meet temporary needs “of exceptional public interest.”

In theory, the law seeks a public sector that is populated by exam-selected civil servants, except for the few positions of free appointment and removal, and exceptional temporary hires. In practice, the situation is different due to a number of practices. For example, there have been instances where commissioned offices have been misused to hire people in positions that do not fall legitimately in that category. More common is the exploitation of temporary contracts to fill positions that should be filled under the civil service regime. The reality is that approximately one third of public employees are not civil servants selected through Concurso Publico. But importantly for this study, the regulations and avoidance mechanisms are common across levels of government.

There are no limits on the number of people that can be hired in the Public Administration, but there are limits to the wage bill of governments. The Fiscal Responsibility Law (Lei 101/2000) establishes those caps. For states and municipalities, personnel expenses cannot exceed 60 percent of their revenues, while for the federal government the limit is set at 50 percent. The Constitution stipulates that, when those limits are breached at any level of government, the entity

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6 The two categories refer to the same set of positions, which are of free appointment and discharge. The difference is that it is called a position of trust when it is exercised by a person who was already employed in the civil service.

7 Even when examinations are used, there are reports of wrongdoing, such as leaking the answers to specific candidates, or changing the grades to favor them. However, these types of violations are not directly relevant for the purpose of this study.
must reduce the wage bill by reducing expenditures on commission offices and positions of trust, discharging untenured servants and, if necessary, dismissing tenured ones.

The Electoral Law (Lei 9504/1997) puts further restrictions on personnel movements in the Public Administration around elections. Specifically, bureaucrats cannot be hired or fired without justified cause, or transferred, in a window of three months before and after elections. There are some exceptions, including the hiring and firing of individuals in positions of trust or commission offices, and the hiring of servants who passed the public examination before the freeze period. These rules are also common to all levels of government.

Firing exam-selected civil servants is difficult. After serving a probationary period they receive tenure, which grants them significant job stability. Tenured civil servants can only be dismissed through a judicial decision or a disciplinary administrative process (Lei 8112/1990). As previously mentioned, the Constitution calls for personnel reduction when the wage bill exceeds certain limits, but enforcement of this provision is lacking. In turn, temporary employees can be let go more easily. They usually have one-year contracts, which can be terminated or simply left to expire and not re-signed.

According to regional comparisons, Brazil has one of the most professional and merit-based civil service systems in Latin America, with good marks regarding its recruiting practices (Iacoviello and Chudnovsky 2015; Iacoviello and Rodríguez-Gustá 2006). However, these assessments are only descriptive, and they speak mostly about the situation at the central level. In contrast with those positive conclusions, recent empirical results show that patronage is common in Brazilian municipalities.

Individuals who are hired without public examinations work on contract under different labor regimes. From now on, we refer to them as temporary workers as opposed to the civil servants.

3 DATA

Our main data source is the PNAD-C. This is a continuous household survey conducted by the Brazilian Institute of Statistics and Geography (IBGE) to produce information on the labor market, tied to demographic and educational characteristics. Each quarter, about 211,000 households are interviewed, covering approximately 16,000 census sectors from 3,500 municipalities. It has a rotating panel structure, in which each sampled household is followed over five consecutive quarters. Its sample is designed to be representative at the levels of states and municipalities where state capitals are seated.

Our analysis focuses on public employees. We identify them directly, using a survey question that asks about the sector (public or private) of employment.\(^8\) Moreover, the PNAD-C also includes a direct question about the level of government (federal, state, or municipal) in which public sector employees work.\(^9\)

We are interested in knowing the share of employees who are new hires for each quarter and level of government, which will be our measure of bureaucratic turnover. We compute this variable using a question in the survey that asks individuals about their job tenure. We label as new hires those who report a tenure of three months or less and calculate the fraction they represent over total employees in the relevant group.

Furthermore, respondents who work in the public sector are also asked whether they work under the civil service regime (whether they are estatutarios). With this information, we classify them into two groups: civil servants (those who report being estatutario) and temporary workers (the

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\(^8\) Here, the definition of public sector is broad, i.e., not restricted to the Public Administration. We later divide and perform our analysis by sector.

\(^9\) This is one of the very few surveys in the region that collects that information.
Note the correspondence between this classification and the types of hires allowed by law as described in Section 2: our category of temporary workers can include people in commissioned offices, but will mainly reflect the widespread use of temporary contracts that circumvent civil service procedures for hiring.

Finally, we also use the survey information on type of occupation and sector of activity. We classify public employees into five occupational groups, according to the categories of the Worldwide Bureaucracy Indicators (WWBI): managers, professionals, technicians, clerical workers, and elementary workers (World Bank 2012). Regarding sector of activity, we classify them into public administration, defense and security, education, health, and others.

The composition of public employment is similar across levels of government (see Table A.1 in the Appendix). Civil servants represent about two-thirds of the workforce in all cases. That figure is in line with what has been reported for municipal workers in previous research that uses administrative data (Akhtari et al. 2022; Colonnelli et al. 2020). The distribution of occupation categories is also very similar, the main difference being the comparative abundance of elementary workers and scarcity of managers in the municipalities. Regarding the sectors of activity, there are some differences that reflect the responsibilities of each level of government. The share of workers in health and education increases as we move towards lower tiers of government, and the opposite happens for defense and security. However, all sectors are well represented in each government level.

We use all the waves of the PNAD-C from the first quarter of 2012 to the fourth quarter of 2019. There are two full electoral cycles in that time window. Municipal elections were held in October 2012 and 2016; while state and federal elections took place in October 2014 and 2018. In all cases, the new authorities assume office in January of the following year.

Figure 1 shows the evolution of the fraction of new hires among public sector workers for each level of government and anticipates our main result. The share of new employees oscillates between two percent and four percent throughout the sample period for federal (first panel) and state (second panel) bureaucrats. The figure is less stable and generally larger for municipal bureaucrats, showing that the baseline level of turnover is higher for municipalities than for higher tiers.

Figure 1 Percentage of public sector employees who are new, by level of government.
Notes: Figure shows the quarterly evolution of the percentage of new public sector employees. This is calculated as the fraction of individuals who report tenure of three months or less over the total of relevant employees. The gray line shows the quarter in which the elected authorities assume office.

10 That is, we classify as temporary workers those who, in the survey, report either having a temporary contract or some other non-civil service (non-estatutario) contract.
Most importantly, there is a very pronounced spike in the percentage of new municipal employees in the first quarter of the year after the elections, which is when the new authorities assume office. The effect extends to the next quarter, albeit somewhat diminished. At the state and federal levels turnover shows no change around elections.

To further study how bureaucratic turnover varies across municipalities we use data from the Relação Anual de Informações Sociais (RAIS), an administrative linked employer-employee dataset that covers the universe of formal employment in Brazil. The main advantage of RAIS over PNAD-C to perform this analysis is that it allows to construct our main outcome variable at the municipality level (instead of at the state level). RAIS microdata allow the identification of all employees in each municipality and contain the date (month) of entry into the job. Hence, for each municipality and month, we can compute the ratio between the number of new labor contracts (i.e., those that had been added to the municipal payroll in that month) divided by the total number of contracts that existed in the previous month.

Since the RAIS data are also well suited to study our main research question, we show that our main results can also be obtained using this dataset. Nevertheless, we prefer to keep PNAD-C over RAIS as the main dataset as it has been shown that the latter, while reliable for measuring total employment in the public sector, is not as reliable for a precise classification of the worker’s area of activity within the public sector (See Akhtari et al. 2022 for more details).

4 EMPIRICAL STRATEGY

We now turn to assess the relationship between elections and bureaucratic turnover in a regression framework. For this, we estimate the following equation:

\[
\text{new}_{\text{employees}}_{st} = \alpha + \sum_{q=1}^{4} \beta_q \text{Quarter}_q + \sum_{q=1}^{4} \lambda_q \text{Quarter}_q * \text{EW}_q + \gamma \text{EW}_q + \text{State}_s + \text{trend}_t + \epsilon_{st} \tag{1}
\]

The outcome is the percentage of new employees in state \(s\) and time \(t\) (which is in calendar quarters). \(\text{Quarter}_q\) is a set of dummy variables capturing quarter-of-the-year fixed effects. \(\text{EW}\) is a dummy that indicates quarters in an electoral window; specifically, it takes value 1 for the two quarters before and the two quarters after the relevant election. This captures the effect of being around elections. Finally, \(\text{State}_s\) and \(\text{trend}_t\) are state fixed effects and a linear trend in time. We estimate the equation separately for employees of each level of government.

Note that the PNAD-C does not identify the municipality of all observations. It only informs if the household is in the capital municipality of the state or not. Consequently, we cannot construct our dependent variable at the municipality level (or rather, we could do it only for state capitals). Thus, we collapse the information at the state level. That is why when we compute the percentage of new municipal employees, we do it at the state level. The regressions for municipal and state employees are ran using Equation (1) exactly as is and clustering standard errors at the state level. Because of the small number of clusters (27), we compute our heteroscedasticity-robust standard errors using the wild-cluster bootstrap procedure developed by Roodman et al. (2019).\(^{11}\)

In the case of federal employees, things are somewhat different. We collapse the information at the quarter level (instead of the state-quarter level), meaning that we compute the percentage of new federal employees in the whole country. Thus, in the regressions we drop the state fixed effects, and calculate robust standard errors.\(^{12}\)

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\(^{11}\) As Cameron et al. (2008) show, clustered standard errors computed using conventional methods can be severely biased when there are few clusters as the large-sample assumptions do not hold.

\(^{12}\) We believe this approach is best suited to capture the fact that these workers respond to authorities with national jurisdiction. However, there are federal employees in all states, so we can perform the analysis at the state level, as in Equation (1). It does not affect the main result.
5 RESULTS

5.1 MAIN RESULTS

Our main results are presented in Figure 2. What we plot in the graph is the effect of being in the electoral window for each quarter (with respect to the same quarter in a non-electoral year). That is, for each quarter \( q \), we plot \( \lambda_q + \gamma \).° The gray shadow indicates the quarter when the elected authorities take office.

The coefficients for the municipal level employees show a clear pattern of politically-driven changes in public employment. Before the election (Jul–Sep), bureaucratic turnover shows no difference with respect to its baseline level. In the quarter of the election (Oct–Dec), there is not much of an effect either; if anything, there is a slight drop in the share of new employees (0.6 p.p.). However, when the new authorities assume office (the quarter after the election), the percentage of new employees jumps by five percentage points. The subsequent quarter, a smaller effect (3 p.p.) still exists. This means that there is an unusually large number of new municipal employees at the start of mayoral terms.°° Note that most previous literature has focused on the causal effect of political turnover by comparing municipalities where the authorities (the mayor or the party) change and municipalities where they do not. Although we do not make that comparison, the magnitude of turnover we find is consistent with the results of that literature.

On the other hand, and perhaps more surprisingly, all the coefficients for employment at the federal and state level are indistinguishable from 0.°°° That is, political cycles at those levels of government do not affect significantly the rate of bureaucratic turnover. These are good news, considering the existing evidence that disrupting the bureaucracy has negative effects on service delivery. This first set of results indicates that in higher levels of government public employment is more insulated from politics, which is usually a sign of institutional quality.

° Except for the third quarter (Jul–Sep). In our regressions, we leave the third quarter as the omitted category. Thus, \( \gamma \) captures the effect of being in an electoral window for that quarter, and that is what we graph in that case.

°° The drop in the share of new employees in the quarter of the election is likely related to the hiring bans discussed in Section 2. The magnitude of the drop is small (0.6 p.p.) in comparison to the post-election surge (5 p.p. + 3 p.p.), which indicates that the post electoral increase in hiring is not driven by recruitment that was delayed because the electoral bans.

°°° Table A.2 in the Appendix presents the results.
We reproduce the analysis using RAIS instead of PNAD-C to estimate Equation 1 and show the results in Figure 3. In this case, the outcome variable is defined with a monthly frequency, so the graph plots the effect of being in the electoral window for each month (with respect to the same month in a non-electoral year). As before, the results point to a clear pattern of politically-driven changes in public employment at the municipal level, but not at the state or federal level. The largest jump in the percentage of new municipal employees occurs in January (by around 7.5 p.p.), the month in which elected authorities take office. There are also increases in the share of new municipal employees in the following months, which are smaller in magnitude and decreasing over time.

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We also use the RAIS data to investigate if the increase in hiring after the elections is associated with an increase in the stock of municipal employees or with an increase in separations. We find the latter to be the main culprit, as it is possible to observe in Figure A.1 in the Appendix. Separations spike in December of every year, but the spike is larger in electoral years and of similar magnitude to the spike in hiring occurred in the adjacent January.

The previous literature has devoted a lot of attention to bureaucratic turnover in the sectors of education and health, at least partly because these are areas where it is relatively easier to obtain measures of performance that can be linked to personnel change. We find that turnover in sectors of front-line service—education, health, defense, and security—increases significantly after elections. However, the effect is much stronger among public administration workers (see Figure 4). There, the share of new personnel goes up by 8.5 percentage points in the quarter after elections, a figure more than double that for education (2.11) and health (3.43). This underlines the disruptive effect that personnel change may have on the administrative work of municipalities, which can go unnoticed in academic research given the difficulty in measuring performance in administrative positions.

In line with the previous sets of results, there are within-sector differences in the effects by level of government. Namely, at the state and federal level, there is no increase in turnover for any sector, while there is for every sector at the municipal level.

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16 Note that in the estimation of Equation (1) with RAIS data, we measure time in calendar months (instead of quarters) and include month-of-the-year fixed effects.
We also estimate the effect by type of occupation. For this, we classify jobs into five occupational groups, following the Worldwide Bureaucracy Indicators: managers, professionals, technicians, clerical, and elementary. The results are presented in Figure 5, where we ultimately grouped professionals and technicians together. Managers are clearly the occupational group that varies most after elections: in the quarter a mayoral term starts, the share of managers who are new goes up by 30 percentage points. There is also a sizeable effect among clerical and elementary workers, with increases of almost six percentage points of new employees in each case. While there is an argument to hire trusted or politically close individuals in some managerial positions, that argument does not extend readily to lower rank positions; thus, the pattern we observe is mostly consistent with patronage as a driving force of bureaucratic turnover. The occupational group more isolated from politically-motivated turnover is that of professionals and technicians. Among them, the increase in the share of new employees is small (although significant) at two percentage points in the average municipality.  

Once again, the most interesting feature of the results is the lack of a significant effect at the state and federal levels for any occupational group, even managers.

Finally, we analyze the effects by type of contract. The pattern observed in municipal employment around elections is entirely driven by workers under temporary contracts, as Figure 6 shows. The share of temporary workers who are new increases by 13.96 percentage points in the quarter after the elections. In contrast, there is no effect at all among civil servants. This is consistent with patronage, since temporary contracts are the type of hires over which elected officials enjoy greater discretion. Interestingly, at the state and federal level, there is no significant increase in

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**Figure 4** Change in the percentage of new employees around elections, by level of government and sector of activity. 
Notes: The figure shows the difference in the percentage of new public sector employees for each quarter around elections with respect to the same quarter in a non-electoral year, by level of government and sector of activity. In terms of Equation (1), we plot the sum of coefficients \( \lambda_q + \gamma \) for each quarter \( q \). The gray line shows the quarter in which the elected authorities assume office. The coefficients come from separate regressions for municipal, state, and national employees. Regressions at the municipal and state level include quarter and state fixed effects. Regression at the national level includes quarter fixed effects and robust standard errors. Confidence intervals at 95 percent level are shown in bars. At the municipal and state level, these are wild cluster robust bootstrap confidence intervals, using Stata’s bootstrast command (Roodman 2015).

17 We cannot distinguish elected and unelected officials in the PNAD-C survey. To investigate if the observed effect in managers is due to turnover among elected officials, we estimate the effect by type of occupation using the RAIS data, taking advantage that elected officials are not reported in this dataset. We obtain similar findings to those reported in Figure 5 (see Figure A.2 in the Appendix), which corroborates that politically-motivated turnover is highly prevalent among unelected officials in managerial positions.
turnover even for that type of contracts. This underlines the fact that the difference in turnover patterns between municipalities and higher tiers of government is not explained by differences in the type of labor regimes employed—in fact, notice in Table A.1 that the share of temporary contracts over the full staff is similar in all the levels of government—but by a difference in how temporary contracts are used around elections. This seems to suggest a better governance of temporary contracts at the state and federal level than at the municipal one.

Reinforcing the notion that our results are related to differences in institutional quality, we also find that post-election turnover is driven by non-capital municipalities, while capital cities have more stable bureaucracies (see Figure 7). Capital municipalities are exposed to stronger accountability mechanisms than non-capitals, since they are home to state-level agencies of control and typically have denser media markets. We will now examine this result in more detail, given its importance for public sector personnel policy.

5.2 MECHANISMS: THE ROLE OF INSTITUTIONAL QUALITY

To further test the hypothesis that our results reflect differences in institutional quality, we take advantage of the fact that RAIS allows us to estimate the level of bureaucratic turnover at the municipal level, so that we can examine how it relates to a measure of municipal institutional quality.

Our measure of the institutional quality of Brazilian municipalities is the Municipal Institutional Quality Indicator (IQIM), developed by the Brazilian Ministry of Planning and Budget. The IQIM aims to assess the quality of public institutions in Brazilian municipalities and is calculated as a

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18 Part of the lack of cyclicity that we find for temporary workers at higher levels of government could be due to measurement error in PNAD-C (this could happen, for instance, if temporary workers with higher salaries at state or federal levels of government are underrepresented in the survey, or if there are subjective differences in the way temporary workers perceive their labor contract that vary by level of government). In fact, when we estimate the change in the percentage of new labor contracts around elections, by level of government and type of labor regime, using RAIS data (which is not subject to any of those problems), we find that the share of new temporary contracts increases both at the municipal and at the state levels of government (See Figure A.3). The magnitude of these changes, however, is almost six-fold larger at the municipal level than at the state level of government (37.8 p.p. versus 6.6 p.p., respectively).

19 The link between geographical isolation and quality of government is explored in Campante and Do (2014).
A combination of different indicators that aim to capture the degree of citizen participation in public management activities, and the financial and managerial capacity of the municipality (see Pereira et al. (2012) for a more detailed description of this index).

Figure 8 shows how the percentage of new labor contracts around elections vary by quintile of IQIM. The results follow a clear pattern: in January of an election year, the month in which elected authorities take office, the percentage of new employment contracts in the municipality increases more as we move to lower quintiles of institutional quality. The same pattern is observed for a few more months, although the increases in municipal employment get smaller and smaller. These results reinforce the notion that the institutional quality at the municipal level is beneficial for bureaucratic stability.

6 CONCLUSIONS

A strong relationship between political cycles and bureaucratic turnover has been established in empirical work on patronage, often using Brazil as a case of study. Here, we show that that relationship only holds at the municipal level of governments. In higher tiers, public employment seems to be more insulated from politics. Importantly, this is not due to differences in the sector composition of the workforce or in the type of labor regimes employed in municipalities vis-a-vis higher levels of government. The most likely explanation is that there is a better governance of public employment regulations at the state and federal levels. In line with this interpretation, we find that post-electoral turnover is higher in municipalities with lower levels of institutional quality.

One important result is that while the share of workers under temporary contract is similar across levels of government, the patterns of turnover for those workers are not. This is interesting because the excessive use of temporary and exceptional contracts has usually been hypothesized as a symptom and cause of patronage. Yet, we observe that the use of temporary contracts does not

20 We group municipalities by quintile of the value of the index for the year 2000, the last available data for this indicator since it was later discontinued. This is not a cause for concern for our purpose of having a measure of the institutional quality of the municipality that can be correlated with the level of turnover in municipal employment, since the quality of public institutions is expected to be relatively stable over short periods of time.
necessarily lead to widespread patronage. Nonetheless, increasing the share of public employees who are civil servants among public employees seems like a sure way to curtail patronage, as the turnover of civil servants is well insulated from political cycles.

A pattern of progressive professionalization of the civil service starting at the highest level of government and moving towards more decentralized units has been documented, namely in the context of the US. Under that light, the results in this paper can be interpreted as reflecting an intermediate stage in that transformation and allow an optimistic outlook regarding the future evolution of the civil service.
**A APPENDIX**

**Figure A.1** Hires and separations of municipal employees, calculated with RAIS data.
Notes: Figure shows the monthly evolution of the hires and separations of municipal sector employees. The gray line shows the month in which the elected authorities assume office.

**Figure A.2** Change in the percentage of new employees around elections, by level of government and occupational category, estimated with RAIS data.
Notes: The figure shows the difference in the percentage of new public sector employees for each month around elections with respect to the same month in a non-electoral year, by level of government and occupational category. In terms of Equation (1), we plot the sum of coefficients $\lambda_q + \gamma$ for each month $q$. Employees are classified in occupational groups following the categories in the Worldwide Bureaucracy Indicators (WWBI) and using the first digit of the Classificação de Ocupações para Pesquisas Domiciliares (1 = managers; 2 and 3 = Professionals and technicians; 4 and 5 = Clerical workers; 6, 7, 8, and 9 = Elementary workers; 0 = Unidentified). The gray line shows the month in which the elected authorities assume office. The coefficients come from separate regressions for municipal, state, and national employees. Regressions at the municipal and state level include month and state fixed effects. Regression at the national level includes month fixed effects and robust standard errors. Confidence intervals at 95 percent level are shown in bars. At the municipal and state level, these are wild cluster robust bootstrap confidence intervals, using Stata's bootest command (Roodman 2015).
Figure A.3 Change in the percentage of new employees around elections, by level of government and type of labor regime, estimated with RAIS data.

Notes: The figure shows the difference in the percentage of new public sector employees for each month around elections with respect to the same month in a non-electoral year, by level of government and type of labor regime. In terms of Equation (1), we plot the sum of coefficients $\lambda_q + \gamma$ for each month $q$. The gray line shows the month in which the elected authorities assume office. Civil servants and temporary workers are classified using the variable TipoVínculo (Non-temporary workers = from 10 to 31; Temporary workers = from 35 to 97). The coefficients come from separate regressions for municipal, state, and national employees. Regressions at the municipal and state level include month and state fixed effects. Regression at the national level includes month fixed effects and robust standard errors. Confidence intervals at 95 percent level are shown in bars. At the municipal and state level, these are wild cluster robust bootstrap confidence intervals, using Stata’s bootest command (Roodman 2015).

Table A.1 Composition of public sector employment by level of government.

Notes: The table shows the composition of public sector employment in the fourth quarter of 2019 for the three levels of government. Civil servants are those who report working under the civil service regime (estatutarios). Those who report not being included in the civil service regime are classified as temporary workers. Employees are classified in occupational groups following the categories in the Worldwide Bureaucracy Indicators (WWBI). The sample for the period represents 42,363 Public Sector employees in the National government, 90,268 at the State level, and 161,994 at the Municipal level.
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COMPETING INTERESTS

The authors have no competing interests to declare.

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REFERENCES


Table A.2 Electoral cycle—Public Sector.

Notes: The table shows the coefficients for Equation (1), running separate regressions by level of government. The dependent variable is the percentage of new public sector employees, calculated as the fraction of individuals who report tenure of three months or less over the total of relevant employees. The omitted category is the third quarter (Jun–Sep). The first three rows are quarter-of-the-year dummies. Electoral year is a dummy variable equal to 1 the two quarters before and the two quarters after an election. Column (1) and (2) include state fixed effects. P-values in parenthesis. Column (1) and (2) show wild cluster robust bootstrap p-values, obtained using boottest command (Roodman 2015).

<table>
<thead>
<tr>
<th>SHARE OF NEW EMPLOYEES</th>
<th>MUNICIPAL</th>
<th>STATE</th>
<th>FEDERAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Oct–Dec</td>
<td>-0.979 (0.000)</td>
<td>-0.530 (0.000)</td>
<td>-0.389 (0.399)</td>
</tr>
<tr>
<td>Jan–Mar</td>
<td>0.633 (0.007)</td>
<td>0.232 (0.296)</td>
<td>0.791 (0.024)</td>
</tr>
<tr>
<td>Apr–Jun</td>
<td>1.740 (0.000)</td>
<td>0.541 (0.022)</td>
<td>1.534 (0.000)</td>
</tr>
<tr>
<td>Electoral year</td>
<td>0.297 (0.955)</td>
<td>0.315 (0.192)</td>
<td>-0.056 (0.864)</td>
</tr>
<tr>
<td>Oct–Dec × electoral year</td>
<td>-0.920 (0.077)</td>
<td>-0.447 (0.109)</td>
<td>0.162 (0.794)</td>
</tr>
<tr>
<td>Jan–Mar × electoral year</td>
<td>4.883 (0.000)</td>
<td>-0.172 (0.670)</td>
<td>0.193 (0.623)</td>
</tr>
<tr>
<td>Apr–Jun × electoral year</td>
<td>2.788 (0.047)</td>
<td>-0.095 (0.802)</td>
<td>0.313 (0.475)</td>
</tr>
<tr>
<td>Linear time trend</td>
<td>-0.008 (0.867)</td>
<td>0.012 (0.261)</td>
<td>-0.040 (0.000)</td>
</tr>
<tr>
<td>Electoral year + Oct–Dec × electoral year</td>
<td>-0.622 (0.002)</td>
<td>-0.131 (0.490)</td>
<td>0.106 (0.421)</td>
</tr>
<tr>
<td>Electoral year + Jan–Mar × electoral year</td>
<td>5.181 (0.000)</td>
<td>0.143 (0.540)</td>
<td>0.138 (0.268)</td>
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<tr>
<td>Electoral year + Apr–Jun × electoral year</td>
<td>3.085 (0.000)</td>
<td>0.221 (0.319)</td>
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<td>Mean dependent variable</td>
<td>4.996</td>
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<td>3.310</td>
</tr>
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<td>State FE</td>
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<td>YES</td>
<td>NO</td>
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<tr>
<td>Observations</td>
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<td>864</td>
<td>32</td>
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