

# PATRONAGE IN THE ALLOCATION OF PUBLIC SECTOR JOBS

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**ABSTRACT.** This paper provides causal estimates of the importance of patronage in public sector employment. Using administrative matched employer-employee data on the universe of public sector workers in Brazil for the period 1997-2014, we construct a unique dataset on the labor market careers of more than 2,000,000 political supporters, namely local political candidates and campaign donors. We first establish three stylized facts: (i) electoral cycles are a key determinant of bureaucratic turnover; (ii) political supporters are more likely than other citizens to hold a public post, especially when they are connected to the party in power; (iii) public sector employees are less qualified than their counterparts in the private sector. We then use a regression discontinuity design that leverages very competitive municipal elections to identify the causal impact of being aligned to the party in power on individual careers in the public sector. We uncover a sizable “patronage effect”: after the election, political supporters of the ruling party are on average 9.4 percentage points more likely to be employed in the public sector - a 39% increase relative to the pre-election period. The presence of patronage is significant throughout the entire public sector hierarchy, and individuals are rewarded proportionally to their level of support. We conclude by showing that patronage may have real effects on the quality of the bureaucracy, as the importance of education for the probability of obtaining a public sector job is significantly lower for supporters of the ruling party.

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## 1. INTRODUCTION

Selecting competent and motivated public sector workers is one of the major goals, and challenges, of both developed and developing economies (Finan et al., 2015). Understanding the frictions in the process by which the government selects applicants for a public sector job is therefore crucial to ensure the presence of a well-functioning bureaucracy. Patronage –the appointment of political supporters to government jobs– is often considered the leading friction in this selection process (Grindle, 2012). While over time most countries have moved towards the adoption of objective criteria for the selection of public sector workers, politicians typically have some discretion in the allocation of many government jobs (Evans and Rauch, 1999). Moreover, since politicians bear only an indirect cost from the inefficient allocation of public sector jobs, they may have incentive to hire individuals in their personal and political networks, with potentially detrimental effects on the quality of the bureaucracy (Shleifer and Vishny, 1994). Anecdotal accounts of this phenomenon are abundant (Royko, 1971, Chubb, 1982, Alesina et al., 2001). Yet, multiple empirical challenges have made it difficult to obtain convincing and well-identified evidence about the importance of patronage, and its consequences for the quality of the bureaucracy.

This paper provides causal estimates of the extent to which patronage drives public sector employment in the context of Brazilian local governments. We do so by relying on a novel dataset on the labor market careers of more than 2,000,000 supporters of local political parties. We obtain exogenous variation in an individual’s alignment with the ruling political party by leveraging competitive electoral races, and we find a sizable presence of patronage: after the election, political supporters of the ruling party are on average 9.4 percentage points more likely to be employed in the public sector - a 39% increase relative to the pre-election period. These large effects are widespread across the entire public sector hierarchy. We also provide suggestive evidence that patronage has negative real outcomes, as reflected by a less qualified pool of bureaucrats.

Local –i.e. municipal– politics in Brazil represents an ideal setting to study this phenomenon. Brazil is a highly decentralized country, with municipalities being responsible for the provision of a wide set of public goods and for the hiring of more than half of Brazilian public sector employees. Despite the existence of a civil-service system, local politicians have considerable leeway in the selection of public sector workers. Additionally, anecdotal evidence strongly indicates that the allocation of jobs through patronage is widespread, especially at the local level.

We combine multiple administrative data sources to overcome the main challenge in studying the way government employees are selected, namely the lack of comprehensive information on the careers of public sector workers and on their connections with the political power. We use matched employer-employee data for all public sector workers in Brazil, and match it to two groups of political supporters, for a total of more than 2,000,000 individuals during the period 1997-2014. The first group consists of all political candidates who run (either successfully or unsuccessfully) for a seat in the municipal council during this period.<sup>1</sup> The second group of supporters are all campaign donors in municipal elections. We define as supporters of the ruling political party all political candidates who belong to the coalition of the winning mayor, and all individuals who donated to the mayor or to members of her coalition.

We start by establishing three key stylized facts about the Brazilian local bureaucracy. First, electoral cycles are a crucial determinant of the size and composition of the public sector: employees' turnover in the municipal public sector is on average 42% higher in the year following a municipal election. Second, political supporters are more likely than other citizens to ever be employed in the public sector throughout their career, and this is particularly true in periods in which the local political party they support is in power. Third, public sector employees are less qualified than their counterparts in the private sector –i.e. have a lower education level than the one typically required to perform their occupation. This evidence suggests that political supporters

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<sup>1</sup>Members of Brazilian municipal councils are allowed to have external jobs. Therefore, even successful candidates can have a job in the public sector in addition to their job as member of the council.

may enjoy a preferential access to public sector jobs and that patronage may be at play in Brazilian local politics.

Motivated by these stylized facts, and to provide a causal estimate of the extent of patronage in public sector employment, we use a regression discontinuity design in close municipal elections. Our strategy compares political supporters –candidates in the same party and campaign donors– of the mayoral candidate who wins the election, to supporters of the runner-up candidate in the same municipality. We restrict the sample to mayoral elections decided by a small margin (1%, 3%, or 5%), and provide supportive evidence for our empirical design by showing that the individuals we compare are not statistically different from each other across a wide set of characteristics, in the pre-election period.

Our key result identifies a sizable “patronage effect” in the hiring of public sector employees. Supporting the winning party in a municipality increases the average probability of having a public sector job by 39% relative to the pre-election period –45% for local politicians and 27% for campaign donors–, which translates into a 39% average increase in total earnings –50% for local politicians and 24% for campaign donors. In line with a patronage mechanism, the whole effect is driven by jobs under the jurisdiction of the local government, that is those over which the mayor has discretion, and it is driven by the extensive margin – an increase in employment probability– rather than the intensive margin– a wage increase.

These patronage estimates are a combination of two effects: supporters of a party that was *not* in power in the previous electoral cycle will experience an increase in hiring probability if they acquire a political connection to the ruling party (*i.e.* if the mayor they support is elected); similarly, supporters of a party that was in power in the previous electoral cycle will experience an increase in the probability of *losing* their job in the public sector (if they had one) if their party loses power. In order to separately identify these two effects we present estimates that leverage a second, related identification strategy. First, focusing on the subsample of supporters of a party that

was in the ruling coalition before time  $t$ , we compare the labor market outcomes of those whose party wins the election at time  $t$ , with the labor market outcomes of those, in a different municipality, whose party loses the election at time  $t$ : losing a connection to the ruling party is associated with a decrease in the probability of having a public sector job of about 31%. Second, we repeat the same exercise but this time focusing on the subsample of supporters of a party that was *not* in the ruling coalition before time  $t$ : acquiring a connection to the ruling party is associated with an increase in the probability of having a public sector job of about 46%.

We then show that the patronage effect is an increasing function of the amount of political support individuals provide to the ruling party. Indeed, political candidates who contribute more votes to the winning party, and campaign donors who contribute more funds to its political campaign, obtain a larger public sector premium. Additionally, the patronage effect is widespread and large across the entire public sector hierarchy, from leadership and managerial positions to more elementary occupations as front-service providers. This suggests that our results are not fully explained by the mayor's attempt to improve the degree of ideological alignment between the executive and top-level bureaucrats. Finally, the persistence of the patronage effect is closely linked to the fortunes of the supported party. If a party fails to re-elect a mayor in the successive term, most political supporters of the ruling party lose their public post. This finding suggests that our results are hardly fully accounted for by a mayor's ability to better screen applicants in her network on unobservable dimensions.

Finally, we investigate one important real effect of patronage, namely its impact on the quality of the pool of public sector workers. We find that the importance of education for the probability of obtaining a public sector job is significantly lower for supporters of the ruling party, which suggests that patronage might lead to a negative effect on the quality of the pool of public sector workers.

Our paper contributes to a recent and rapidly growing literature on bureaucrats (Finan et al. (2015), Ashraf et al. (2014b), Best et al. (2016), Akhtari et al. (2016)),

focusing on selection (Ashraf et al. (2014a), Deserranno (2014), Xu (2017)) and relying on extremely rich administrative data which allow us to study patronage across the entire public sector hierarchy. Example of other studies of patronage are Labonne and Fafchamps (2015), Cruz et al. (2015), Folke et al. (2015), Gagliarducci and Manacorda (2016), and Bobonis et al. (2016). We also contribute to the literature on returns to politics (Fisman et al. (2014), Eggers and Hainmueller, 2009, Lenz and Lim, 2009, Querubin and Snyder, 2013) by providing novel evidence on a specific type of return for political candidates.

The paper is organized as follows. In Section 2 we provide details on key features of the Brazilian institutional context that are of interest for our analysis. In Section 3 we describe the data sources. In Section 4 we establish some key stylized facts about the Brazilian public sector. In Section 5 we describe the empirical strategy. In Section 6 we present the estimates of patronage. In Section 7 we discuss the impact of patronage on the quality of the pool of public sector workers. Section 8 concludes.

## 2. INSTITUTIONAL CONTEXT

In this section, we first describe the main features of Brazilian municipal elections and the role played by the two groups of political supporters which are the focus of our paper, namely candidates to Brazilian local councils and individual donors to municipal campaigns. We then discuss the selection process of public sector workers in Brazil.

**2.1. Local Politics in Brazil.** Brazil's 5,570 municipalities are governed by a mayor (*prefeito*) together with a council of local legislators (*Camara de Vereadores*), simultaneously elected every four years. A voter can cast two votes in a municipal election: one for a mayoral candidate and one for an individual candidate to the council (or, alternatively, a generic vote for a party).

Mayors are term-limited, allowed to be in office in a municipality for a maximum of two consecutive terms. Mayors are elected by plurality rule, with municipalities with more than 200,000 registered voters holding a second round election if no candidate

has received a majority in the first round. While mayors are associated with a party, they are typically supported by a coalition of parties.<sup>2</sup>

The number of council seats, ranging from 9 to 55, varies as a function of the population in the municipality.<sup>3</sup> Unlike mayors, members of the council face no term limits. Candidates for the local council run individually in a unique “at-large” district comprising the whole municipality, and they are elected using an open-list proportional representation system. Candidates are members of a party, with parties generally forming pre-election coalitions.<sup>4</sup>

Council seats are awarded to a coalition in proportion to the total number of “personal” votes received by its candidates and of “generic” votes received by the parties comprising the coalition.<sup>5</sup> The seats allocated to a coalition are then assigned to the candidates of the coalition who received the highest number of “personal” votes. Therefore, the electoral system gives strong incentive to parties and coalitions to present lists with large numbers of candidates, since even votes for non-viable candidates are valuable as they contribute to increase the number of seats allocated to the coalition.<sup>6</sup>

Members of the local council have a number of important responsibilities: they review and approve the local budget proposed by the mayor (with the power of vetoing certain budget items), and they submit bills mainly directed to the adoption of social programs. Being a local legislator is also a remunerative activity, with the average

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<sup>2</sup>81% of mayoral candidates over the 2000-2012 period were supported by a coalition of parties.

<sup>3</sup>The allowed number of seats was established by the 1988 Brazilian Constitution up until the 2000 elections, by Resolution 21.702 elaborated by the *Tribunal Superior Eleitoral* for the 2004 and 2008 elections, and by the 58th amendment to the Brazilian Constitution for the 2012 elections. These rules leave a degree of discretion to local legislators with respect to the choice of the number of council seats, establishing only a maximum (but not a minimum) number of seats as a function of population size (Dahis, 2015).

<sup>4</sup>87% of parties running in a local election over the 2000-2012 period were part of an electoral coalition. Parties supporting different mayors cannot be part of the same coalition for the local council election.

<sup>5</sup>Specifically, seats are awarded using an electoral quota and the d’Hondt formula.

<sup>6</sup>Electoral rules limit the number of candidates on the ballot by specifying that each party (coalition) can present a maximum of  $1.5S$  ( $2S$ ) candidates, where  $S$  is the total number of council seats in the municipality. For the elections from 2000 to 2012, we find that coalitions take advantage of this rule, with each additional seat in the council being associated with a 1.7 increase in the number of candidates running in a coalition. However, the fact that the coefficient is less than 2 potentially implies that intra-coalition competition introduces some incentive to limit the number of candidates on the ballot.

legislator earning a wage that is approximately 2.6 times the average wage in her municipality (Ferraz and Finan, 2011). *Vereadores* are not required to give up their outside jobs upon election, as being a legislator is a part-time activity.<sup>7</sup>

Up until the 2012 municipal elections, mayoral candidates and candidates to the local council could receive campaign donations from both corporations and individuals, with the latter being allowed to donate up to 10% of their gross annual income.<sup>8</sup> Law no. 8713/1993 requires candidates to submit to electoral courts a detailed overview of all the campaign contributions received in the election cycle. In the 2008 and 2012 elections, the average share of funds that came from individuals was 28% for mayoral candidates and 40% for candidates to the local council.<sup>9</sup> Anecdotal evidence suggests that these donations typically come from candidates' friends and, to a lesser extent, family members.<sup>10</sup>

**2.2. The Allocation of Jobs in the Public Sector.** Brazil is a highly decentralized country. Local government spending is mainly financed by transfers from the state and federal government, and municipalities are responsible for the provision of a wide range of public goods in areas such as education, health and transportation. (Afonso and Araújo, 2000, Souza, 2002). Municipalities employ the largest share of Brazilian public sector employees – 52% as of 2010 (Instituto de Pesquisa Economica Aplicada, 2011).

Selection in most public sector jobs is based on objective selection criteria: applicants present academic and professional credentials, and undertake a formal civil service examination (*Concurso Publico*), which is job-specific and consists of a combination of written and oral tests. Article 37 of the Constitution establishes clear transparency

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<sup>7</sup>As described in Ferraz and Finan (2011), 98 percent of legislators elected in the 2004 election reported having another professional activity outside of politics. In our data, we indeed find no evidence that candidates elected to the council give up their external jobs.

<sup>8</sup>Donations from corporations have been prohibited by Law 13.165/2015. Therefore, since 2016, candidates can finance their campaign only with donations from individuals or using party funds.

<sup>9</sup>These shares are based on the authors' calculations using the campaign data from the *Tribunal Superior Eleitoral* described in section 3.1.

<sup>10</sup>However, cases of large donations by individuals related to corporations are not uncommon. In the 2012 election, the largest single donor was a businessman of the luxury real estate sector, who donated a total of 2.85 million Reais (about 900,000 USD). See <http://veja.abril.com.br/brasil/empresario-da-construcao-da-r-3-milhoes-a-campanhas/>, accessed February 2017.



requirements for the selection of public servants.<sup>11</sup> Civil servants acquire tenure after three years of service, following which they can be fired only for reasons of misconduct after a judicial decision.

Public workers can be hired without passing the civil service examination under three special exempt categories of public workers: commissioned posts (*cargos comissionados*), positions of trust (*funcao de confianca*), and temporary jobs (*emprego temporario*). Hiring in the first two categories is limited to positions of manager, supervisor or advisor, allowing politicians discretion in the selection of people in leadership roles.<sup>12</sup> In practice, the vague language used by the law leaves ample discretion to politicians, with possible cases of violations when individuals are appointed to commissioned posts even though their jobs do not fall under the leadership categories required by the Brazilian Constitution.<sup>13</sup>

Politicians can also hire temporary public servants to “meet a temporary need of exceptional public interest” (Article 37 IX of the Brazilian Constitution). In these cases, the law states that no civil service exam is necessary and that the selection process can be limited to the analysis of an applicant’s curriculum, without other formal criteria of objective measurement. The law also contains a detailed list of the instances that fall under this category, and politicians can be prosecuted in case they hire temporary workers without justification.<sup>14</sup>

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<sup>11</sup>Article 37 of the Constitution states: “*The governmental entities and entities owned by the Government in any of the powers of the union, the states, the federal district and the Municipalities shall obey the principles of lawfulness, impersonality, morality, publicity, and efficiency...*”

<sup>12</sup>The difference between positions of trust and commissioned posts is that the former requires that the individual is already employed as a civil servant, whereas the latter allows for the hiring of individuals who have never passed the civil service examination.

<sup>13</sup>For example, in 2012 the mayor of the municipality of Jundiá exploited commissioned posts and ad-hoc laws to appoint more than 300 people to jobs that did not fall under a leadership category. The public prosecutor of São Paulo ordered all individuals to be fired, and initiated a trial against the mayor. See [http://www.mpsp.mp.br/portal/page/portal/noticias/noticia?id\\_noticia=14608320&id\\_grupo=118](http://www.mpsp.mp.br/portal/page/portal/noticias/noticia?id_noticia=14608320&id_grupo=118), accessed February 2017.

<sup>14</sup>For instance, in 2015 the public prosecutor of Pernambuco accused the mayor of the municipality of Belo Jardim of illegally hiring 574 teachers through temporary contracts. See <http://www.mppe.mp.br/mppe/index.php/comunicacao/noticias/ultimas-noticias-noticias/5162-mppe-denuncia-ex-prefeito-de-belo-jardim-por-contratacoes-ilicitas-de-professores>, accessed February 2017.

In addition to the above exempt categories, anecdotal evidence suggests that fraud in the allocation of public sector jobs is widespread, especially at the local level. In 2012, a reportage by the team of journalists of *Fantastico*, one of the most popular TV shows of the premier Brazilian network “Globo,” uncovered an astonishing number of such cases across the country.<sup>15</sup> *Fantastico* reported that the discretionary allocation of positions in the bureaucracy is primarily achieved through illegal interference with the public examinations, by (i) providing individuals with the answer sheet prior to the exam, (ii) ex-post replacing specific individual tests with better ones, and (iii) directly changing the list of winning candidates.<sup>16</sup>

### 3. DATA

We use information from two main sources. Data on electoral results, candidates to municipal councils, and individual donors come from the Brazilian Electoral Commission (TSE). Data on public sector employment come from the *Relação Anual de Informações Sociais* database (RAIS). In this section we describe the two datasets, the matching procedure, and the construction of the main variables used in our analysis.

**3.1. Electoral Data.** We obtain the publicly available electoral data for the 2000, 2004, 2008, and 2012 municipal elections from the Tribunal Superior Eleitoral (TSE). This data provides information on the outcome of the election, the number of votes received by the candidates, as well as the party and coalition each candidate is running for. The data contain information on candidates and electoral results for both mayoral elections and elections for the local council.<sup>17</sup>

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<sup>15</sup>See “Golpe transforma concursos publicos em cabides de emprego”: <http://g1.globo.com/fantastico/noticia/2012/06/golpe-transforma-concursos-publicos-em-cabides-de-emprego.html>, accessed February 2017.

<sup>16</sup>For example, in the municipality of Novo Barreiro, in the state of Rio Grande do Sul, the public prosecutor found the mayor and other members of the local administration guilty of such a fraudulent scheme: a company bidding to administer the test won the tender under the condition that a few specific jobs were “kept available” for specific political appointees. In the nearby municipality of Itati, an exam’s supervisor noticed that several applicants turned in blank tests, and then ended up being selected for the position.

<sup>17</sup>For the remainder of the paper, we use the term “candidate” to refer to a candidate to the local council; we use the expression “mayoral candidate” to refer to a candidate who run for mayor of a municipality.

TSE also provides demographic information on the candidates, such as candidate's full name and date of birth, gender, education, and the amount of money she raised during her campaign. Importantly, the data contains the candidate's individual tax identification number, called *CPF* (Cadastro de Pessoas Físicas). There are 1,034,194 candidates who run for a seat in the local council over this period, with about 27% of candidates running in more than one election. After dropping the few cases (0.3%) of candidates without valid information on their *CPF*, we are left with a sample of 1,031,056 unique members of a political party who run in an election for the local council over the 2000-2012 period. We code each candidate as a supporter of a specific mayoral candidate if she belongs to a party in a coalition that supports that mayoral candidate.

For the 2004, 2008, and 2012 municipal elections, TSE provides data on all individuals' donations to candidates to the local council and to mayoral candidates. We keep all records for which the data contains valid information on a donor's *CPF*, and we drop cases of donations made by political candidates.<sup>18</sup> We code each donor as a supporter of a specific mayoral candidate if she either (i) contributed to that mayoral candidate's campaign, or (ii) contributed to the campaign of a candidate to the local council who belongs to the coalition that supports that mayoral candidate. It is extremely rare for an individual to donate to the campaign of parties that support different mayoral candidates, and we drop the few cases (0.32%) where this happens, since this prevents us from identifying the donor as a supporter of a unique mayoral candidate in an election. Our final sample includes donations by 1,057,216 unique individuals. While we choose to identify an individual as a supporter simply based on the extensive margin of her donations (whether she donated to a candidate) and not on the intensive margin (how much she donated), we leverage information on the amount donated to investigate possible heterogeneous effects in the amount of financial support provided.

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<sup>18</sup>Missing information on a donor's *CPF* is extremely rare for the 2008 and 2012 elections, but about 36% of donations in the 2004 elections do not include this information.

**3.2. Labor Market Data.** The principal source of employment data is the *RAIS* (Relação Anual de Informações Sociais) database. *RAIS* is an administrative matched employer-employee dataset managed by the Brazilian Ministry of Labor (Ministério do Trabalho e Emprego - MTE). The dataset covers the universe of workers among those employed in Brazilian public bodies and in the formal private sector (Menezes-Filho et al., 2008).<sup>19</sup> Each individual in *RAIS* is assigned a unique administrative worker identifier called PIS (Programa de Integração Social), which allows for tracking of the individual over time and across employers. We use data for the years 1997 to 2014.

Two categories of individuals who are formally employed do not appear in *RAIS*: elected politicians and self-employed individuals. However, in such circumstances, only the specific job as politician or self-employed worker is missing: all other jobs of the politician or self-employed individual do appear in the dataset. Importantly, throughout the analysis, when we talk about labor market outcomes in the public sector we are excluding the earnings that elected candidates derive as local legislators.

For each worker-job pair, the *RAIS* database contains information on payroll, hiring and separation dates, employer identifier, as well as location and industry of the employer. Additionally, it contains details on the hours worked by contract, the reason of separation, the specific occupation of each worker, and the worker's level of education. Finally, the data contain information on a worker's *CPF*.

The Brazilian official occupational classification system divides the Brazilian labor market in 2,511 occupations. We complement the data from *RAIS* with information from the *Classificação Brasileira de Ocupações 2002 (CBO)*, an official publication by the Brazilian Ministry of Labor which describes, among other things, the educational level typically required to perform a specific occupation. We use this information to code, for each worker-job pair in *RAIS*, whether the worker is unqualified for the job

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<sup>19</sup>The dataset also includes information on no-profit and international organizations.

(namely, whether her educational level is lower than the educational level typically required to perform her occupation).<sup>20</sup>

**3.3. Final Dataset and Construction of the Main Variables.** The *RAIS* database allows us to have a unique picture of the universe of Brazilian public sector workers in the period 1997-2014, as well as a general picture of private sector employment in the Brazilian formal economy. We match our datasets of candidates and donors to *RAIS* using the individual identifier *CPF*, which is available in both datasets. We find 66.9% of political supporters in *RAIS* (67.3% of candidates and 66.4% of donors). Of these, 69% of candidates and 52% of donors are employed in the public sector for at least one year in the period 1997-2014.<sup>21</sup>

We construct variables on employment status, earnings, and characteristics of the occupation for each worker-job pair in both the public and the private sector.

We build three dummies for employment at the individual-year level – *Employed Public*, *Employed Private* and *Employed Any* –, which are equal to one if an individual is employed in the public sector, in the private sector, or in either of the two, respectively.

We calculate annual earnings by multiplying information on total monthly wages by the number of months the individual worked in the firm or public body during the year. We calculate three separate measures of annual earnings: *Earnings Public* measures earnings in the public sector, *Earnings Private* measures earnings in the private sector, and *Earnings Total* measures total earnings in the formal sector. If an individual does not work in a specific sector in a given year (or if she does not work at all in the formal economy) we impute 0 earnings to the respective variable. All earnings measures are expressed in 2000 Brazilian Reals.<sup>22</sup>

<sup>20</sup>We code this variable as missing for occupations for which the *CBO* publication does not clearly specify an educational level.

<sup>21</sup>The 33.1% of supporters who are not matched to *RAIS* are never employed in the public sector or as employees in the formal private sector in this period. These supporters are either unemployed, working in the informal economy, self-employed, or holding a job as elected politician (or a combination of these) during the entire 1997-2014 period.

<sup>22</sup>To reduce the possible influence of outliers in the earnings variables in our main analysis, we winsorize the earnings variables at the 1% in our sample of political supporters. This choice does not significantly affect our estimates.

Each individual is allowed to have both a public sector *and* a private sector job in the same year. A small subset of individuals have multiple occupations within the same sector in the same year. For these cases, we keep the job with the highest wage, following the common practice of other studies that use the *RAIS* dataset (Menezes-Filho et al., 2008, Colonnelli and Prem, 2017).

We categorize each job into one of five broad occupational categories following the *CBO*: managerial, professional, high skilled technical, clerical, and blue collar. Finally, as described in the previous subsection, information from the *CBO* official publication allows us to build the variable *Unqualified*, a dummy variable equal to one if a worker's educational level is lower than the educational level typically required to perform her occupation.<sup>23</sup>

#### 4. STYLIZED FACTS ABOUT THE BRAZILIAN PUBLIC SECTOR

In this section, we present three stylized facts about the Brazilian public sector. First, electoral cycles are a crucial determinant of the size and composition of the public sector. Second, political supporters are more likely than other citizens to ever be employed in the public sector throughout their career, and this is particularly true in periods in which the local political party they support is in power. Third, public sector employees are less qualified than their counterparts in the private sector –i.e. have a lower education level than the one required for their occupation.

**4.1. Public Sector Turnover Spikes in Election Years.** Figure 1 provides evidence that local political dynamics have an impact on municipal public sector employment. The left panel plots the average share of yearly new hires and worker-job separations in the municipal public sector in Brazilian municipalities over the 1999-2014 period. For each municipality, the new hires are defined as the public sector workers

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<sup>23</sup>Before 2003, *RAIS* uses a previous occupational classification. While it is possible to construct a matching between the previous and the current classification, the former is less detailed and the same occupational code matches multiple, more detailed occupational codes in the latter. For this reason, when we exploit information on a worker's specific occupation we focus on the 2003-2014 period.

employed by the municipality who were not public sector workers in the same municipality the previous year. The terminations are defined as the municipal public sector workers who were employed by the municipality in the previous year and are not employed anymore. We compute shares using as denominator the total number of public sector workers in the municipality in the previous year.

Local public sector turnover is significantly higher in a year that immediately follows a local election (indicated by a green vertical line in the figure). This is consistent with [Akhtari et al. \(2016\)](#), who show the high rate of turnover for teachers and headmasters in local schools following the change of the party controlling a municipality. As it is clear from Panel B, there is no significant spike in private-sector turnover following an election year.

We formally investigate the magnitude of this turnover effect in [Table A.1](#).<sup>24</sup> Years following a municipal election see an increase in the share of new hires in the local public sector of about 8.4 percentage points, and an increase in the share of terminations of about 5 percentage points (columns 1 and 3). These represent a 50% and 41% increase relative to other years. The results are not affected by the inclusion of municipality-specific time trends (columns 2 and 4). The larger increase in the share of new hires relative to the increase in terminations translate into a significant net increase in local public sector employment following an election year (columns 5 and 6).

In sum, electoral dynamics seem to represent a crucial driver of local public sector employment: there is significant turnover in the workforce of the municipal public sector following election years, with a sizable net increase in the number of public sector workers.

#### 4.2. Political Supporters Are More Likely to Be Public Sector Workers.

[Table 1](#) provides an overview of the labor market careers of political supporters in the

<sup>24</sup>The panel of municipalities is not balanced since some municipalities are merged or split during this period. In addition, the share of new hires and terminations are missing for municipality-years with zero public sector employment. We obtain very similar estimates if we restrict the sample to a balanced panel of 4,579 municipalities that exist and have positive local public sector employment throughout the entire period.

period 1997-2014. We compare local candidates and donors to the population of 87,5 millions workers who enter the *RAIS* dataset during this period, having been employed in the formal economy for at least one year. For the purpose of this table, we exclude the 33.1% of supporters who are not present in *RAIS*, since they are never employed in the formal economy in the 1997-2014 period.

The table highlights a number of interesting findings. First, political supporters are significantly more likely than the average Brazilian worker to be ever employed in the public sector: among the universe of workers, 19% are employed in the public sector at least one year over the 1997-2014 period, while the share is 52% for donors and 69% for local candidates. Accordingly, political supporters are instead significantly less likely to be ever employed in the private sector. These figures can be rationalized by political supporters' greater public service motivation, or by the fact that they could obtain preferential access to public sector jobs.

Second, public sector occupations are lucrative relative to private sector ones: the average annual earnings of a job in the public sector are about 90% higher than the average earnings in the private sector. Conditional on being employed in the public sector, earnings of local candidates are on average lower than the earnings in the population (even though median wages are very similar), while local candidates earn more in the private sector. Consistent with donors belonging to a relatively richer group of citizens, their earnings in both the public and the private sector are on average the highest across the three groups of workers.

Third, the distribution of occupations in the public sector look very different for the three groups of workers. Political supporters are significantly more likely than the average public sector worker to be employed in managerial positions at the top of the bureaucracy. At the same time, they also more likely to be employed in clerical jobs, which include administrative assistants and supervisors, and other common white collar occupations that require a relatively low level of skills. On the other side, supporters are less likely than the average public sector worker to be employed in technical occupations



that require a relatively higher level of skills, such as primary school teachers and nurses, or as blue collar workers, such as garbage collectors, community health workers, or drivers. Finally, donors are over-represented among professionals, a category which includes high school and university professors as well as doctors.

Figure 2 reveals that the careers of political supporters seem affected by the fortunes of the political party they affiliate with. We analyze the evolution of supporters' employment probability in the public sector around the time of a municipal election, from 3 years before to 6 years after the election. Supporters are divided between candidates and donors, and we further differentiate between those who supported the mayor who ends up winning the election and those who supported one of the losing mayoral candidates. Supporters of the party who wins the mayoral elections experience a sharp increase in public sector employment probability that takes place precisely in the year of the election and somewhat dissipates at the end of the term. Since supporters of different parties are not in general comparable, in the next section we will use an identification strategy based on close races to identify whether these trends can be explained by the presence of patronage in public sector hiring.

**4.3. Public-Private Sector Gap in Workers' Pay and Qualification.** We can analyze the degree of qualification of the Brazilian workforce using the measure of unqualification that we constructed on the basis of a worker's level of education. About 17% of all public sector workers in the period 2003-2014 are unqualified for the occupation they are hired to perform. The share is particularly high at the municipal level (20.8%) and lower at the state (12.3%) and at the federal level (11.6%). The share of unqualified workers is 10.2% in the private sector.

The fact that the majority of workers have an educational level that is equivalent or higher to the one required for the occupation suggests that our measure of qualification is an important determinant of hiring decisions in the public sector. This is also consistent with the fact that applicants to most public sector jobs are required to present academic and professional credentials to become civil servants. However, a

sizable share of Brazilian workers appear unqualified, and there is a significant gap in qualifications between the public and the private sector.

This gap might be driven by a higher share of unqualified public sector workers relative to private sector workers employed in similar jobs, or, alternatively, by the fact that jobs in the public sector have different characteristics than jobs in the private sector. In order to disentangle these two different channels, in Table 2 we analyze whether municipal public sector workers are more likely to be unqualified than their counterparts in the private sector when we restrict the comparison to workers employed in similar occupations. Specifically, in each regression the dependent variable is a dummy equal to one if a worker is employed in a job for which she does not have the required educational level, and we include on the right hand side an indicator equal to one for a municipal public sector job. We include municipality fixed effects, year fixed effects, and 43 occupation groups fixed effects, which allow us to narrow the comparison to workers employed in very similar occupations.<sup>25</sup> We further control for a worker's job tenure and for the worker's age. After we control for these job's and worker's characteristics, public sector workers are 1.3 percentage points more likely to be unqualified than private sector workers (column 1). In columns 2-5 we analyze which occupational categories are responsible for this gap. While there is no gap in professional and clerical occupations, high skilled technical workers and managers are significantly more likely to be unqualified for their position. The gap is particularly large for managerial occupations, with public sector workers being 7.2 percentage points more likely to have an educational level that is lower than the one required for their position.

One possible explanation for the presence of this gap is that municipal public sector jobs pay less than similar private sector jobs. Table 3 shows that this is not the

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<sup>25</sup>Specifically, the occupation groups correspond to the groups defined by the first 2 digits of the occupation code (Subgrupo Principal) in the *Classificação Brasileira de Ocupações 2002*. For jobs in the managerial category, there are only 3 groups capturing public sector managers, private sector managers and managers of public-interest entities, and we therefore aggregate the 3 groups in a unique group.

case. Consistent with previous evidence ((Finan et al., 2015)), earnings in the public sector are significantly higher than in the private sector: this is particularly true for managerial jobs (an 11.9% earnings gap) and for high skilled technical jobs (a 9.4% earnings gap).

## 5. EMPIRICAL STRATEGY

Our goal is to provide a causal estimate of patronage, defined as the labor market return in the public sector from being a supporter of the ruling party in a municipality. In the ideal experiment, we would compare the change in public sector employment probability (or public sector earnings) following the election for supporters of the ruling party, with the change that they would have experienced in the counterfactual scenario in which they were supporting the losing side in the election. In this section, we discuss how we leverage close electoral races generating plausibly exogenous variation in political power to approximate this ideal experiment and provide a causal estimate of patronage. Specifically, in our main analysis we compare the careers in the public sector for supporters of the party winning a municipal election with the careers of supporters of the losing party in the *same* municipality and in the same year (a within-election design). As we discuss below, the estimates from this design are a combination of a higher hiring probability for supporters of the winning side and of a higher probability of losing the job for supporters of the losing side. To separately identify these two effects, we use a second, related strategy (cross-election design), in which we compare the careers in the public sector for supporters of the party winning a municipal election with the careers of supporters of the losing party in an election taking place in a *different* municipality in the same year.

**5.1. Within-election design.** In our main strategy, we compare the labor market outcomes of supporters of the successful mayoral candidate with the outcomes of supporters of the runner-up mayoral candidate who run in the same election (*i.e.* in the

same municipality and in the same year); we further restrict the sample to municipalities where the mayor has a margin of victory over the runner up of 5% or less.<sup>26</sup>

We modify the standard regression discontinuity design (RDD) approach (Imbens and Lemieux, 2008) to close elections by extending our specification to multiple time periods, in a difference-in-difference (DiD) framework. Specifically, for our main estimation method we apply local linear regression and we estimate the following model:

$$(5.1) \quad y_{item} = \alpha_{ie} + \gamma_{te} + \sum_{t=-3}^{+4} \beta_t Mayor_{iem} + \sum_{t=-3}^{+4} \theta_t MV_{em} + \sum_{t=-3}^{+4} \psi_t MV_{em} \times Mayor_{iem} + \epsilon_{item}$$

where  $y_{item}$  is the labor market outcome (employment or earnings) of supporter  $i$ , who supports mayoral candidate  $m$  in election  $e$ , measured  $t$  periods (*i.e.* years) before/after the election year.  $\alpha_{ie}$  and  $\gamma_{te}$  are supporter-election and period-election fixed effects.<sup>27</sup>  $Mayor_{iem}$  is a dummy that equals one if mayoral candidate  $m$  won election  $e$  at time 0, becoming the municipality mayor from period 1 to 4. Finally,  $MV_{em}$  measures the margin of victory of mayoral candidate  $m$  in election  $e$ . To extend the RDD approach to our DiD framework we allow the effect of  $MV_{em}$  to differ not only on both sides of the margin of victory cutoff but also over time. The coefficients of interest are  $\beta_t$ , where  $t$  ranges from 3 years before the election to 4 years after the election. We constrain the coefficient to be zero in the year of the election ( $\beta_0 = 0$ ). Throughout the analysis, standard errors are double clustered at the supporter and

<sup>26</sup>As we show in the appendix, the results are highly robust to restricting the bandwidth to a 3% or 1% margin of victory.

<sup>27</sup>Since candidates can run, and donors can contribute, in multiple elections, each supporter can enter the sample multiple times as part of different “natural experiments”. The inclusion of supporter-election and period-election fixed effects ensure that, in each election, supporters of the winning mayor are compared to supporters of the runner-up *in the same election*.

election level. We show our results both by looking at all supporters together, and by looking separately at candidates and donors.<sup>28</sup>

We present the results in two additional ways. First, we show a non-parametric representation of the results by plotting the dynamics of mean labor market outcomes for supporters of the elected mayor and of the runner-up around the year of election. We consider this to be a fully transparent way of describing the labor market trends around the election. Second, we estimate the following more parsimonious specification:

$$(5.2) \quad y_{item} = \alpha_{ie} + \gamma_{te} + \beta^{Post} Mayor_{iem} \times Post_{et} + \sum_{t=-3}^{+4} \theta_t MV_{em} + \sum_{t=-3}^{+4} \psi_t MV_{em} \times Mayor_{iem} + \epsilon_{item}$$

where  $Post_{et}$  is a dummy turning one in the post-election period. The coefficient  $\beta^{Post}$  captures the average effect of supporting the ruling party over the four years of the mayor's term. This specification is useful in quantifying the average effect of supporting the ruling party on a supporter's career in the public sector.

The identifying assumption is that, in absence of the treatment, the labor market outcomes of supporters of the mayoral candidate who wins by a small margin would have evolved similarly to the labor market outcomes of supporters of the runner-up mayoral candidate in the same election. Tables 4 and 5 provide evidence supporting this assumption using information on a wide array of pre-treatment covariates. Pre-treatment covariates appear largely similar between supporters of the winning mayor and supporters of the runner-up, and there are not significant differential trends between supporters of the two parties in the years preceding the election.

This identification strategy leverages only within-election variation, and the final estimates will represent averages of the effects over different municipalities and different years. While our focus on close races ensures us that our estimates are internally valid

<sup>28</sup>As an individual can donate in elections in different municipalities in the same year, in 0.4% of the cases a donor is a supporter of the winning mayor in a municipality, and of the runner-up in another municipality in the same year. As we include supporter-election fixed effects, we do not drop these cases from the analysis and we consider them as both "treated" and "control" observations, depending on the municipality considered. Dropping these few cases from the analysis does not affect the results.

within each election, intuitively we may expect some elections to exhibit larger effects: specifically, elections that lead to big changes in the coalition in power will be more likely to generate larger changes in the pool of municipal public sector workers and therefore to contribute more to the identification of the patronage effect. For instance, consider an election where the incumbent mayor remains in power and is supported by the same coalition of parties that were supporting her in the previous electoral cycle: if political alignment is a significant driver of public sector employment, we can expect that most of the supporters of the winning mayor had already obtained a public sector job before the election and will keep it after the election; similarly, we can expect that supporters of the runner-up will not obtain a public sector job after the election, but they were also less likely to have a public sector job in the pre-election period. Therefore, we will expect to find a small estimate of patronage in this election. Consider instead an election where after the election a completely different coalition of parties get in power. Intuitively, we will expect substantial turnout in the pool of public sector workers, with supporters of the coalition that was in power before the election more likely to lose their public sector job, if they had one, and supporters of the new ruling coalition more likely to be hired, if they were not already employed in the public sector. The combination of these two effects will translate in a large patronage effect.

**5.2. Cross-election design.** As discussed in the final part of the previous subsection, the estimates from the within-municipality design will be a combination of two effects: if political alignment is a significant driver of public sector employment, supporters of a party that was not in power in the previous electoral cycle will experience an increase in the probability of hiring; similarly, supporters of a party that was in power in the previous electoral cycle but now loses the election will experience an increase in the probability of losing their job in the public sector if they had one. While for most of the paper we will focus on our within-election design, in order to separately identify these two effects we present estimates that leverage a second, related identification strategy.

Specifically, we first divide political supporters in election  $t$  between those who are supporting a party that was already in the ruling coalition in the previous election cycle and those who are supporting a party who was *not* in the ruling coalition in the previous election cycle. With a slight abuse of terminology, we call the first group the “old supporters” and the second group the “new supporters”.<sup>29</sup>

Focusing on the subsample of “old supporters”, we compare the labor market outcomes of those who are supporting a party that wins the election at time  $t$  (and therefore maintain their connection to the ruling party in the municipality beyond period  $t$ ) with the labor market outcomes of those who, in a different municipality, are supporting a party that loses the election at time  $t$  (and therefore lose their connection to the ruling party in the municipality after period  $t$ ). As for the previous identification strategy, we restrict the sample to municipalities where the mayor has a margin of victory over the runner up of 5% or less, to ensure that the “old supporters” in the treatment and the control groups are comparable. This exercise allows us to identify the change in public sector employment probability that takes place when a political supporter loses his connection to the ruling party.

For our main estimation method we once again apply local linear regression and we estimate the following model:

$$(5.3) \quad y_{it\tau m} = \alpha_{i\tau} + \gamma_{t\tau} + \sum_{t=-3}^{+4} \beta_t \text{Loser}_{i\tau m} + \sum_{t=-3}^{+4} \theta_t \text{MV}_{\tau m} + \sum_{t=-3}^{+4} \psi_t \text{MV}_{\tau m} \times \text{Loser}_{i\tau m} + \epsilon_{it\tau m}$$

where  $y_{it\tau m}$  is the labor market outcome (employment or earnings) of supporter  $i$ , who supports mayoral candidate  $m$  in election taking place in year  $\tau$ , measured  $t$  periods (*i.e.* years) before/after the election year.  $\alpha_{i\tau}$  and  $\gamma_{t\tau}$  are supporter-year of the election and period-year of the election fixed effects.  $\text{Loser}_{i\tau m}$  is a dummy that equals one if mayoral candidate  $m$  lost election in year  $\tau$ , making her supporters no

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<sup>29</sup>Since the *TSE* does not provide data on the composition of municipal coalitions for the 1996 election cycle, we cannot classify supporters in these two subgroups, and therefore we do not use the 2000 election cycle in the cross-election design.

longer connected to the ruling party after period 0.  $MV_{\tau m}$  is defined as in equation 5.1 and its effect is similarly allowed to vary not only on both sides of the margin of victory cutoff but also over time.

Focusing instead on the subsample of “new supporters”, we compare the labor market outcomes of those who are supporting a party that wins the election at time  $t$  (and therefore gain a connection to the ruling party in the municipality after period  $t$ ) with the labor market outcomes of those who, in a different municipality, are supporting a party that loses the election at time  $t$  (and therefore are not connected to the ruling party in the municipality both before and after period  $t$ ). This exercise allows us to identify the change in public sector employment probability that takes place when a political supporter gains a connection to the ruling party.

In this case, our local linear regression model is the following:

$$(5.4) \quad y_{it\tau m} = \alpha_{i\tau} + \gamma_{t\tau} + \sum_{t=-3}^{+4} \beta_t \text{Winner}_{i\tau m} + \sum_{t=-3}^{+4} \theta_t MV_{\tau m} + \sum_{t=-3}^{+4} \psi_t MV_{\tau m} \times \text{Winner}_{i\tau m} + \epsilon_{it\tau m}$$

where  $\text{Winner}_{i\tau m}$  is a dummy that equals one if mayoral candidate  $m$  won election in year  $\tau$ , making her supporters connected to the ruling party after period 0, and all other variables are defined as in equation (5.3).<sup>30</sup>

The identifying assumption of this cross-election strategy is that, within each of the two subsamples of supporters (the “old supporters” and the “new supporters”), in absence of the treatment the labor market outcomes of supporters of a mayoral candidate who wins by a small margin would have evolved similarly to the labor market outcomes of supporters of a runner-up mayoral candidate who run in the same year. Tables 6, 7, 8 and 9 provide evidence supporting this assumption.

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<sup>30</sup>To quantify average effects we will also estimate two more parsimonious specifications similar to (5.2).



## 6. RESULTS

6.1. **Main Results: within-election results.** Figure 3 shows the results of the estimation of equation (5.1) using probability of employment in the public sector (left) and earnings in the public sector (right) as dependent variables. The top panel pools all supporters, while the bottom panel presents separate estimates for the sample of candidates (in blue) and of donors (in red). Figure 4 reports the non-parametric representation of the results by plotting the dynamics of mean public sector outcomes for candidates and donors, respectively. Finally, Table 10 shows the results of the estimation of equation (5.2).<sup>31</sup>

Consistent with a sizable presence of patronage in public sector hiring, we observe a large and statistically significant impact of supporting the ruling party on the probability of being employed in the public sector and on public sector earnings. The effect fully materializes at the time of the election, with no differential pre-trends for any of the outcome variables, and it is significant for both types of supporters. The estimates of Table 10 provide the average causal effect of supporting the ruling party: supporting the winning party in a municipality increases the average probability of having a public sector job by 9.4 percentage points (11.6 p.p for candidates and 5.7 p.p for campaign donors). This represents a 39% increase relative to the average employment probability before the election (45% for candidates and 27% for donors). Relative to the pre-election period, supporters of the winning party increase their public sector earnings by 39% (50% for candidates and 24% for campaign donors).<sup>32</sup>

<sup>31</sup>Appendix Tables A.4 and A.5 present results when we restrict the margin of victory to define an election as “close” to 3% and 1%.

<sup>32</sup>As shown in Appendix Table A.2, most of the patronage effect for candidates is driven by those who fail to win a council seat. However, the effect is significant also for the subset of candidates elected to the council, consistent with the part-time nature of the job as local councilor, which allows successful candidates to have also a job in the public sector. These results point to a system of *within-coalition insurance*. Candidates may spend considerable financial resources as well as time in the race, and can therefore be attracted to politics by the promise of a public sector job in the negative state of the world in which they do not win a council seat, while they are automatically rewarded with the political wage and other perks from office if they are elected.

Figure 4 highlights how the overall effect is driven both by an increase in employment probability for supporters of the winning mayor and by a (smaller) decrease in employment probability for supporters of the opponent who had a public sector job in the pre-election period. The overall effect is therefore the sum of a “premium” for the supporters of the ruling party and of a “punishment” for the supporters of the runner-up mayoral candidate.

Figure 5 shows the discontinuous jump in the increase in public sector employment probability after the election for the group of candidates (Panel A) and of donors (Panel B). While the estimates cannot be interpreted as causal as we move far away from the discontinuity, it is interesting that the effect is similar even if we consider relatively less competitive elections, suggesting that the effect we uncover is likely to generalize to municipalities where the mayoral race was decided by larger vote margins.

We next investigate whether public sector jobs are allocated to supporters who were previously employed in the private sector. Panel A of Table 11 shows only a limited crowding out effect on private sector employment. As a consequence, Panel B shows that there is a sizable increase in total formal sector earnings for supporters of the winning mayor.<sup>33</sup>

Since our data have information on the specific job within the public sector obtained by a candidate, we can break down public sector jobs among those under the jurisdiction of the local, state, and federal government. In Table 12 we present the results of the estimation of equation (5.2) using employment probabilities in a local, state or federal public sector job as separate dependent variables. In line with the mayor being able to allocate to political supporters only jobs over which she has discretion, the whole alignment effect is concentrated at the municipal level.

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<sup>33</sup>Appendix Table A.3 presents the patronage estimates for the subsample of supporters who are not already employed in the public sector at the time of the election: supporting the winning party translates into a 9.9 p.p increase in public sector employment probability.

The results presented in this section points to a significant presence of patronage in the Brazilian local public sector: supporters of the party holding power in a municipality are significantly more likely to have a public sector job. The effect does not seem limited to a specific group of political supporters: while the magnitude of the effect is larger for party members who run for a seat in a local council, individuals who provided financial support to the winning coalition enjoy a sizable benefit as well. We next investigate which occupations are more likely to be affected by patronage, the evolution of supporters' public sector careers after the end of the electoral term, and whether the public sector premium enjoyed by political supporters is a function of the amount of support provided to the winning party.

**6.2. Cross-election results.** In this section, we try to separately identify the two effects that drive the significant patronage effect that we uncover. The effect we found in the previous section can be decomposed in the increase in the probability of employment in the public sector for supporters of a party that was not in power in the previous electoral cycle, and in the decrease in employment probability for supporters of a party that was in power in the previous electoral cycle but loses the new election.

Figure 6 and 7 shows the results of the estimation of equation (5.3) and (5.4) using probability of employment in the public sector (left) and earnings in the public sector (right) as dependent variables. The top panel pools all supporters, while the bottom panel presents separate estimates for the sample of candidates (in blue) and of donors (in red). Table 13 shows the results of the estimation of a more parsimonious equation similar to (5.2).

Panel A of Table 13 shows that, when a supporter who was previously *not* connected to the ruling party gains a connection (*i.e.* the mayor he supports is elected), he experiences a large increase in the probability of having a public sector job (an increase of 10.1 p.p, or 46% of the average probability in the pre-election period) and in public sector earnings (a 44% increase relative to the pre-election period).

Symmetrically, as shown in Panel B of the figure when a supporter who was previously connected to the ruling party loses his connection (*i.e.* the mayor he supports loses the election), he experiences a large decrease in the probability of having a public sector job (by 8.6 p.p, or 30% of the average probability in the pre-election period) and in public sector earnings (31% relative to the pre-election period).

While for the rest of the paper we focus on our within-election strategy, it is important to remember that the patronage effects that we will estimate in the next sections will be combinations of an increase in employment probability for supporters who acquire a connection to the ruling party and of a decrease in employment probability for supporters who lose their connection.

**6.3. Patronage Across the Public Sector Hierarchy.** Is patronage present only for specific occupations or is it widespread across the whole public sector hierarchy? To answer this question we generate five different indicator variables, each turning to one if, in a given year, a supporter has a job belonging to one of our five occupational categories (managerial, professional, technical workers, clerical occupations, and blue collar). Table 14 shows the estimated coefficients  $\beta^{Post}$  from estimating equation (5.2) for these five different dependent variables. There is a positive and significant effect throughout the whole hierarchy of occupations: supporters of the winning mayor are significantly more likely to be hired for a job at the top of the bureaucratic hierarchy—in managerial positions—, but also as professional or technical workers, as well as for jobs requiring lower skills' levels.<sup>34</sup>

The fact that patronage is distributed across a wide range of public sector jobs seems inconsistent with an interpretation for which patronage is only the result of a mayor's desire to achieve a high degree of ideological alignment between the executive power and the top of the bureaucracy in order to successfully fulfill the mayor's agenda.

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<sup>34</sup>The only exception seems to be that donors supporting the winning mayor are not significantly more likely to be hired as professional.

Consistent with the results of Table 14, we find that the average increase in public sector earnings enjoyed by supporters of the winning mayor masks considerable heterogeneity. Using information on the universe of public sector workers over the sample period, we obtain information on the average wage paid in each public sector occupation in a given municipality in a given year. We use this information to generate five different indicator variables, each turning to one if, in a given year, a political supporter has a job that falls into a specific quintile of the public sector wage distribution for that municipality in that year. Table 15 repeats the estimation of equation (5.2) for these five different variables. Occupations in which supporters of the ruling party are hired are highly heterogeneous in terms of compensation: the mayor's political supporters are not only more likely to be hired in occupations at the top of the wage distribution of their municipality, but are also more likely to obtain public sector jobs that are in the middle or at the bottom of the distribution. The results are consistent with efforts by the political power to distribute rents to a large set of political supporters through a wide range of different public sector jobs.

**6.4. The Evolution of Supporters' Careers in the Long-Run.** In this section, we investigate how political supporters' careers in the public sector evolve at the end of the four-years electoral term. On the one side, we can expect supporters' public sector careers to be deeply linked to the fortunes of their party: after the end of the term, the party may lose control of the municipality and, in turn, the benefits of alignment may dissipate, as the new mayor substitute workers allocated to public jobs by the former ruling party with individuals in her own political network.

On the other side, hiring political supporters may be an efficient way for the mayor to screen among a set of applicants, since the mayor could have better information on the ability to perform a specific job for the set of individuals close to her – information that is difficult to observe ex-ante for the general applicant. Therefore, the mayor could find it optimal to hire a political supporter, so as to improve the quality of job-applicant matches. To the extent that public sector workers reveal at least part of their ability

as they perform the job, if this channel were at play we should not expect them to lose their job as soon as soon as the party of the mayor changes.<sup>35</sup>

The average employment probabilities in the public sector plotted in Figure 8 provide evidence consistent with the interpretation that aligned workers hired after the election are *not* characterized by higher *ex-ante* unobservable ability in the job in which they are hired. We focus on the pool of supporters of the mayor who is elected at time 0, further dividing them between (i) those whose party maintains power in the municipality after the end of the four-years term (blue line), and (ii) those whose party fails to re-elect a mayor for the next term (red line).<sup>36</sup> In the first group, supporters largely keep their job in the longer-run. Among supporters whose party loses power at the end of the term, there is a sharp decrease in the probability of having a public sector job.

These dynamics suggest that public sector jobs allocated to political supporters are deeply linked to the fortunes of the party, and provide some evidence that the screening of better applicants for a job is not a strong channel behind the patterns documented in the previous sections.

**6.5. Patronage as a Function of Political Support.** In this section, we ask whether the public sector premium enjoyed by political supporters of the mayor is a function of the amount of support provided to the winning party. For candidates to the local council, we use two different objective measures of political support: a candidate's electoral performance, and the amount of money she spent during the campaign. For donors, we use the amount of money contributed as a proxy for political support.

We start by looking at candidates' electoral performance. Candidates obtaining a large number of personal votes are valuable to the mayor's coalition for two reasons. First, since council seats are awarded to a coalition in proportion to the total number of

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<sup>35</sup>The crucial assumption of this argument is that the degree of ability revelation to the new mayor is on average not lower than the private information that the new mayor has on potential replacements among individuals in her network.

<sup>36</sup>Electoral coalitions can change from one election to the next. Therefore, for the purpose of this analysis, we define supporters of the winning party as the candidates belonging to the mayor's party (rather than the mayor's coalition) and the donors donating to the mayor's party (rather than to any party in the mayor's coalition).

votes received by its candidates, more successful candidates increase the overall number of seats awarded to the coalition. Second, personal votes for a candidate to the local council are also likely to translate into votes for the mayor supported by the candidate. As shown in Appendix Table A.2, most of the patronage effect for candidates is driven by those failing to win a council seat. Therefore, we focus on this subset of candidates in this section.

We calculate, for each losing candidate, the quintile of the vote share distribution within her coalition (either the mayor's or the runner-up's coalition) in which she falls (considering only votes brought by losing candidates). We are therefore categorizing losing candidates on the basis of the number of votes that they contributed to the coalition. We then create five indicator variables ( $Quintile_{ie}^q$ ), turning to one if candidate  $i$ 's within-coalition vote share in election  $e$  falls into quintile  $q$ . We then estimate an augmented version of equation (5.2) in which we include four interactions terms between  $Quintile_{ie}^q$  and  $Aligned \times Post$ .<sup>37</sup>

$$\begin{aligned}
 (6.1) \quad y_{item} = & \alpha_{ie} + \gamma_{te} + \sum_{q=2}^{+5} \beta^{Aq} Q_{iem}^q \times Mayor_{iem} \times Post_{te} + \\
 & + \sum_{q=2}^{+5} \beta^q Q_{iem}^q \times Post_{te} + \beta^A Mayor_{iem} \times Post_{te} + \\
 & + \sum_{t=-3}^{+4} \theta_t MV_{em} + \sum_{t=-3}^{+4} \psi_t MV_{em} \times Mayor_{iem} + \epsilon_{item}
 \end{aligned}$$

This specification allows us to investigate whether the patronage effect is stronger for candidates who contributed relatively more votes to their coalition. Column 1 of Table 16 presents the estimated patronage effect at different quintiles of the vote share distribution.<sup>38</sup> Consistent with the hypothesis that candidates who are more valuable from an electoral perspective are rewarded more, we find that the patronage effect is

<sup>37</sup>We include interaction terms using only  $Quintile_{ie}^q$  for  $q$  from 2 to 5. Therefore, the coefficient on  $Aligned \times Post$  alone gives the patronage effect conditional on being in the bottom quintile of the vote share distribution. To obtain a triple-difference specification, we also include interactions of the  $Quintile_{ie}^q$  dummies with an indicator that turns to one in the post-election period.

<sup>38</sup>In particular, for the bottom quintile, the effect is simply the coefficient on the  $Aligned \times Post$  indicator, while for higher quintiles the effect is the sum of the coefficient on  $Aligned \times Post$  and the coefficient on the interaction between  $Aligned \times Post$  and  $Quintile_{ie}^q$ .

strictly increasing in a candidate's position in the vote share distribution. While the effect is positive and significant throughout the whole distribution, the patronage effect monotonically increases in the amount of support provided, with candidates in the top quintile being about 8.9 percentage points more likely than candidates in the bottom quintile to obtain a public sector job thanks to their alignment with the mayor.

In Column 2 of Table 16 we repeat the same analysis categorizing losing candidates on the basis of the amount of money that they spent in the campaign. Once again, losing candidates at the bottom of the distribution benefit significantly less from their alignment with the mayor than losing candidates that spent more resources to campaign.

Finally, Column 3 of Table 16 focuses on donors, looking at the patronage effect as a function of the quintile in the distribution of amount donated. As for candidates, donors who provided more support are significantly more likely to be hired in the public sector: moving from the bottom to the top quintile of the distribution increases the patronage effect by 2.1 percentage points.

## 7. PATRONAGE AND HUMAN CAPITAL IN THE PUBLIC SECTOR

In this section, we investigate one important potential real effect of patronage: its impact on the quality of the pool of public sector workers. Being a political supporter of the ruling party could increase the probability of obtaining a public sector job conditional on being qualified for the position: in this case, the presence of patronage would not lead to a decrease in the quality of the pool of public sector workers. Alternatively, being a political supporter could act as a substitute for an applicant's level of qualifications, lowering the average quality of the new hires.

To distinguish between these two hypotheses, we leverage the coding of the required level of education to perform each occupation in the Brazilian public sector, together with information on a supporter's education. Since we do not have information on the



education of all supporters for the sample of donors, we exclude them from the analysis of this section.<sup>39</sup> We estimate a series of triple-differences equations of the form:

(7.1)

$$y_{item} = \alpha_{ie} + \gamma_{te} + \beta^{PQ} \text{Mayor}_{iem} \times \text{Qualified}_i \times \text{Post}_{et} + \beta^P \text{Mayor}_{iem} \times \text{Post}_{et} + \beta^Q \text{Qualified}_i \times \text{Post}_{et} + \sum_{t=-3}^{+4} \theta_t \text{MV}_{em} + \sum_{t=-3}^{+4} \psi_t \text{MV}_{em} \times \text{Mayor}_{iem} + \epsilon_{item}$$

where  $y_{item}$  is a dummy equal to one if, in period  $t$  relative to the election-year  $e$ , supporter  $i$  is employed in a public sector job that requires a specific educational level, the variable  $\text{Qualified}_i$  is a dummy equal to one if supporter  $i$  has a level of education that is equal or higher to the one required to perform this job, and all the other variables are defined as before. We estimate three different specifications, where we focus on jobs for which the required level of education is secondary school degree, high school degree, or college degree, respectively. The coefficient  $\beta^P$  measures the average impact of supporting the ruling party on the probability of obtaining a public sector job requiring a specific level of education, for the subsample of candidates who have an educational level that makes them *not* qualified for those jobs. More importantly,  $\beta^{PQ}$  measures the differential impact of being qualified for a job on the probability of being hired for the supporters of the ruling party relative to the supporters of the runner-up mayoral candidate.

Table 17 presents the results. Column 1 focuses on public sector jobs that require secondary school education, showing that for this category of jobs the importance of qualifications is significantly lower for supporters of the winning party: having a secondary school degree increases the chances of obtaining a job requiring this level of education by 0.8 percentage points *less* for supporters of the winning mayor. Column

<sup>39</sup>We have information on donors' education only for donors who have been matched to the *RAIS* dataset. Since we have data on candidates' education from the *TSE*, we have this information for all candidates independently on whether they were matched to *RAIS*.

3 reveals a similar pattern when we focus on public sector jobs that require a college degree, while the coefficient is negative but statistically insignificant for jobs that require a high school degree.

These results suggest that patronage lowers the level of screening on education for applicants to a public sector job, providing evidence that patronage has a negative effect on the quality of the pool of public sector workers along one important observable measure of quality, *i.e.* education.

## 8. CONCLUSION

In this paper we provide causal estimates of the importance of patronage as a driver of public sector employment. We do so in the context of Brazilian local governments, relying on a novel dataset on the labor market careers of more than 2,000,000 supporters of local political parties. Exploiting exogenous variation to supporters' alignment with the ruling party provided by competitive municipal elections, we find that political supporters of the ruling party are on average 9.4 percentage points more likely to be employed in the public sector - a 39% increase relative to the pre-election period.

The patronage effect is widespread across the entire public sector hierarchy, from managerial positions to more elementary occupations as front-service providers, showing that our results are not fully explained by a mayor's attempt to improve the degree of ideological alignment between the executive and the top of the bureaucracy. The persistence of the patronage effect is closely linked to the fortunes of the supported party. If a party fails to re-elect a mayor in the successive term, most political supporters of the ruling party lose their public jobs. This finding suggests that the screening of better applicants for a job is likely not a strong channel behind the patterns that we document.

Finally, we investigate one important real effect of patronage: its impact on the quality of the pool of public sector workers. We find that the patronage effect is largely

orthogonal to a supporter's educational qualifications, which suggests that patronage might lead to a negative effect on the quality of the pool of public sector workers.

These findings can help explain the fact that electoral cycles are a crucial determinant of the size and composition of the Brazilian public sector workforce, and why public sector employees are less qualified in terms of education than workers in the private sector.

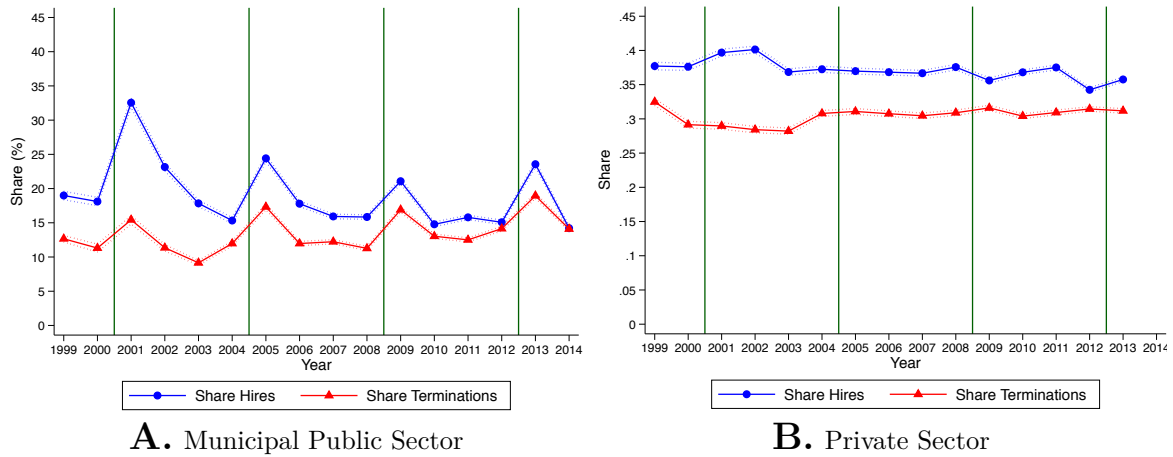
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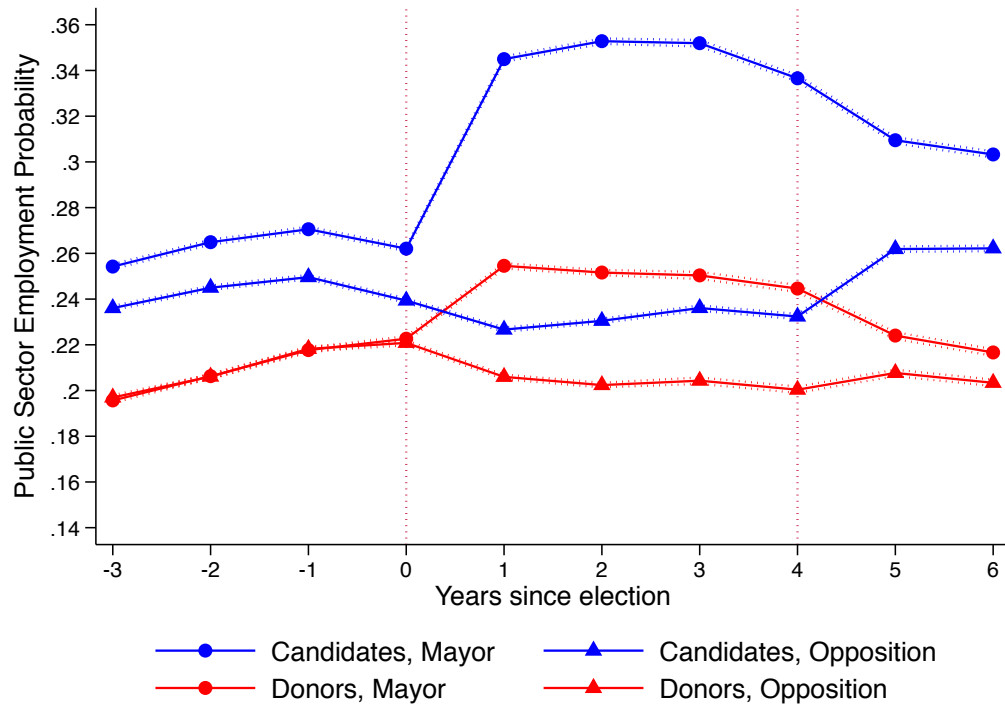
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FIGURE 1. Turnover in Municipal Public and Private Sector



*Notes:* The figure shows the average share of hires and terminations in the local public sector (left panel) and in the private sector (right panel) by year in Brazilian municipalities. Each observation in the data is a municipality-year pair. 95% confidence intervals are shown in parentheses. The green lines indicate the time of local elections, which were held in November of 2000, 2004, 2008, 2012, with the mayor taking office in January of 2001, 2005, 2009, 2013.

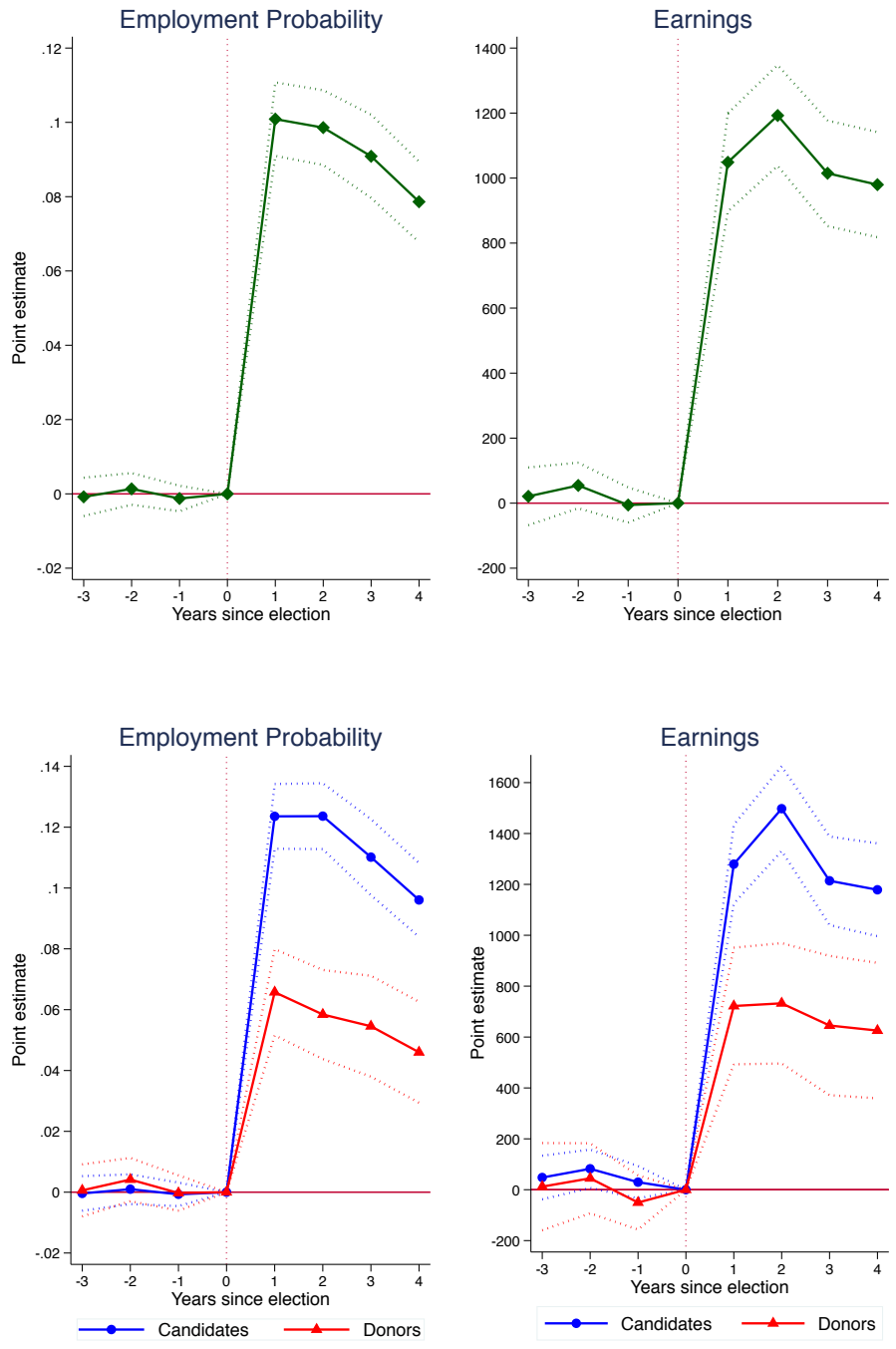
FIGURE 2. Labor Market Trends in the Public Sector for Universe of Supporters



*Notes:* The figure shows the dynamics of average public sector employment probability around the election for all political supporters of the elected mayor or of one of the parties running against the elected mayor. The sample of supporters is split between candidates who run for a seat in the local council (in blue) and donors (in red). The sample of elections is 2000, 2004, 2008, 2012 for candidates and 2004, 2008, 2012 for donors. The election is held in period 0 and the elected mayor is in power until period 4. See section 3.3 for a description of the outcome variables. The dotted lines show 95% confidence intervals around the means. The sample is composed of 508,218 candidates supporting the mayor, 622,748 candidates supporting one of the opposition parties, 524,191 donors supporting the mayor, and 570,076 donors supporting one of the opposition parties.

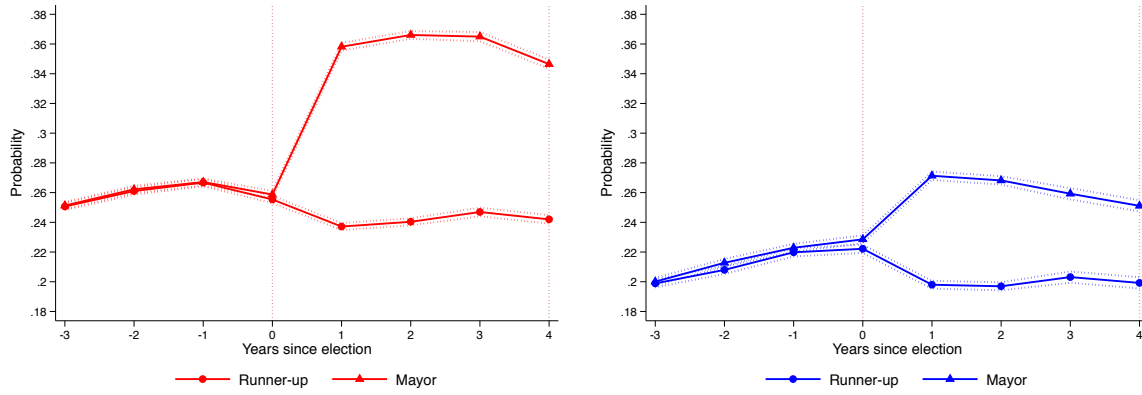


FIGURE 3. Dynamic Patronage Effect on Public Sector Outcomes



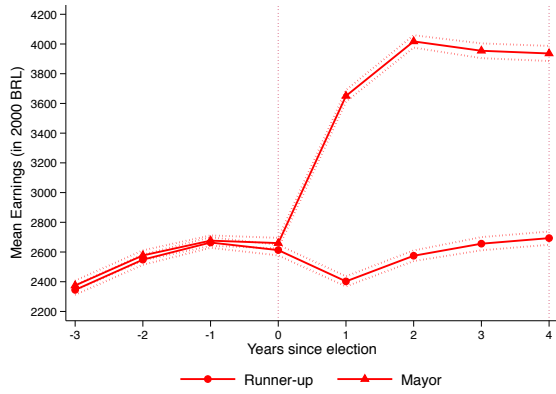
*Notes:* The figure presents the estimated  $\beta_t$  coefficients from equation (5.1) for probability of employment in the public sector (left) and annual public sector earnings (right). The top panel pools all the supporters together. The bottom panel present separate estimates for the sample of candidates (in blue) and of donors (in red). See section 3.3 for a description of the outcome variables. The sample of elections is 2000, 2004, 2008, 2012 for candidates and 2004, 2008, 2012 for donors. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The top panel includes 418,146 supporters across 5,419 elections. The bottom panel includes 233,238 supporters across 5,413 elections for the sample of candidates, and 177,590 across 3,162 elections for the sample of donors. The dotted lines show 95% confidence intervals and are based on standard errors double clustered at the candidate and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

FIGURE 4. Trends in Public Sector Outcomes of Political Supporters in Close Races

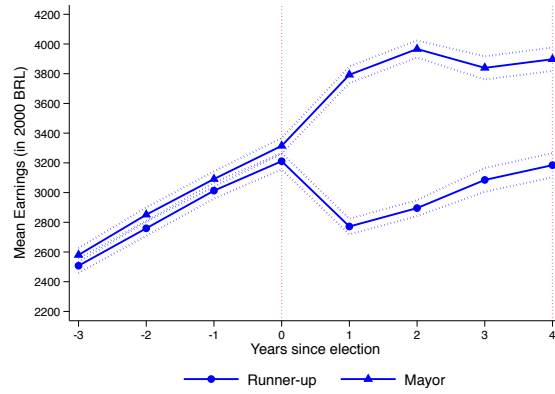


A. Public Employment Probability, Candidates

B. Public Employment Probability, Donors



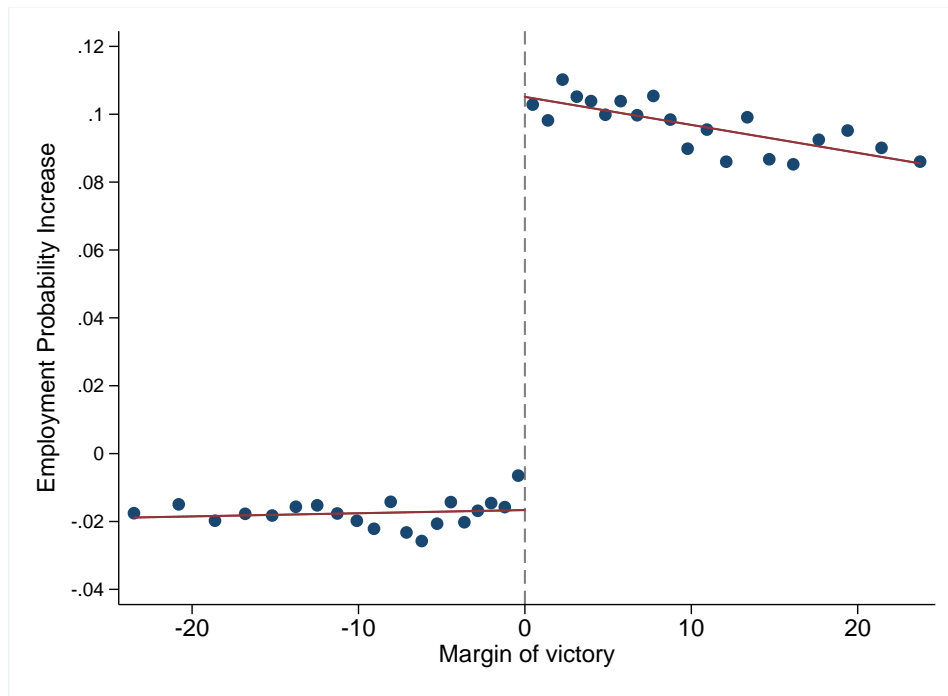
C. Public Earnings, Candidates



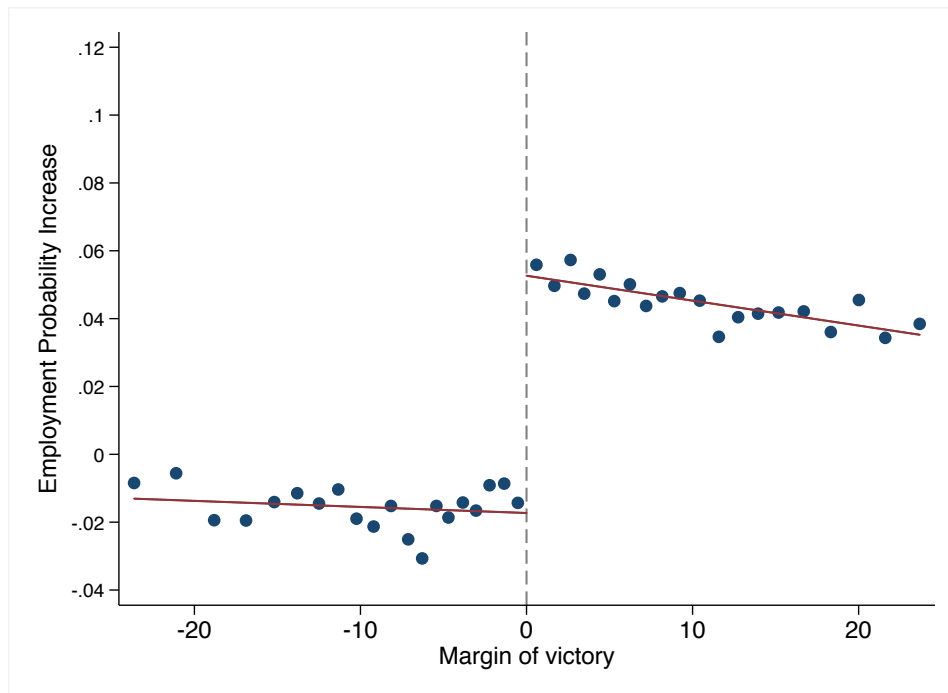
D. Public Earnings, Donors

Notes: The figure shows the dynamics of mean labor market outcomes for supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. Panel A and B focus on public sector employment probability for the subsample of candidates to the local council and of donors, respectively. Panel C and D focus on public sector earnings for the subsample of candidates to the local council and of donors, respectively. See section 3.3 for a description of the outcome variables. The sample of elections is 2000, 2004, 2008, 2012 for candidates and 2004, 2008, 2012 for donors. The dotted lines show 95% confidence intervals around the mean.

FIGURE 5. Increase in Public Sector Employment Probability and Political Alignment



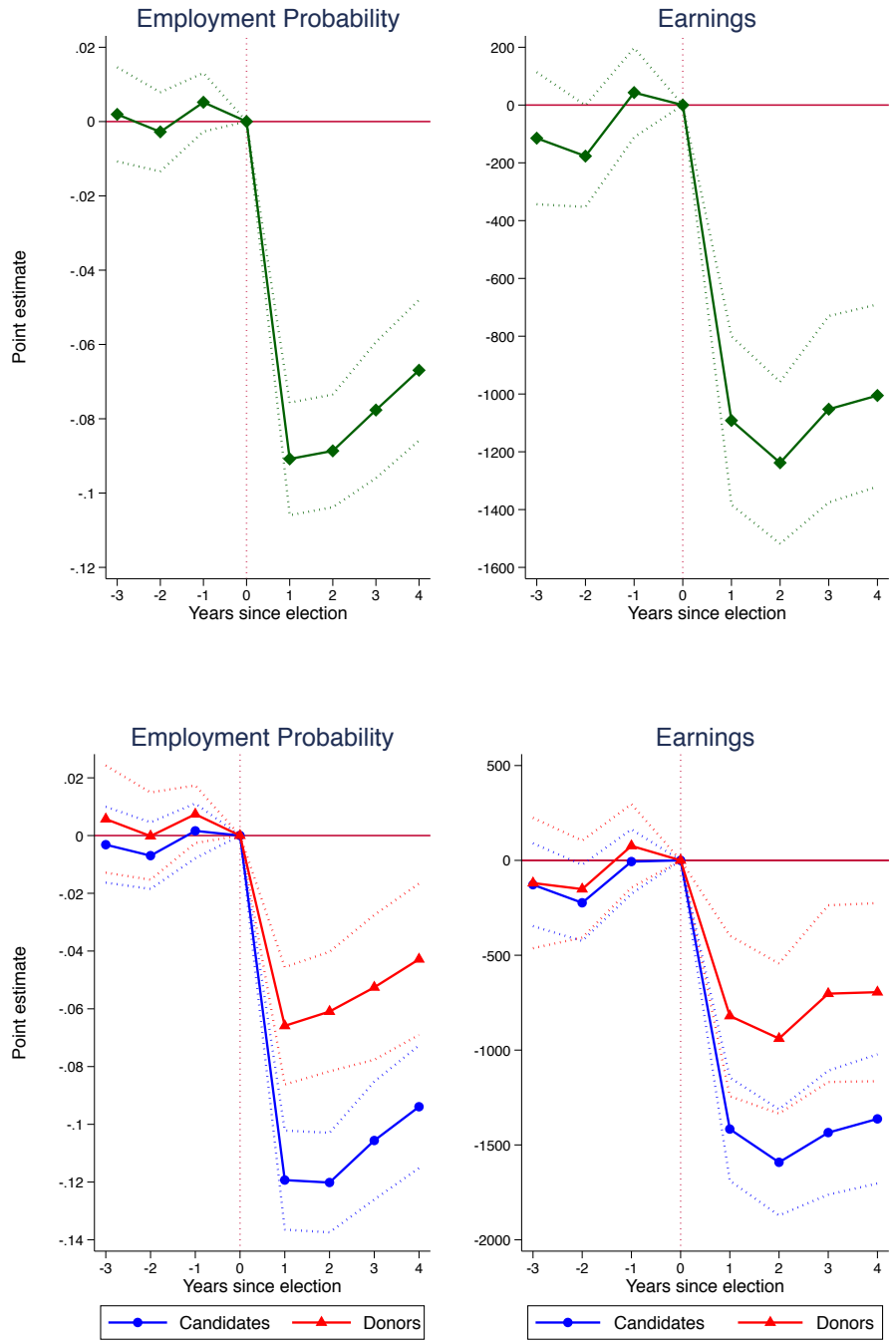
A. Candidates



B. Donors

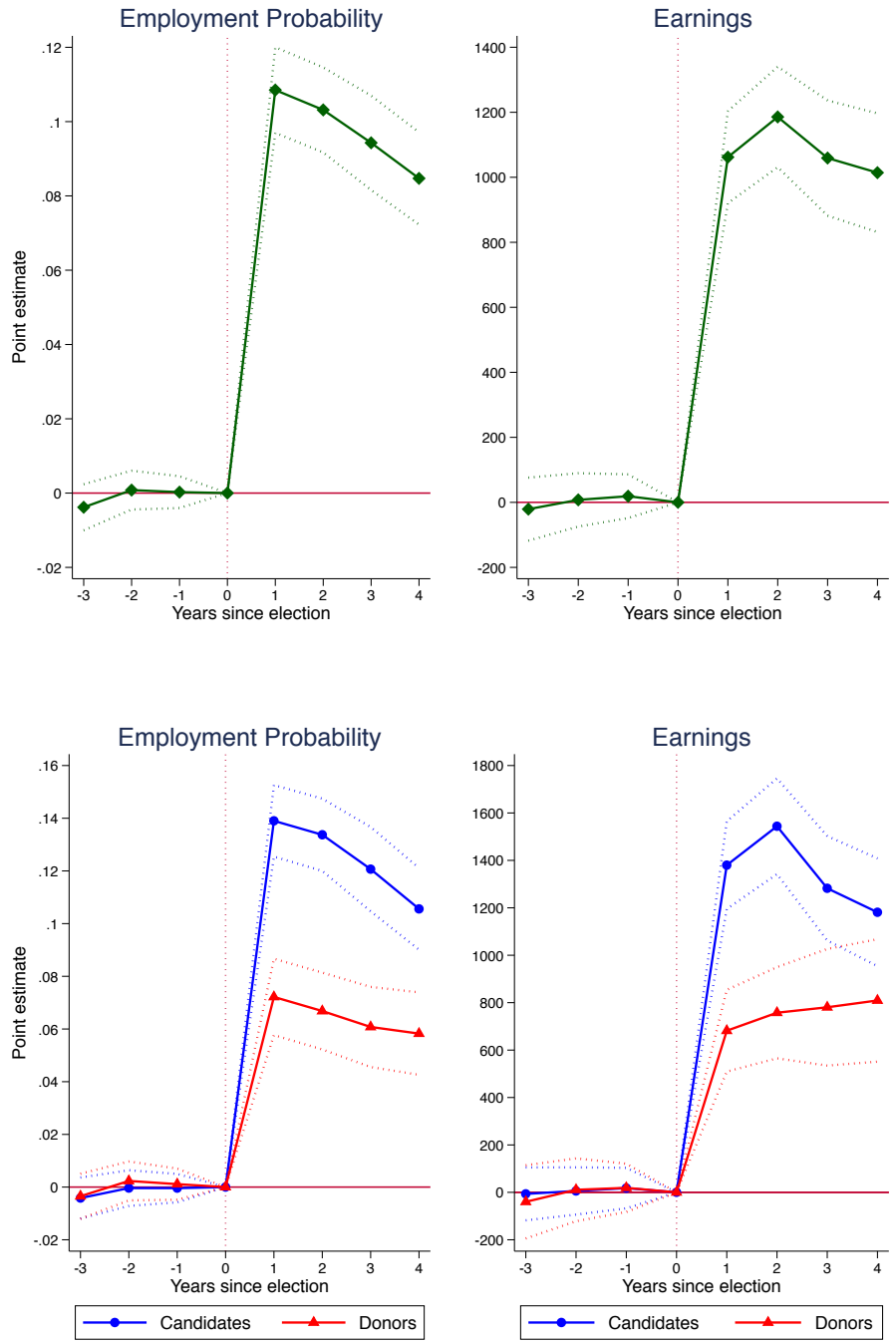
*Notes:* This figure shows the average difference in public sector employment probability in the 4 years after and before the election, by bins of the vote margin of the mayor supported over the runner-up. Supporters whose mayor lost have a negative margin of victory, while supporters supporting the winning mayor have a positive margin of victory. Panel A focuses on the sample of candidates, and Panel B focuses on the sample of donors. The sample of elections is 2000, 2004, 2008, 2012 for candidates and 2004, 2008, 2012 for donors.

FIGURE 6. Dynamic Patronage Effect on Public Sector Outcomes – Cross-Election Strategy, “Old Supporters”



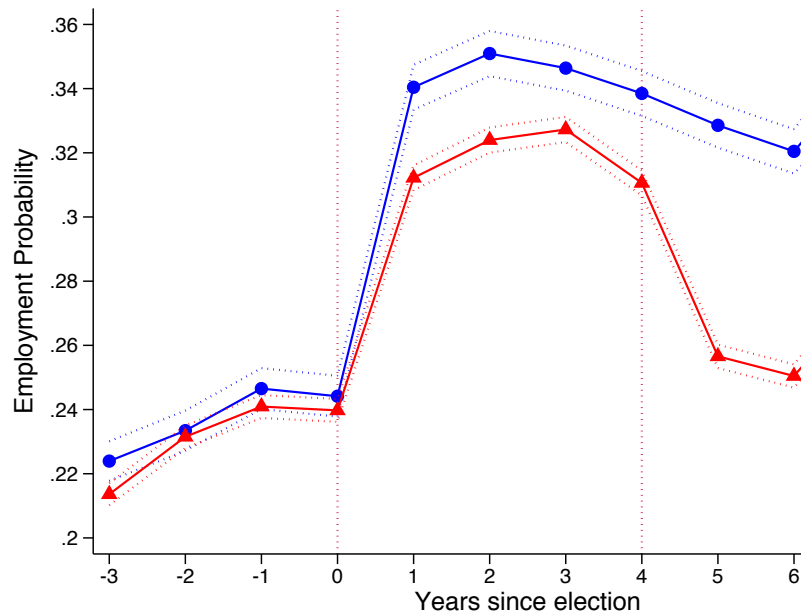
Notes: The figure presents the estimated  $\beta_t$  coefficients from equation (5.3) for probability of employment in the public sector (left) and annual public sector earnings (right). The top panel pools all the supporters together. The bottom panel present separate estimates for the sample of candidates (in blue) and of donors (in red). See section 3.3 for a description of the outcome variables. The sample of elections is 2004, 2008, 2012 for donors. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races, restricting the sample to the supporters who are supporting a party who was in the ruling coalition in the previous election cycle. The top panel includes 145,671 supporters. The bottom panel includes 65,998 candidates and 79,673 donors. The dotted lines show 95% confidence intervals and are based on standard errors double clustered at the candidate and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

FIGURE 7. Dynamic Patronage Effect on Public Sector Outcomes – Cross-Election Strategy, “New Supporters”



Notes: The figure presents the estimated  $\beta_t$  coefficients from equation (5.3) for probability of employment in the public sector (left) and annual public sector earnings (right). The top panel pools all the supporters together. The bottom panel present separate estimates for the sample of candidates (in blue) and of donors (in red). See section 3.3 for a description of the outcome variables. The sample of elections is 2004, 2008, 2012 for donors. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races, restricting the sample to the supporters who are supporting a party who was not in the ruling coalition in the previous election cycle. The top panel includes 228,023 supporters. The bottom panel includes 121,065 candidates and 106,958 donors. The dotted lines show 95% confidence intervals and are based on standard errors double clustered at the candidate and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

FIGURE 8. Public Sector Employment Probability Depends on Party Fortune



*Notes:* The figure shows the dynamics of public sector employment probability for the pool of supporters of a winning mayor who wins the election by a margin of victory of 5% or less at time 0. The sample is divided between those whose party maintains power in the municipality after the end of the four-years term (blue line), and those whose party fails to re-elect a mayor for the next term (red line). We define supporters of the winning party as the candidates belonging to the mayor's party (rather than the mayor's coalition) and the donors donating to the mayor's party (rather than to any party in the mayor's coalition). The sample of elections is 2000, 2004, 2008, 2012 for candidates and 2004, 2008, 2012 for donors. The dotted lines show 95% confidence intervals around the mean.

TABLE 1. Summary Statistics

	Candidates (694,273 obs.)			Donors (701,954 obs.)			Universe of Workers (87,528,336 obs.)		
<i>Panel A: Conditional on Being in RAIS</i>									
	Share			Share			Share		
Ever in Public Sector	69%			52%			19%		
Ever in Private Sector	62%			75%			91%		
<i>Panel B: Earnings Conditional on Employment</i>									
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Total Earnings	10,259	6,112	90,948	13,432	6,523	60,053	8,212	4,479	61,589
Public Sector Earnings	12,123	7,548	117,475	17,300	10,088	41,390	13,659	7,678	62,697
Private Sector Earnings	7,775	4,620	29,739	10,551	4,807	70,710	7,070	4,128	61,299
<i>Panel C: Among Public Servants</i>									
	Share			Share			Share		
Managerial	16%			18%			9.50%		
Professional	21.10%			27.60%			24.90%		
High Skilled Technical	16.50%			13.80%			20.20%		
Clerical	24%			26.80%			21.60%		
Blue Collar	22.50%			13.90%			23.80%		

*Notes:* The table provides summary statistics on probability of employment and earnings in the public and private sector for local candidates who are matched to RAIS, donors who are matched to RAIS, and the population of workers who enter the RAIS dataset during the 1997-2014 period and do not belong to the population of candidates or donors. Panel A shows the share of individuals in each category who is ever employed in the private or public sector during the 1997-2014 period. Panel B shows the annual earnings (in 2000 Brazilian Reals) in each sector conditional on employment. Panel C shows, for the subsample of individuals in each group who are employed in the public sector, the share that is employed in each of the 5 occupational categories.

TABLE 2. Unqualification in the Municipal Public Sector and in the Private Sector

	(1)	(2)	(3)	(4)	(5)
	All	Managerial	Professional	High Skilled Technical	Clerical
Public	0.013*** (0.000)	0.072*** (0.000)	-0.002*** (0.000)	0.007*** (0.000)	-0.001*** (0.000)
Observations	542,611,838	19,818,793	38,973,484	47,902,360	99,609,571
R-squared	0.104	0.122	0.163	0.140	0.054

*Notes:* The table shows the difference in the probability that a worker is unqualified in terms of education between jobs in the municipal public sector and jobs in the private sector. The dependent variable is a dummy equal to one if a worker is employed in a job for which she does not have the required educational level. Column 1 pools together all jobs. Columns 2-5 look separately at each of the five occupational categories indicated in the column. All regressions include controls for the worker's age and job tenure, municipality fixed effects, year fixed effects, and 43 occupation groups fixed effects. The sample includes all jobs in the Brazilian municipal public sector and private sector over the 2003-2014 period. Standard errors are shown in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**TABLE 3. Earnings Gap between the Municipal Public Sector and the Private Sector**

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Managerial	Professional	High Skilled Technical	Clerical	Blue Collar
Public	0.008*** (0.000)	0.119*** (0.001)	0.063*** (0.000)	0.094*** (0.000)	0.001*** (0.000)	0.043*** (0.000)
Observations	542,765,047	19,996,222	38,973,287	47,895,867	99,601,552	336,298,116
R-squared	0.445	0.258	0.303	0.296	0.277	0.329

*Notes:* The table shows the difference in earnings between jobs in the municipal public sector and jobs in the private sector. Column 1 pools together all jobs. Columns 2-5 look separately at each of the five occupational categories indicated in the column. The dependent variable is the log of annual earnings (in 2000 Brazilian Reals) and the variable is winsorized at the 1% level. All regressions include controls for the worker's job tenure, municipality fixed effects, year fixed effects, and 43 occupation groups fixed effects. The sample includes all jobs in the Brazilian municipal public sector and private sector over the 2003-2014 period. Standard errors are shown in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



TABLE 4. **Covariates Balance for Candidates – Within-election strategy**

(1) Covariate	(2) Coefficient	(3) Standard Error	(4) Observations	(5) Mean Cont. Group	(6) Supporters	(7) Elections
Earnings Public t=0	66.332	(77.019)	254,848	2613	233238	5413
Earnings Private t=0	21.740	(29.015)	254,848	794.3	233238	5413
Earnings Total t=0	69.593	(83.994)	254,848	3697	233238	5413
Employed Private t=0	-0.004	(0.003)	254,848	0.110	233238	5413
Employed Public t=0	0.008	(0.005)	254,848	0.260	233238	5413
Employed Any t=0	0.002	(0.005)	254,848	0.380	233238	5413
Employed Qualified t=0	0.004	(0.005)	191,805	0.22	178993	4154
Employed Unqualified t=0	0.003	(0.003)	191,805	0.0600	178993	4154
Earnings Public t=-1	95.992	(72.977)	254,848	2664	233238	5413
Earnings Private t=-1	34.461	(28.952)	254,848	816.5	233238	5413
Earnings Total t=-1	124.925	(78.411)	254,848	3778	233238	5413
Employed Private t=-1	-0.000	(0.003)	254,848	0.120	233238	5413
Employed Public t=-1	0.007	(0.005)	254,848	0.270	233238	5413
Employed Any t=-1	0.007	(0.005)	254,848	0.400	233238	5413
Employed Qualified t=-1	0.003	(0.005)	191,191	0.220	178466	4154
Employed Unqualified t=-1	0.003	(0.003)	191,191	0.0600	178466	4154
Earnings Public t=-2	148.589**	(68.660)	254,848	2548	233238	5413
Earnings Private t=-2	34.898	(29.868)	254,848	814.3	233238	5413
Earnings Total t=-2	194.677**	(76.231)	254,848	3655	233238	5413
Employed Private t=-2	-0.000	(0.003)	254,848	0.120	233238	5413
Employed Public t=-2	0.009*	(0.005)	254,848	0.260	233238	5413
Employed Any t=-2	0.009*	(0.005)	254,848	0.390	233238	5413
Employed Qualified t=-2	0.002	(0.006)	129,920	0.230	124793	2723
Employed Unqualified t=-2	0.001	(0.004)	129,920	0.0600	124793	2723
Earnings Public t=-3	114.260*	(62.912)	254,848	2345	233238	5413
Earnings Private t=-3	42.483	(29.846)	254,848	814.3	233238	5413
Earnings Total t=-3	162.969**	(70.123)	254,848	3442	233238	5413
Employed Private t=-3	0.001	(0.003)	254,848	0.120	233238	5413
Employed Public t=-3	0.008	(0.005)	254,848	0.250	233238	5413
Employed Any t=-3	0.009*	(0.005)	254,848	0.380	233238	5413
Employed Qualified t=-3	0.003	(0.006)	129,249	0.220	124255	2723
Employed Unqualified t=-3	-0.000	(0.004)	129,249	0.0600	124255	2723
Secondary School	-0.002	(0.004)	252,805	0.220	231500	5413
High School	-0.002	(0.005)	252,805	0.350	231500	5413
University Degree	0.008**	(0.003)	252,805	0.150	231500	5413
Age	0.075	(0.101)	254,676	43.44	233092	5411
Male	0.000	(0.003)	254,824	0.760	233216	5413
Run Past Election	-0.000	(0.005)	254,848	0.340	233238	5413
Incumbent	-0.002	(0.003)	254,848	0.130	233238	5413
Contributions received	98.115	(115.403)	194,252	2111	180895	4154
Contributions spent	94.133	(115.012)	194,252	2105	180895	4154

*Notes:* The table shows balance tests for candidates' covariates in the pre-election period. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2000, 2004, 2008, 2012, except for *Contributions received* and *Contributions spent* for which it is limited to the 2004, 2008 and 2012 elections. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 5. Covariates Balance for Donors – Within-election strategy

	Coefficient	Standard Error	Observations	Mean Cont. Group	Supporters	Elections
Earnings Public t=0	181.207	(217.002)	180,886	3211	177590	3162
Earnings Private t=0	-42.408	(79.622)	180,886	1481	177590	3162
Earnings Total t=0	-2.222	(261.809)	180,886	5344	177590	3162
Employed Private t=0	-0.001	(0.006)	180,886	0.190	177590	3162
Employed Public t=0	0.010	(0.011)	180,886	0.220	177590	3162
Employed Any t=0	0.009	(0.010)	180,886	0.420	177590	3162
Employed Qualified t=0	0.007	(0.010)	180,040	0.180	176783	3162
Employed Unqualified t=0	0.003	(0.003)	180,040	0.0400	176783	3162
Earnings Public t=-1	130.829	(201.875)	180,886	3013	177590	3162
Earnings Private t=-1	-117.652	(76.862)	180,886	1487	177590	3162
Earnings Total t=-1	-151.033	(245.673)	180,886	5116	177590	3162
Employed Private t=-1	-0.002	(0.006)	180,886	0.200	177590	3162
Employed Public t=-1	0.010	(0.011)	180,886	0.220	177590	3162
Employed Any t=-1	0.006	(0.010)	180,886	0.430	177590	3162
Employed Qualified t=-1	0.008	(0.009)	180,052	0.180	176800	3162
Employed Unqualified t=-1	0.001	(0.003)	180,052	0.0400	176800	3162
Earnings Public t=-2	226.096	(189.827)	180,886	2759	177590	3162
Earnings Private t=-2	-120.865	(75.494)	180,886	1431	177590	3162
Earnings Total t=-2	-14.190	(236.512)	180,886	4772	177590	3162
Employed Private t=-2	0.000	(0.006)	180,886	0.190	177590	3162
Employed Public t=-2	0.015	(0.010)	180,886	0.210	177590	3162
Employed Any t=-2	0.011	(0.009)	180,886	0.410	177590	3162
Employed Qualified t=-2	0.012	(0.009)	178,150	0.170	174984	3162
Employed Unqualified t=-2	0.001	(0.003)	178,150	0.0300	174984	3162
Earnings Public t=-3	193.280	(169.013)	180,886	2508	177590	3162
Earnings Private t=-3	-78.479	(74.002)	180,886	1367	177590	3162
Earnings Total t=-3	15.404	(213.831)	180,886	4428	177590	3162
Employed Private t=-3	0.001	(0.006)	180,886	0.190	177590	3162
Employed Public t=-3	0.011	(0.010)	180,886	0.200	177590	3162
Employed Any t=-3	0.012	(0.009)	180,886	0.400	177590	3162
Employed Qualified t=-3	0.007	(0.009)	157,368	0.160	155132	2393
Employed Unqualified t=-3	0.001	(0.003)	157,368	0.0300	155132	2393

*Notes:* The table shows balance tests for donors' covariates in the pre-election period. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2004, 2008 and 2012. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 6. Covariates Balance for Candidates – Across-election strategy, “new supporters” sample

(1) Covariate	(2) Coefficient	(3) Standard Error	(4) Observations	(5) Mean Cont. Group	(6) Supporters	(7) Elections
Earnings Public t=0	-14.677	(93.475)	126,392	2521	121065	4147
Earnings Private t=0	-55.009	(45.868)	126,392	875.1	121065	4147
Earnings Total t=0	-101.486	(119.361)	126,392	3687	121065	4147
Employed Private t=0	-0.009*	(0.005)	126,392	0.130	121065	4147
Employed Public t=0	0.012*	(0.007)	126,392	0.250	121065	4147
Employed Any t=0	0.001	(0.007)	126,392	0.390	121065	4147
Employed Qualified t=0	0.008	(0.006)	124,959	0.200	119827	4147
Employed Unqualified t=0	0.003	(0.003)	124,959	0.0500	119827	4147
Earnings Public t=-1	2.320	(91.284)	126,392	2572	121065	4147
Earnings Private t=-1	-51.769	(45.095)	126,392	885.3	121065	4147
Earnings Total t=-1	-80.692	(119.819)	126,392	3760	121065	4147
Employed Private t=-1	-0.005	(0.005)	126,392	0.130	121065	4147
Employed Public t=-1	0.011	(0.007)	126,392	0.260	121065	4147
Employed Any t=-1	0.005	(0.007)	126,392	0.410	121065	4147
Employed Qualified t=-1	0.007	(0.006)	124,580	0.200	119472	4147
Employed Unqualified t=-1	0.004	(0.003)	124,580	0.0500	119472	4147
Earnings Public t=-2	-8.908	(85.743)	126,392	2423	121065	4147
Earnings Private t=-2	-48.810	(44.530)	126,392	853.7	121065	4147
Earnings Total t=-2	-67.548	(113.751)	126,392	3555	121065	4147
Employed Private t=-2	-0.006	(0.005)	126,392	0.130	121065	4147
Employed Public t=-2	0.011*	(0.007)	126,392	0.260	121065	4147
Employed Any t=-2	0.007	(0.007)	126,392	0.400	121065	4147
Employed Qualified t=-2	0.006	(0.007)	82,212	0.210	80285	2717
Employed Unqualified t=-2	0.002	(0.004)	82,212	0.0500	80285	2717
Earnings Public t=-3	-21.378	(79.090)	126,392	2239	121065	4147
Earnings Private t=-3	-49.426	(44.548)	126,392	831.4	121065	4147
Earnings Total t=-3	-96.076	(105.274)	126,392	3346	121065	4147
Employed Private t=-3	-0.004	(0.005)	126,392	0.130	121065	4147
Employed Public t=-3	0.008	(0.006)	126,392	0.250	121065	4147
Employed Any t=-3	0.004	(0.006)	126,392	0.390	121065	4147
Employed Qualified t=-3	0.006	(0.007)	81,873	0.210	79998	2717
Employed Unqualified t=-3	0.000	(0.004)	81,873	0.0500	79998	2717
Secondary School	-0.009	(0.006)	125,852	0.210	120562	4146
High School	0.003	(0.007)	125,852	0.360	120562	4146
University Degree	0.005	(0.006)	125,852	0.150	120562	4146
Age	0.021	(0.163)	126,291	43.32	120969	4146
Male	0.002	(0.004)	126,391	0.750	121064	4147
Run Past Election	0.005	(0.007)	126,392	0.330	121065	4147
Incumbent	0.000	(0.005)	126,392	0.110	121065	4147
Contributions received	-38.405	(148.350)	126,392	1832	121065	4147
Contributions spent	-37.694	(149.639)	126,392	1825	121065	4147

*Notes:* The table shows balance tests for candidates’ covariates in the pre-election period, restricting the sample to the candidates who are supporting a party who was not in the ruling coalition in the previous election cycle. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including year of the election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2004, 2008, 2012. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 7. Covariates Balance for Candidates – Across-election strategy, “old supporters” sample

(1) Covariate	(2) Coefficient	(3) Standard Error	(4) Observations	(5) Mean Cont. Group	(6) Supporters	(7) Elections
Earnings Public t=0	37.452	(183.300)	67,899	3591	65998	3895
Earnings Private t=0	-39.653	(62.376)	67,899	769.9	65998	3895
Earnings Total t=0	45.278	(223.779)	67,899	4689	65998	3895
Employed Private t=0	0.001	(0.006)	67,899	0.110	65998	3895
Employed Public t=0	0.002	(0.010)	67,899	0.340	65998	3895
Employed Any t=0	0.005	(0.010)	67,899	0.450	65998	3895
Employed Qualified t=0	0.005	(0.009)	66,885	0.250	65069	3892
Employed Unqualified t=0	-0.003	(0.006)	66,885	0.0800	65069	3892
Earnings Public t=-1	30.551	(178.698)	67,899	3666	65998	3895
Earnings Private t=-1	-26.102	(61.594)	67,899	776.5	65998	3895
Earnings Total t=-1	33.459	(212.653)	67,899	4759	65998	3895
Employed Private t=-1	0.002	(0.006)	67,899	0.110	65998	3895
Employed Public t=-1	0.003	(0.010)	67,899	0.350	65998	3895
Employed Any t=-1	0.006	(0.010)	67,899	0.480	65998	3895
Employed Qualified t=-1	0.005	(0.009)	66,650	0.260	64843	3894
Employed Unqualified t=-1	-0.002	(0.006)	66,650	0.0800	64843	3894
Earnings Public t=-2	-186.522	(170.180)	67,899	3397	65998	3895
Earnings Private t=-2	-54.895	(58.460)	67,899	761.3	65998	3895
Earnings Total t=-2	-258.580	(208.665)	67,899	4453	65998	3895
Employed Private t=-2	0.001	(0.006)	67,899	0.120	65998	3895
Employed Public t=-2	-0.005	(0.010)	67,899	0.340	65998	3895
Employed Any t=-2	-0.003	(0.010)	67,899	0.460	65998	3895
Employed Qualified t=-2	0.002	(0.010)	47,747	0.260	46892	2592
Employed Unqualified t=-2	-0.005	(0.007)	47,747	0.0800	46892	2592
Earnings Public t=-3	-91.338	(159.645)	67,899	3156	65998	3895
Earnings Private t=-3	-25.936	(59.975)	67,899	768.1	65998	3895
Earnings Total t=-3	-110.456	(198.494)	67,899	4220	65998	3895
Employed Private t=-3	0.004	(0.006)	67,899	0.120	65998	3895
Employed Public t=-3	-0.002	(0.010)	67,899	0.330	65998	3895
Employed Any t=-3	0.004	(0.010)	67,899	0.450	65998	3895
Employed Qualified t=-3	0.002	(0.010)	47,415	0.250	46583	2593
Employed Unqualified t=-3	-0.005	(0.007)	47,415	0.0800	46583	2593
Secondary School	-0.017**	(0.008)	67,660	0.200	65773	3895
High School	0.015	(0.010)	67,660	0.370	65773	3895
University Degree	0.006	(0.009)	67,660	0.160	65773	3895
Age	0.076	(0.208)	67,859	44.04	65959	3893
Male	0.001	(0.005)	67,897	0.740	65996	3895
Run Past Elections	0.002	(0.010)	67,899	0.390	65998	3895
Incumbent	-0.002	(0.007)	67,899	0.150	65998	3895
Contributions received	-112.510	(303.592)	67,899	2620	65998	3895
Contributions spend	-99.469	(303.647)	67,899	2614	65998	3895

*Notes:* The table shows balance tests for candidates’ covariates in the pre-election period, restricting the sample to the candidates who are supporting a party who was in the ruling coalition in the previous election cycle. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including year of the election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2004, 2008, 2012. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 8. **Covariates Balance for Donors – Across-election strategy, “new supporters” sample**

(1) Covariate	(2) Coefficient	(3) Standard Error	(4) Observations	(5) Mean Cont. Group	(6) Supporters	(7) Elections
Earnings Public t=0	126.153	(228.991)	107,969	2641	106958	3658
Earnings Private t=0	-121.028	(150.918)	107,969	1460	106958	3658
Earnings Total t=0	-146.662	(390.550)	107,969	4736	106958	3658
Employed Private t=0	-0.003	(0.014)	107,969	0.190	106958	3658
Employed Public t=0	0.008	(0.013)	107,969	0.190	106958	3658
Employed Any t=0	0.007	(0.019)	107,969	0.390	106958	3658
Employed Qualified t=0	0.005	(0.011)	107,561	0.160	106558	3657
Employed Unqualified t=0	0.002	(0.003)	107,561	0.0300	106558	3657
Earnings Public t=-1	147.915	(221.441)	107,969	2512	106958	3658
Earnings Private t=-1	-118.409	(148.369)	107,969	1467	106958	3658
Earnings Total t=-1	-106.342	(378.602)	107,969	4581	106958	3658
Employed Private t=-1	0.001	(0.015)	107,969	0.200	106958	3658
Employed Public t=-1	0.009	(0.012)	107,969	0.190	106958	3658
Employed Any t=-1	0.010	(0.020)	107,969	0.400	106958	3658
Employed Qualified t=-1	0.009	(0.011)	107,565	0.160	106560	3658
Employed Unqualified t=-1	-0.001	(0.003)	107,565	0.0300	106560	3658
Earnings Public t=-2	139.039	(207.041)	107,969	2308	106958	3658
Earnings Private t=-2	-123.534	(143.990)	107,969	1416	106958	3658
Earnings Total t=-2	-99.276	(357.470)	107,969	4291	106958	3658
Employed Private t=-2	-0.003	(0.015)	107,969	0.190	106958	3658
Employed Public t=-2	0.010	(0.012)	107,969	0.180	106958	3658
Employed Any t=-2	0.008	(0.019)	107,969	0.380	106958	3658
Employed Qualified t=-2	0.012	(0.011)	92,123	0.140	91515	2568
Employed Unqualified t=-2	0.001	(0.003)	92,123	0.0300	91515	2568
Earnings Public t=-3	90.339	(195.471)	107,969	2098	106958	3658
Earnings Private t=-3	-65.830	(136.078)	107,969	1325	106958	3658
Earnings Total t=-3	-90.021	(339.786)	107,969	3960	106958	3658
Employed Private t=-3	0.002	(0.014)	107,969	0.190	106958	3658
Employed Public t=-3	0.005	(0.011)	107,969	0.170	106958	3658
Employed Any t=-3	0.006	(0.019)	107,969	0.370	106958	3658
Employed Qualified t=-3	0.008	(0.011)	92,115	0.140	91509	2568
Employed Unqualified t=-3	-0.001	(0.003)	92,115	0.0200	91509	2568

*Notes:* The table shows balance tests for donors’ covariates in the pre-election period, restricting the sample to the candidates who are supporting a party who was not in the ruling coalition in the previous election cycle. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2004, 2008 and 2012. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 9. **Covariates Balance for Donors – Across-election strategy, “old supporters” sample**

(1) Covariate	(2) Coefficient	(3) Standard Error	(4) Observations	(5) Mean Cont. Group	(6) Supporters	(7) Elections
Earnings Public t=0	-82.811	(553.091)	80,256	4022	79673	3142
Earnings Private t=0	215.427	(198.845)	80,256	1290	79673	3142
Earnings Total t=0	232.665	(685.195)	80,256	5898	79673	3142
Employed Private t=0	0.026	(0.020)	80,256	0.160	79673	3142
Employed Public t=0	-0.018	(0.024)	80,256	0.280	79673	3142
Employed Any t=0	0.006	(0.023)	80,256	0.450	79673	3142
Employed Qualified t=0	-0.007	(0.021)	79,768	0.230	79205	3136
Employed Unqualified t=0	-0.010	(0.007)	79,768	0.0500	79205	3136
Earnings Public t=-1	-3.725	(523.714)	80,256	3700	79673	3142
Earnings Private t=-1	295.324	(189.503)	80,256	1290	79673	3142
Earnings Total t=-1	419.898	(654.560)	80,256	5559	79673	3142
Employed Private t=-1	0.029	(0.019)	80,256	0.170	79673	3142
Employed Public t=-1	-0.011	(0.023)	80,256	0.270	79673	3142
Employed Any t=-1	0.019	(0.022)	80,256	0.450	79673	3142
Employed Qualified t=-1	-0.005	(0.020)	79,779	0.220	79217	3138
Employed Unqualified t=-1	-0.007	(0.007)	79,779	0.0400	79217	3138
Earnings Public t=-2	-235.087	(486.477)	80,256	3418	79673	3142
Earnings Private t=-2	294.819	(188.294)	80,256	1228	79673	3142
Earnings Total t=-2	142.026	(627.571)	80,256	5180	79673	3142
Employed Private t=-2	0.026	(0.020)	80,256	0.170	79673	3142
Employed Public t=-2	-0.019	(0.022)	80,256	0.260	79673	3142
Employed Any t=-2	0.012	(0.022)	80,256	0.440	79673	3142
Employed Qualified t=-2	0.003	(0.021)	68,764	0.200	68425	2325
Employed Unqualified t=-2	-0.007	(0.006)	68,764	0.0400	68425	2325
Earnings Public t=-3	-204.527	(433.279)	80,256	3043	79673	3142
Earnings Private t=-3	285.761	(191.605)	80,256	1179	79673	3142
Earnings Total t=-3	139.332	(580.872)	80,256	4729	79673	3142
Employed Private t=-3	0.029	(0.021)	80,256	0.160	79673	3142
Employed Public t=-3	-0.013	(0.020)	80,256	0.240	79673	3142
Employed Any t=-3	0.014	(0.022)	80,256	0.410	79673	3142
Employed Qualified t=-3	0.004	(0.019)	68,798	0.190	68462	2327
Employed Unqualified t=-3	-0.005	(0.006)	68,798	0.0400	68462	2327

*Notes:* The table shows balance tests for donors’ covariates in the pre-election period, restricting the sample to the candidates who are supporting a party who was in the ruling coalition in the previous election cycle. The coefficients and standard errors in columns 2 and 3 are from regressions of the covariate in column 1 on an indicator for treatment status (supporting the winning mayor), controlling for margin of victory and including election fixed effects, with standard errors clustered at the election level, and focusing on mayoral races deciding by a margin of victory of 5% or less. Column 5 includes the mean of the covariate in the control group, namely among supporters of the runner-up mayoral candidate. The sample of elections is 2004, 2008 and 2012. Robust standard errors are shown in parentheses and are clustered at the election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

TABLE 10. Patronage Effect on Public Sector Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Mayor×Post	0.094*** (0.004)	0.116*** (0.005)	0.057*** (0.006)	1,058.297*** (63.769)	1,273.597*** (69.636)	697.276*** (98.669)
Observations	3,221,262	1,887,280	1,274,376	3,221,262	1,887,280	1,274,376
R-squared	0.828	0.827	0.835	0.811	0.790	0.836
Mean D.V. Pre-election	0.240	0.260	0.210	2705	2558	2919
Supporters	418146	233238	177590	418146	233238	177590
Elections	5419	5413	3162	5419	5413	3162

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the public sector (columns 1-3) and public sector earnings (columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters. Results in columns (2) and (5) are estimated on the sample of candidates to the local council, and results in columns (3) and (6) are estimated on the sample of donors. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 2, 4, 6, and 2004, 2008, 2012 in columns 3, 5. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 11. Patronage Effect on Formal Sector Employment

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel A: Private Sector</b>						
	Employed Private			Earnings Private		
	All	Candidates	Donors	All	Candidates	Donors
Mayor $\times$ Post	-0.023*** (0.002)	-0.025*** (0.002)	-0.019*** (0.003)	-108.891*** (17.441)	-127.119*** (18.418)	-66.244* (34.822)
R-squared	0.737	0.720	0.757	0.801	0.779	0.821
Mean D.V. Pre-election	0.150	0.120	0.190	1052	818.3	1383
<b>Panel B: Formal Sector</b>						
	Employed Any			Earnings Total		
	All	Candidates	Donors	All	Candidates	Donors
Mayor $\times$ Post	0.065*** (0.004)	0.083*** (0.004)	0.035*** (0.006)	944.292*** (66.254)	1,154.270*** (71.576)	610.261*** (107.781)
R-squared	0.839	0.838	0.844	0.828	0.802	0.854
Mean D.V. Pre-election	0.400	0.390	0.410	4172	3669	4888
Observations	3,221,262	1,887,280	1,274,376	3,221,262	1,887,280	1,274,376
Supporters	418146	233238	177590	418146	233238	177590
Elections	5419	5413	3162	5419	5413	3162

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the private sector (Panel A, columns 1-3) and private sector earnings (Panel B, columns 4-6), overall employment probability in the formal sector (Panel B, columns 1-3) and total earnings in the formal sector (Panel B, columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters. Results in columns (2) and (5) are estimated on the sample of candidates to the local council, and results in columns (3) and (6) are estimated on the sample of donors. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 2, 4, 6, and 2004, 2008, 2012 in columns 3, 5. "Mean D.V. Pre-election" shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



TABLE 12. Patronage Effect By Public Actor Allocating Jobs

	(1)	(2)	(3)	(4)	(5)	(6)
	Municipal		State		Federal	
	Candidates	Donors	Candidates	Donors	Candidates	Donors
Mayor×Post	0.127*** (0.005)	0.069*** (0.007)	-0.011*** (0.001)	-0.012*** (0.002)	-0.001* (0.000)	0.000 (0.001)
Observations	1,887,280	1,274,376	1,887,280	1,274,376	1,887,280	1,274,376
R-squared	0.774	0.780	0.824	0.807	0.787	0.767
Mean D.V. Pre-election	0.180	0.140	0.0700	0.0600	0.0100	0.0100
Supporters	233238	177590	233238	177590	233238	177590
Elections	5413	3162	5413	3162	5413	3162

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the municipal public sector (columns 1-2) in the state public sector (columns 3-4) and in the federal public sector (columns 5-6). Results in columns 1, 3, and 5 are estimated on the sample of candidates to the local council, and results in columns 2, 4, and 6 are estimated on the sample of donors. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 3 and 5, and 2004, 2008, 2012 in columns 2, 4 and 6. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 13. **Patronage Effect on Public Sector Outcomes**  
– **Cross-Election Strategy**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel A: “New Supporters” Sample</b>						
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Winner×Post	0.101*** (0.005)	0.129*** (0.006)	0.066*** (0.006)	1,091.003*** (67.630)	1,374.516*** (86.191)	745.686*** (85.642)
Observations	1,695,266	920,524	774,742	1,695,266	920,524	774,742
R-squared	0.816	0.815	0.819	0.808	0.785	0.829
Mean D.V. Pre-election	0.220	0.260	0.180	2458	2457	2460
Supporters	228023	121065	106958	228023	121065	106958
Elections	4154	4147	3660	4154	4147	3660
<b>Panel B: “Old Supporters” Sample</b>						
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Loser×Post	-0.086*** (0.007)	-0.111*** (0.008)	-0.062*** (0.009)	-1,061.254*** (113.503)	-1,381.121*** (113.561)	-778.657*** (163.420)
Observations	1,041,572	482,222	559,350	1,041,572	482,222	559,350
R-squared	0.834	0.828	0.841	0.812	0.782	0.833
Mean D.V. Pre-election	0.290	0.340	0.260	3467	3425	3503
Supporters	145671	65998	79673	145671	65998	79673
Elections	3911	3895	3144	3911	3895	3144

*Notes:* The table presents the estimated effects of supporting the mayor who wins (Panel A) or loses (Panel B) from a parsimonious version of equations (5.3) and (5.4), as in equation (5.2). The dependent variable is employment probability in the public sector (columns 1-3) and public sector earnings (columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters. Results in columns (2) and (5) are estimated on the sample of candidates to the local council, and results in columns (3) and (6) are estimated on the sample of donors. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2004, 2008, 2012. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 14. **Patronage Effect Across the Public Sector Hierarchy**

	(1)	(2)	(3)	(4)	(5)
	Managerial	Professional	High Skilled Technical	Clerical	Blue Collar
<b>Panel A: All Supporters</b>					
Mayor×Post	0.046*** (0.004)	0.004*** (0.002)	0.006*** (0.001)	0.030*** (0.003)	0.012*** (0.002)
Observations	2,496,864	2,496,864	2,496,864	2,496,864	2,496,864
R-squared	0.582	0.763	0.731	0.659	0.778
Mean D.V. Pre-election	0.0400	0.0600	0.0400	0.0600	0.0500
Supporters	357866	357866	357866	357866	357866
Elections	4160	4160	4160	4160	4160
<b>Panel B: Candidates</b>					
Mayor×Post	0.067*** (0.005)	0.005*** (0.002)	0.006*** (0.002)	0.041*** (0.004)	0.015*** (0.002)
Observations	1,224,736	1,224,736	1,224,736	1,224,736	1,224,736
R-squared	0.566	0.768	0.748	0.663	0.804
Mean D.V. Pre-election	0.0400	0.0600	0.0500	0.0700	0.0700
Supporters	174346	174346	174346	174346	174346
Elections	4143	4143	4143	4143	4143
<b>Panel C: Donors</b>					
Mayor×Post	0.023*** (0.004)	0.004 (0.002)	0.005** (0.002)	0.018*** (0.003)	0.008*** (0.002)
Observations	1,220,296	1,220,296	1,220,296	1,220,296	1,220,296
R-squared	0.594	0.738	0.694	0.641	0.718
Mean D.V. Pre-election	0.0400	0.0600	0.0300	0.0500	0.0300
Supporters	176219	176219	176219	176219	176219
Elections	3157	3157	3157	3157	3157

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) using as dependent variables employment probabilities in the five occupational categories of the public sector. Results in Panel A includes all supporters. Results in Panel B includes only candidates to the local council. Results in Panel C includes only donors. The dependent variables are indicators equal to one if the supporter is employed in the specific occupational category in the public sector. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2004, 2008, 2012. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 15. Patronage Effect Across the Earnings Distribution

	(1) Quintile 1	(2) Quintile 2	(3) Quintile 3	(4) Quintile 4	(5) Quintile 5
<b>Panel A: All Supporters</b>					
Mayor×Post	0.009*** (0.001)	0.016*** (0.002)	0.020*** (0.002)	0.029*** (0.002)	0.020*** (0.002)
Observations	3,153,710	3,153,710	3,153,710	3,153,710	3,153,710
R-squared	0.554	0.509	0.535	0.489	0.551
Mean D.V. Pre-election	0.0300	0.0500	0.0700	0.0500	0.0300
Supporters	409876	409876	409876	409876	409876
Elections	5419	5419	5419	5419	5419
<b>Panel B: Candidates</b>					
Mayor×Post	0.010*** (0.001)	0.018*** (0.002)	0.029*** (0.003)	0.035*** (0.003)	0.023*** (0.002)
Observations	1,840,950	1,840,950	1,840,950	1,840,950	1,840,950
R-squared	0.568	0.519	0.539	0.478	0.508
Mean D.V. Pre-election	0.0300	0.0600	0.0700	0.0500	0.0300
Supporters	227814	227814	227814	227814	227814
Elections	5413	5413	5413	5413	5413
<b>Panel C: Donors</b>					
Mayor×Post	0.007*** (0.002)	0.011*** (0.003)	0.004 (0.003)	0.017*** (0.003)	0.017*** (0.003)
Observations	1,253,294	1,253,294	1,253,294	1,253,294	1,253,294
R-squared	0.539	0.507	0.544	0.523	0.623
Mean D.V. Pre-election	0.0200	0.0400	0.0600	0.0500	0.0400
Supporters	174755	174755	174755	174755	174755
Elections	3146	3146	3146	3146	3146

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) using as dependent variables employment probabilities in a public sector occupation that falls into a specific quintile of the public sector wage distribution in the supporter's municipality in that year. Results in Panel A includes all supporters. Results in Panel B includes only candidates to the local council. Results in Panel C includes only donors. The dependent variables are indicators equal to one if the supporter is employed in a public sector occupation that falls into a specific quintile of the public sector wage distribution in the supporter's municipality in that year. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in Panel A and Panel B, and 2004, 2008, 2012 in Panel C. "Mean D.V. Pre-election" shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 16. **Patronage Effect and Heterogeneity in Amount of Support**

	(1) Supporters Vote Share	(2) Supporters Money Spent	(3) Donors Money Donated
Mayor×Post	0.088*** (0.006)	0.127*** (0.008)	0.045*** (0.007)
Mayor×Post×Quintile 2	0.029*** (0.004)	0.021*** (0.006)	0.009* (0.005)
Mayor×Post×Quintile 3	0.050*** (0.004)	0.020*** (0.006)	0.016*** (0.005)
Mayor×Post×Quintile 4	0.062*** (0.004)	0.038*** (0.006)	0.017*** (0.005)
Mayor×Post×Quintile 5	0.089*** (0.005)	0.045*** (0.006)	0.021*** (0.006)
Observations	1,537,092	1,146,220	1,274,376
R-squared	0.832	0.834	0.835
Mean D.V. Pre-election	0.250	0.280	0.210
Supporters	196802	152141	177590
Elections	5412	4154	3162

*Notes:* The table presents the estimated coefficients  $\beta^{Aq}$  from equation (6.1). We report the heterogeneous patronage effect for different quintiles of the vote share distribution (column 1) or the distribution of amount of money spent by candidates in the campaign (column 2) or the distribution of amount of money contributed by donors (column 3). The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample in columns 1 and 2 include candidates to the local council. The sample in column 3 includes donors. The sample of elections is 2000, 2004, 2008, 2012 in columns 1 and 2, and 2004, 2008, 2012 in column 3. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

TABLE 17. Patronage and Supporters' Qualifications

	(1)	(2)	(3)
=1 if has a job that requires:	Secondary School	High School	College Degree
Mayor×Qualified×Post	-0.008*** (0.002)	-0.003 (0.003)	-0.019*** (0.005)
Mayor×Post	0.014*** (0.002)	0.050*** (0.004)	0.068*** (0.005)
Qualified×Post	0.005*** (0.001)	-0.005*** (0.002)	0.004 (0.003)
Observations	1,211,316	1,211,316	1,211,316
R-squared	0.749	0.717	0.756
Mean D.V. Pre-election	0.0400	0.100	0.110
Supporters	172647	172647	172647
Elections	4153	4153	4153

*Notes:* The table presents estimates from equation (7.1). The dependent variable is an indicator equal to one if the supporter is employed in a public sector occupation for which the required level of education is secondary school degree (column 1), high school degree (column 2), or college degree (column 3) respectively. The sample includes all candidates in the 2004, 2008 and 2012 elections, restricting the sample of elections to those decided by a margin of victory of 5% or less. The variable *Qualified* is a dummy equal to one if the candidate has an educational level that makes her qualified for the job. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## APPENDIX A. ADDITIONAL TABLES

TABLE A.1. Local Public Sector Turnover is Higher in Years Following an Election

	(1)	(2)	(3)	(4)	(5)	(6)
	Share Hires	Share Hires	Share Terminations	Share Terminations	Difference	Difference
Election	8.384*** (0.140)	8.583*** (0.143)	5.018*** (0.119)	4.897*** (0.121)	3.198*** (0.137)	3.542*** (0.142)
Observations	87,018	87,018	86,570	86,570	86,570	86,570
R-squared	0.214	0.691	0.188	0.609	0.039	0.190
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality Trends	No	Yes	No	Yes	No	Yes
Mean D.V. Off Election	16.86	16.86	12.15	12.15	4.350	4.350
Municipalities	5569	5569	5569	5569	5569	5569

*Notes:* The table presents the estimated coefficient of an indicator equal to one in years after a municipal election (2001, 2005, 2009, 2013). The dependent variable is the share of new hires (columns 1-2) and terminations (3-4) in the local public sector in the municipality-year. The dependent variable in columns 5 and 6 is the difference between the share of new hires and the share of terminations. Each observation in the data is a municipality-year pair. All columns include municipality fixed effects. Municipality-specific time trends are included in even columns. Local elections were held in November of 2000, 2004, 2008, 2012, with the mayor taking office in January of 2001, 2005, 2009, 2013. Robust standard errors are shown in parentheses and are clustered at the municipality level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

TABLE A.2. Patronage Effect - Winning versus Losing Candidates

	(1)	(2)	(3)	(4)
	Employed Public		Earnings Public	
	Winners	Losers	Winners	Losers
Mayor×Post	0.023*** (0.006)	0.137*** (0.006)	541.082*** (104.591)	1,440.845*** (76.117)
Observations	346,646	1,537,092	346,646	1,537,092
R-squared	0.861	0.832	0.819	0.802
Mean D.V. Pre-election	0.290	0.250	3246	2400
Supporters	41841	196802	41841	196802
Elections	5322	5412	5322	5412

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the public sector (columns 1-2) and public sector earnings (columns 3-4). Results in columns (1) and (3) are estimated on the sample of candidates to the council who won a seat in the council. Results in columns (2) and (4) are estimated on the sample of candidates to the council who did not win a seat. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**TABLE A.3. Patronage Effect on Public Sector Outcomes For Supporters Who Are Not Public Servants at the Time of the Election**

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Mayor×Post	0.099*** (0.004)	0.127*** (0.005)	0.051*** (0.005)	919.162*** (48.190)	1,201.544*** (62.387)	479.210*** (65.568)
Observations	2,441,324	1,407,608	979,530	2,441,324	1,407,608	979,530
R-squared	0.499	0.526	0.469	0.454	0.470	0.454
Supporters	319490	175692	137016	319490	175692	137016
Elections	5417	5411	3010	5417	5411	3010

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the public sector (columns 1-3) and public sector earnings (columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters who are *not* already employed in the public sector at the time of the election. Results in columns (2) and (5) are estimated on the sample of candidates to the local council who are *not* already employed in the public sector at the time of the election, and results in columns (3) and (6) are estimated on the sample of donors who are *not* already employed in the public sector at the time of the election. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 5% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 2, 4, 6, and 2004, 2008, 2012 in columns 3, 5. Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**TABLE A.4. Patronage Effect on Public Sector Outcomes 3% Margin of Victory Bandwidth**

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Mayor×Post	0.095*** (0.006)	0.114*** (0.006)	0.062*** (0.008)	1,096.766*** (80.219)	1,259.494*** (91.004)	856.709*** (122.868)
Observations	1,880,714	1,123,150	723,084	1,880,714	1,123,150	723,084
R-squared	0.827	0.827	0.835	0.810	0.788	0.837
Mean D.V. Pre-election	0.240	0.260	0.210	2624	2494	2813
Supporters	249928	143897	101685	249928	143897	101685
Elections	3288	3283	1906	3288	3283	1906

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the public sector (columns 1-3) and public sector earnings (columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters. Results in columns (2) and (5) are estimated on the sample of candidates to the local council, and results in columns (3) and (6) are estimated on the sample of donors. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 3% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 2, 4, 6, and 2004, 2008, 2012 in columns 3, 5. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



**TABLE A.5. Patronage Effect on Public Sector Outcomes  
1% Margin of Victory Bandwidth**

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed Public			Earnings Public		
	All	Candidates	Donors	All	Candidates	Donors
Mayor×Post	0.098*** (0.011)	0.114*** (0.013)	0.069*** (0.015)	1,015.179*** (140.160)	1,123.880*** (175.880)	844.625*** (207.218)
Observations	605,260	371,334	221,106	605,260	371,334	221,106
R-squared	0.827	0.826	0.834	0.812	0.785	0.846
Mean D.V. Pre-election	0.240	0.250	0.210	2654	2461	2989
Supporters	81798	49089	31063	81798	49089	31063
Elections	1092	1091	622	1092	1091	622

*Notes:* The table presents the estimated coefficients of  $\beta^{Post}$  from equation (5.2) for employment probability in the public sector (columns 1-3) and public sector earnings (columns 4-6). Results in columns (1) and (4) are estimated on the sample of all supporters. Results in columns (2) and (5) are estimated on the sample of candidates to the local council, and results in columns (3) and (6) are estimated on the sample of donors. See section 3.3 for a description of the outcome variables. The sample is composed of supporters of the winning mayoral candidate or the close loser, using a 1% margin of victory to define close races. The sample of elections is 2000, 2004, 2008, 2012 in columns 1, 2, 4, 6, and 2004, 2008, 2012 in columns 3, 5. “Mean D.V. Pre-election” shows the average of the dependent variable in the four periods from  $t = -3$  to  $t = 0$ . Robust standard errors are shown in parentheses and are double clustered at the supporter and election level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .